

**ATTITUDES, RISKS AND NORMS:
UNDERSTANDING PARENTS' MEASLES-
MUMPS-RUBELLA (MMR)
IMMUNISATION DECISION-MAKING**

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ABSTRACT

Since Wakefield, Murch, Anthony, Linnell, Casson, Malik, Berelowitz, Dhillon, Thomson, Harvey, Valentine, Davies and Walker-Smith's (1998) proposed a causal link between the MMR vaccine and autism and Crohn's disease (a form of irritable bowel disease: IBD), vaccine uptake rates gradually declined in the UK. Parents of young children began to question the safety of MMR immunisation and were required to assess the risks and benefits of MMR immunisation during their decision-making process. The studies in the present thesis aimed to investigate factors influencing parents' risk assessment, MMR intentions and behaviour to gain an understanding of parents' decision-making process. A mixed method approach was taken, using both quantitative and qualitative methods. Four studies involving parents of young children and students were carried out in Scotland.

The first study was a cross-sectional questionnaire-based study which used Protection Motivation Theory (PMT) and Subjective Norm (SN) to understand parents' MMR immunisation intentions and behaviour for first dose and second dose MMR vaccine. The results suggest PMT was a useful psychometric risk model when examining first-dose and second-dose MMR immunisation and associated risks. The inclusion of SN in the model increased its overall robustness. Differences between immunising parents and non-immunising parents were identified. Immunisers perceived measles, mumps and rubella to be severe diseases and reported greater susceptibility and fear in relation to the diseases, whereas non-immunisers reported more concern about the associated risks of autism and IBD. Additionally, immunisers were more likely to follow the advice of health professionals (GP and health visitor) and reported them to be important sources of

information, whereas non-immunisers were less likely to follow advice from health professionals and reported the media and internet to be important sources of information.

The second study used a similar methodology to the first study but used PMT and SN to investigate MMR immunisation decision-making in a sample of 90 previously non-immunised university students during a mumps outbreak on campus. PMT and SN were found to be important constructs when understanding the students' immunisation behaviour. In comparison with non-immunising students, immunising students reported greater fear, severity and perceived risks of the vaccine-preventable diseases. Non-immunisers perceived greater external barriers to immunisation and anxiety about immunisation to be an internal barrier. Both groups valued the information provided by health professionals and were more likely to follow the advice from these referents than any other referent group.

Comparisons were made between the results of the first two studies. The findings indicate PMT, including SN, was a useful model when examining the MMR decision-making process for immunisers and non-immunisers in different population groups. Parents and students reported similar threat appraisals in relation to the vaccine-preventable diseases, but were different in their coping responses (response efficacy and self-efficacy). Many similar patterns between students and parents were illustrated, but parents reported stronger beliefs related to their parental role. The results indicate that MMR decision-making differs depending on the population under study.

The third study used 5 focus groups and thematic analysis to explore the role of subjective norm (SN) and other social norms in greater depth with immunising parents. The findings indicate that social norms play a central role in the decision-making process, in addition to SN. Social normative factors which were found to contribute to the decision process included: group identification and norms, SN, descriptive norms, private self, relational self, and moral norms. The 'private self', i.e. own personal identity as 'parents', and feelings of moral obligation to their child were perceived as important social norms during the MMR decision. Parents were willing to listen to the advice of significant others but perceived their 'private self' as playing a more active role during the decision process. Experience of other parents' MMR behaviour (descriptive norm) contributed to the risk assessment of the MMR vaccine and increased confidence in their own decision when congruent. The dual role of health professionals (who were also parents) as a 'medical professional' and as a 'parent' was influential during the decision process.

The final study further investigated the influence of health professionals (HPs) on parents' MMR decision-making. The role of interpersonal and generalised trust was explored using one-to-one interviews with 6 MMR immunisers, 3 non-immunisers and 8 immunisers with single vaccines. All groups of parents reported generalised mistrust in the Government based on the provision of biased information and past experiences of Government behaviour. Parents who opted for the MMR vaccines described interpersonal trust with their own HPs, where HPs were willing to openly discuss concerns relating to the MMR vaccine. Parents opting for the single vaccines or refusing all vaccines tended to report mixed experiences with their HPs, with some parents citing them as unhelpful and unwilling to discuss MMR

concerns. Greater trust was illustrated by all parents, regardless of immunisation status, for their own health professionals and the NHS than for private clinics offering the single vaccines. Parents opting for the single vaccines perceived them to be safer (in terms of autism and IBD) than the MMR vaccine but questioned their credibility.

The four studies illustrate that PMT facilitates understanding of parents' MMR decision making and behaviour, and highlights the importance of including social norms (as well as important sources of information) and trust in future MMR immunisation research. Furthermore, comparisons with parents and students illustrate differences in coping appraisal between the two groups and suggest risk assessment differs depending on the saliency of the risk for the population group.

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Chapter 1

MMR Immunisation

1.1 Introduction

“Immunisation is both a public and private good”

(Petts & Niemeyer, 2004)

In 1988 the triple measles, mumps and rubella (MMR) vaccine was introduced in the UK for children aged 12-15 months with a follow-up second dose at 3-5 years (NHS Choices, 2009). However, the vaccine has been surrounded by controversy since 1998 when Wakefield and colleagues (Wakefield, Murch, Anthony, Linnell, Casson, Malik, Berelowitz, Dhillon, Thomson, Harvey, Valentine, Davies and Walker-Smith, 1998) hypothesised a possible causal link between the vaccine and autism and Crohn’s disease (a form of IBD: inflammatory bowel disease). Since then, UK Government bodies, medical professionals, scientists, and majority of the authors on the original paper have refuted the article, maintaining the vaccine’s safety (e.g. Peltola, Patja, Leinikki, Valle et al, 1998; Medicines Control Agency, 1999; Taylor, Miller, Farrington, Petropoulos et al, 1999; Madsen, Hviid, Vestergaard, Schendel et al, 2002; Smeeth, Cook, Fombonne, Heavey et al, 2004; Honda, Shimizu and Rutter, 2005; DeStefano, 2007; Baird, Pickles, Simonoff, Charman et al, 2008; Mrozek-Budzyn, Kiełtyka and Majewska, 2010). In 2010 the article was retracted by the Lancet. Additionally, the General Medical Council ruled that Wakefield had acted unethically and he was struck off the medical register. However, it took 12 years for the MMR vaccine to be cleared from its association with autism and bowel disease, and during this time period uptake rates declined and measles and mumps outbreaks were reported.

1.2 The MMR Vaccine

Childhood vaccination and immunisation¹ is important for disease control and prevention of childhood diseases, and is considered one of the most effective public health interventions in the world (Andre, Booy, Bock, Clemes, Datta, John, Lee, Lolekha, Peltola, Ruff, Santosham and Ruff, 2008; Health Protection Agency, 2009a). According to Poland, Murray and Bonilla-Guerro (2002), mass immunisation is one of the most outstanding achievements of modern medicine. The triple MMR vaccine was introduced in the UK in 1988 to protect children against measles, mumps and rubella (also referred to as German measles). The vaccine triggers the immune system to produce antibodies against measles, mumps and rubella, and thus providing immunity to the diseases (NHS Choices, 2009). All three vaccine-preventable diseases are serious and can result in morbidity and possible mortality from measles (see Table 1.1 for a summary of the consequences of the disease).

The first dose of the vaccine is offered to children aged between 12 and 15 months, and a second dose is given prior to starting school (between the ages of 3 and 5 years) (NHS Choices, 2009). The first MMR dose produces good immunity to the diseases – measles (97% immunity), mumps (97% immunity) and rubella (95% immunity), and the second dose provides further immunity to all three diseases (99.7%) (Immunization Action Coalition, 2009; National Network for Immunization Information, 2010). In order for ‘virtual’ elimination of measles,

¹ The terms ‘vaccination’ and ‘immunisation’ are used interchangeably but they differ in meaning: ‘vaccination’ refers to having the actual vaccine, and ‘immunisation’ refers to both receiving the vaccine and becoming immune to the diseases (Department of Health and Aging, Australian Government, 2010). In the present research, the term ‘immunisation’ will be used.

mumps and rubella to be achieved there needs to be a 95% vaccine uptake rate for both first MMR vaccine and second dose vaccine (Pareek and Pattison, 2000).

Table 1.1: Vaccine-Preventable Diseases and Complications

Disease	Possible Complications for Children
<i>Measles</i>	Pneumonia, ear and eye infections, convulsions, croup (infection of the lungs and throat), and encephalitis (inflammation of the brain). Can result in mortality.
<i>Mumps</i>	Swelling of the testes in males and ovaries in females, hearing loss, meningitis, inflammation of pancreas, and encephalitis (inflammation of the brain).
<i>Rubella</i>	Harmful in pregnant women – can cause miscarriage, or possible eye problems (e.g. blindness), deafness, brain damage and heart abnormalities in the baby

(Department of Health, 2003)

1.3 Medical Evidence

Definition of autism:

“Autism is a complex developmental disability that typically appears during the first three years of life and is the result of a neurological disorder that affects the normal functioning of the brain, impacting development in the areas of social interaction and communication skills. Both children and adults with autism typically show difficulties in verbal and non-verbal communication, social interactions, and leisure or play activities.”

(Autism Society of America, ASA)

Autism affects every individual differently, hence it is known as a spectrum disorder. Some individuals will require full-time care, and parents are often viewed as the primary carer for life (Autistica, 2010). It has been reported that parents with autistic children experience high levels of stress (Freeman, Perry and Factor, 1991; Szatmari, Archer, Fisman and Steiner, 1994; Kasari and Sigman, 1997; Hastings and Johnson, 2001; Lecavalier, Leon and Wiltz, 2006), and this stress is illustrated to be greater for parents with autistic children in comparison to children with other disabilities (Dumas, Wolf, Fisman and Culligan, 1991).

Definition of Crohn's disease

"A chronic inflammatory bowel disease (IBD), resulting in swelling and dysfunction of the intestinal tract."

(Medical Dictionary Online)

Crohn's disease is a form of inflammatory bowel disease which can affect any part of the digestive system and all layers of the lining of the bowel can become inflamed (National Association of Colitis and Crohn's disease, 2010). Symptoms include abdominal pain, weight loss, diarrhoea (often with blood or mucus) and fatigue. Although patients with Crohn's disease can learn to manage their condition, the condition can impact on their health-related quality of life (physical and mental), result in unemployment or work absenteeism, and result in frequent hospitalisation to prevent, control and manage complications associated with the condition (Binder, Hendriksen and Kreiner, 1985; Mayberry, Probert, Srivastava,

Rhodes and Mayberry, 1992; Casellas, Lopez-Vovancos, Vergara and Malagelada, 1999; Lichtenstein, Yan, Bala and Hanauer, 2004).

Prior to his controversial research being published in 1998, Wakefield and colleagues (Thompson, Montgomery, Pounder and Wakefield, 1995) previously conducted research which suggested that children given the measles virus-containing vaccine had a risk of developing Crohn's disease and ulcerative colitis. This was soon followed by Wakefield et al (1998) who conducted research with 12 children to understand the association between behavioural problems (regressive developmental disorder) and enterocolitis (inflammation of the colon and small intestine). Among eight of the children, the onset of behavioural problems were linked to the MMR vaccine by either the parents or child's physician. After a series of gastroenterological, neurological and developmental assessments, the researchers associated the intestinal abnormalities with developmental autistic regression. There followed a public health scare and a decline in MMR uptake rates.

1.4 Research Refuting Wakefield and Colleagues

Since Wakefield et al's 1998 proposed link between the vaccine and autism and Crohn's disease, there has been very little research supporting the claim. The majority of the research supporting the claim has come from Wakefield's own group (including some of the original authors). For example, Uhlmann, Martin, Sheils, Pilkington, Silva, Killalea, Murch, Walker-Smith, Thomson, Wakefield and O'Leary (2002) examined the intestines of children with IBD and a developmental disorder for the presence of the measles virus. They collected samples from the

terminal ileum of 91 children with ileal lymphonodular hyperplasia and 70 controls not affected by the disease. They found that amongst the 91 affected children, 75 had evidence of the measles virus, whereas this was true for only 5 of the 70 controls. The authors concluded that there was a positive correlation between developmental disorders with accompanying gastrointestinal symptoms and the measles virus in children.

However, there has been widespread research conducted to refute Wakefield et al's claim and alternative explanations provided for the increase in autism cases. Over 40 years ago it was estimated that the incidence of autism spectrum disorders was 4 per 10,000 population, but now it is approximated to range from 30 to 60 cases per 10,000 population (Centers for Disease Control and Prevention, 2008). Nevertheless, this was not considered to be related to the MMR vaccine but instead to the broadening of the diagnostic concept of autism (Hirtz, 2000). The Cochrane Library also published a review of the studies which examined the MMR and autism link (Demicheli, Jefferson, Rivettie and Price, 2005); a meta-analysis was conducted with 31 medical studies, excluding small studies and studies with potential for bias (this exclusion also included Wakefield et al' 1998 study due to the sample size), and the findings refuted Wakefield et al's proposed link and instead the majority of research provided support for the continual use of the MMR vaccine.

Much epidemiological and clinical research (including case-control and time-trend studies) was conducted to investigate the links between the MMR vaccine and autism and/or IBD, and majority found no correlation (Peltola et al, 1998; Taylor et al, 1999; Dales, Hammer and Smith, 2001; Davis, Karamarz, Bohlke, Benson,

Thompson, Mullooly, Black, Shinefield, Lewis, Ward, Marcy, Eriksen, Destefano and Chen, 2001; Fombonne and Chakrabarti, 2001; Kaye, del Mor Melero-Montes and Jick, 2001; Madsen, Hviid, Vestergaard et al, 2002; Smeeth, Cook, Fombonne et al, 2004; Honda et al, 2005; Baird et al 2008).

Taylor et al (1999) investigated cases of autism in London since 1979 and linked them to the regional vaccination registry. They found no sharp increase in autism cases since the introduction of the vaccine in 1988, only steady increases per year were found. Furthermore, the study found that regardless of when the child was immunised with the MMR vaccine (before the age of 18 months, after 18 months of age, or not immunised at all) all children had similar ages of autism diagnosis. The relative incidence of autism within pre-defined time periods after immunisation was also investigated and no relationship was found. Thus, these findings refuted Wakefield et al's findings.

Kaye et al (2001), Dales et al (2001), and Honda et al (2005) conducted time-trend analysis by focusing upon temporal trends in measles coverage with corresponding trends in autism prevalence, and all three studies came to similar conclusions of no association between the MMR vaccine and autism. In the UK, Kaye et al (2001) found that the incidence of newly diagnosed autism increased from 0.3% per 10,000 person years in 1998 to 2.1 per 10,000 person years in 1999, and the MMR vaccine uptake rates remained over 95% for the successive annual birth cohorts. Similarly, in the US Dales et al (2001) found an increase in autism case numbers from 1980 to 1994 – from 44 cases per 100,000 live births to 208 cases per 100,000, respectively. The MMR coverage for the same period was much smaller with a relative increase

of only 14%. However, Honda et al (2005) found that in Japan the MMR vaccination rates declined from 1988 to 1992 (with no uptake in 1993), and yet the incidence of autism cases increased from 1988 to 1996.

Case-control studies were also conducted to investigate Wakefield et al's claim, and children with autism were case-matched with healthy cohorts (Madsen et al, 2002; Smeeth et al, 2004; Baird et al, 2008). In the UK, Baird et al (2008) case-matched children with autism to two control groups – children with learning disability (and no autism) and 'typically developing' group (i.e. no disabilities). Blood samples were taken for analysis and the results showed no differences between the cases and controls for the measles antibody response.

Madsen et al (1992) and Smeeth et al (2004) both conducted epidemiological research to understand the proposed autism link. Smeeth et al carried out a case-control study in the UK of individuals born in 1973 with a diagnosis of pervasive developmental disorder and age/gender/general practice matched controls. The authors report that after adjusting for age, the odds ratio for an association between MMR and a developmental disorder was 0.86 (95% CI, 0.68-1.09). Likewise, Madsen et al conducted a similar study in Denmark of children born between 1991 and 1998. After adjusting for potential confounders, the odds ratio for the relative risk of autism was 0.92 (95% CI, 0.68-1.24) and the odds ratio for the relative risk of another autistic-spectrum disorder was 0.83 (95% CI, 0.65-1.07). These studies highlight the lack of association between the MMR vaccine and autism.

So far the research above has highlighted the lack of association between the MMR vaccine and autism. However research was also conducted to investigate the link between the MMR vaccine and inflammatory bowel disease. Petola et al (1998) examined the link between the vaccine and IBD and autism by assessing medical records of children born in Finland from 1982 to 1996. They investigated children who had received the MMR vaccine and had reported gastrointestinal symptoms lasting 24 hours or more. They found that among the 3 million doses of vaccine given to this cohort, only 31 children exhibited gastrointestinal symptoms, with common symptoms of vomiting and diarrhoea, but fully recovered when checked after a 6 year period. Additionally, no child had been diagnosed with a developmental disorder. Thus the findings did not support Wakefield et al's claims.

Fombonne and Chakrabarti (2001) used epidemiological data of children immunised with the vaccine and diagnosed with pervasive developmental disorder, and comparisons were made with clinical data of pre- and post-MMR children with autism. Gastrointestinal data was also collected. The results showed that the prevalence of a childhood disintegrative disorder was 0.6/10000 (95% CI, 0.02-3.6/10000), which suggests that MMR immunised children do not have a higher frequency of disease than children/parents who refuse the vaccine. Furthermore, no differences were noted in the mean age when parents noticed developmental problems between children who had and had not received the vaccine. Additionally, gastrointestinal symptoms were reported for 18.8% of children (the most common symptom being constipation) but no inflammatory bowel disease was reported. Only 2.1% of the sample experienced both developmental regression and gastrointestinal symptoms, but overall there was no evidence of an association

between the two – odds ratio of 0.63 (95% CI, 0.06-3.2). Thus the evidence lends support to the lack of association between the vaccine and IBD and autism.

Davis et al (2001) conducted a case-control study in the US to address the link between the vaccine and IBD. The sample included 155 IBD patients born between 1958 and 1989 and controls were matched by gender, age and Health Maintenance Organisation (a form of health care coverage fulfilled by health-care providers). The findings revealed past vaccination was not associated with an increased risk for Crohn's disease (odds ratio of 0.4, 95% CI, 0.08-2.0) and also for IBD (odds ratio of 0.59, 95% CI, 0.21-1.68). The analysis also indicates that in comparison with non-vaccinated children, the risk of IBD did not increase for vaccinated children younger than 12 months.

1.5 The MMR Vaccine and Controversy Timeline

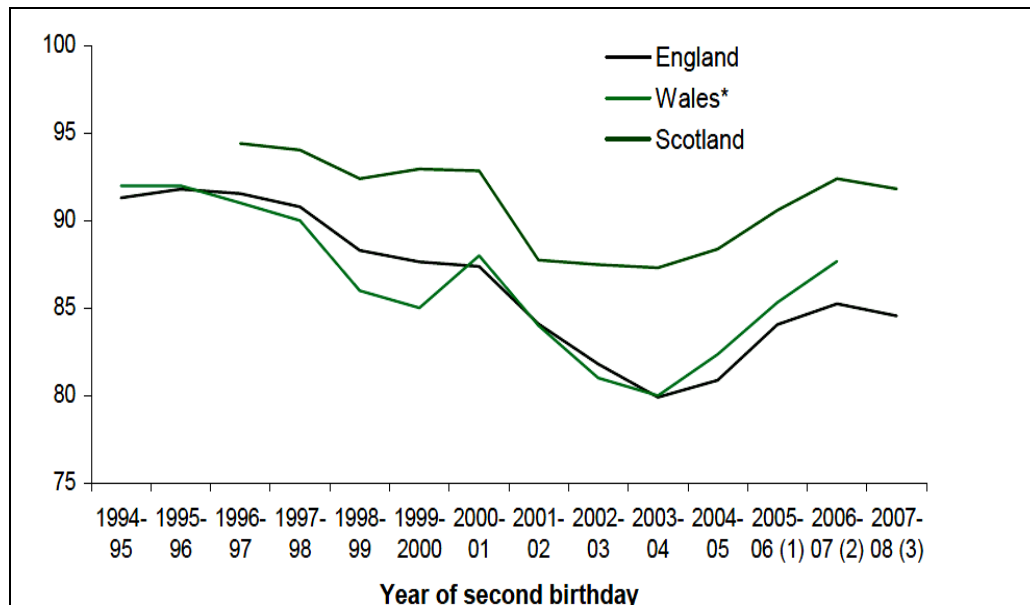
Table 1.2 highlights the controversy and milestones of the MMR vaccine in the UK, and also indicates when the studies in the present research were conducted.

Table 1.2: The MMR Vaccine Timeline

Date	Event
1970-1988	The single measles vaccine is administered in the UK.
1988	The MMR vaccine is introduced in the UK. Prior to this there was an average of 13 acute measles deaths per year in the UK between 1970 and 1988 (BMA, 2002).
1998	Andrew Wakefield and colleagues propose a hypothetical link between the MMR vaccine and autism and Crohn's disease. A press conference was held before the article was published in the Lancet. - Since the proposed link, media interest grew and vaccine uptake rates declined (refer to section 1.7). - Following the proposed link, research refuting Wakefield et al's claims were conducted (refer to section 1.4).
2003	Study 1 conducted (refer to Chapter 3)
2004	Ten of the 13 authors from Wakefield's paper place a retraction in the Lancet regarding the interpretation of the findings.
2004	Study 2 conducted (refer to Chapter 4)
2005	Study 3 conducted (refer to Chapter 5)
2004-2005	A mumps epidemic amongst the student population, effecting 41 universities.
2006	Study 4 conducted (refer to Chapter 6)
2006	The General Medical Council confirm that they would hold a disciplinary hearing of Andrew Wakefield and his involvement in the 1998 research.
2010 (Jan)	The General Medical Council report that Wakefield acted "dishonestly and irresponsibly", with "callous disregard" for the children involved in his study, had undeclared conflicts of interest, and his research was conducted improperly without approval of an independent ethics committee.
2010 (Feb)	The Lancet retracts Wakefield et al's (1998) article.
2010 (May)	Andrew Wakefield was struck off the medical register by the General Medical Council

1.6 MMR Vaccine Uptake Rates

Figure 1.1: MMR Uptake Rates in England, Scotland and Wales from 1994-2003



*2007-2008 Data for Wales was not available

(Taken from Thompson, 2009)

A 95% vaccine uptake rate is recommended by the World Health Organisation to help eliminate the diseases (WHO, 1999, 2005). As illustrated by the graph in Figure 1.1, vaccine uptake rates gradually declined following Wakefield et al's proposed links of autism and IBD with the vaccine. In Scotland, rates fell from 94.5% in 1996 to 86.9% in 2001, with rates gradually increasing in 2005 (ISD Scotland 2001 to present). In England and Wales a similar pattern was seen, although uptake rates were lower and dipped below 80% in 2003 (Thompson, 2009). MMR uptake rates differed depending on the region in which they were measured, for example in London rates dipped below 50% in 2004 (Deer, 2006). However, recent reports in 2010 indicate that by 24 months of age, 92.7% of children in Scotland and 89.4% of children in the UK have been immunised with the first dose MMR vaccine (Health Protection Agency, 2010; ISD Scotland, 2010).

Although previously common, measles, mumps and rubella are potentially serious illnesses with severe consequences (refer to Table 1.1). The WHO (1999) had suggested that measles could be eliminated by 2007, but within the UK recent outbreaks have indicated otherwise. According to officials, these outbreaks were the largest since the MMR vaccine was introduced in 1988 (English, 2006), and the UK was reported to be approaching “the danger zone where measles could again become endemic in the UK” (Jansen, Stollenwerk, Jensen, Ramsay, Edmunds and Rhodes, 2003). The studies in the present research were conducted in 2003 to 2006 when uptake rates were still relatively low.

1.7 Media Response

“The British Public have been fed by the media on a mixed diet of scientific evidence, theories, views and other verbal roughage”.

(Clements & Ratzan, 2003)

A fall in uptake rates for the triple vaccine since 1998 was blamed on the scare created by Wakefield et al (Thomas, Salmon and King, 1998) and the further embellishment of the proposed link by the British media (Begg, Ramsay, White and Bozoky, 1998; Clements and Ratzan, 2003; Colgrove and Bayer, 2005). Thompson (2009) reports that in the UK there was an over-representation of negative reports in the media about the MMR vaccine and autism; less than a third of the 1531 newspaper articles focusing on the link between the vaccine and IBD reported any scientific evidence about the safety of the vaccine. Prior to the retraction of the Wakefield et al’s 1998 publication, the UK was hit with headlines such as “Ban three-in-one jab” (Daily Mail, 27th Feb, 1998) and “Strong new evidence of MMR

link to autism” (Daily Mail, 4th Oct, 2003) and documentaries of parents with autistic children blaming the vaccine. Although it has been reported that the media coverage had limited influence on MMR uptake rates in the United States (Smith, Ellenberg, Bell and Rubin, 2008), examination of UK rates tell a different story. From a survey of attitudes towards the MMR vaccine, Pareek and Pattison (2000) suggest the media coverage created a negative impact, whereby they found 30% of parents believed the triple vaccine caused autism, and 13% of parents believed the vaccine caused Crohn’s disease. Smailbegovic, Laing and Bedford (2003) have also reported similar results.

According to Berry (2004), the mass media plays an important role in shaping perceptions of risk. For example, during the MMR controversy the media created a negative impact in risk perception (see above). However, the media has also been illustrated as positive and influential in health promotion. For example, a mass media campaign (television, radio and newspapers) was launched in Finland to increase MMR uptake rates, and successfully increased the uptake from 89.3% to 96.5% (Paunio, Virtanen, Peitola et al, 1991). In the UK, the media’s influence has been illustrated by Evans, Stoddart, Condon et al (2001), whereby they report that parents who previously had no doubts concerning the safety of the MMR vaccine subsequently refused the vaccination due to the media coverage. Thus, the media is an influential tool in changing public risk perception.

1.8 Risk Perception

Risk refers to “situations in which a decision is made whose consequences depend on the outcomes of future events having unknown probabilities” (Lopes, 1987).

According to Yates and Stone (1992) there are three elements essential for understanding the 'risk' construct: 1) potential loss, 2) significance of the losses, and 3) uncertainty of the losses. Additionally, Berry (2004) states that risk assessment involves the identification, characterisation and quantification of risk. Risk assessment may also differ depending on the individuals' pre-existing beliefs: Nisbett and Ross (1980) suggest that when an individual receives information that is not consistent with their own beliefs then the evidence is seen as unreliable and erroneous, but, if the evidence is synonymous with their prior beliefs then it is viewed as reliable and informative. Risk is assessed by individuals through risk perception, which involves beliefs, attitudes, judgements and feelings (Pidgeon, Hood, Jones, Turner and Gibson, 1992). According to Slovic, Fischhoff and Lichtenstein (1980) and Fischhoff, Slovic, Lichtenstein, Read and Coombes (1978), the following factors play a crucial role in the relationship between risk acceptance, perceived benefits of risk, and perceived risk: familiarity, control, catastrophic potential, equity and knowledge.

Furthermore, risk can be understood differently depending on the groups involved. For example, in a study by Slovic (1987) of risk perception of hazards, experts perceived risk as 'objective' and as technical estimates of annual fatalities, whereas for non-experts' (lay people) risk assessment strongly correlated with 'subjective' factors and referred to risk as catastrophic, threat to future generations (hazard characteristics) and focused on unknown risk and the number of people exposed to the risk. These differences in risk perceptions may lead to misunderstandings and mistrust (Berry, 2004). Risk management entails communication between different groups or stakeholders, and as a result may create the potential for mistrust (Slovic,

Flynn and Laynan, 1991; Frewer, 1999). Levitt and Dubner (2003) suggest that risk assessment is based on perceived control of the outcome – the greater the control perceived then the less risk is associated. For example, individuals perceive the risk of flying in a plane as greater than the risk of driving a car yet the number of fatalities is higher for the latter. Therefore, a precisely known risk is preferred to a risk that is indeterminate (Spier, 2002).

Berry (2004) categorises health risk into two main approaches: 1) the cognitive science approach, and 2) the sociocultural perspective. The cognitive science approach suggests that risk is seen as an ‘objective’ variable and the individual’s reaction as the ‘subjective’ variable. The risk experts, for example medical doctors, are valued for their scientific knowledge and training, whereas lay people are considered to respond unscientifically to risk. When both groups differ in risk perceptions then this approach suggests that lay people need education in knowledge and risk management skills. Psychological models, such as Protection Motivation Theory and the Health Belief Model, are used within this approach to understand individuals’ risk perceptions and behaviour, and are referred to as ‘psychometric risk models’ (Berry, 2004). These models suggest that human behaviour is both rational and volitional; individuals perceive the severity of the risk and their vulnerability to the risk, and make a rational decision (intention) to prevent or reduce the risk (these models will be described in greater depth later in the chapter). Focus is placed on the individual with this approach.

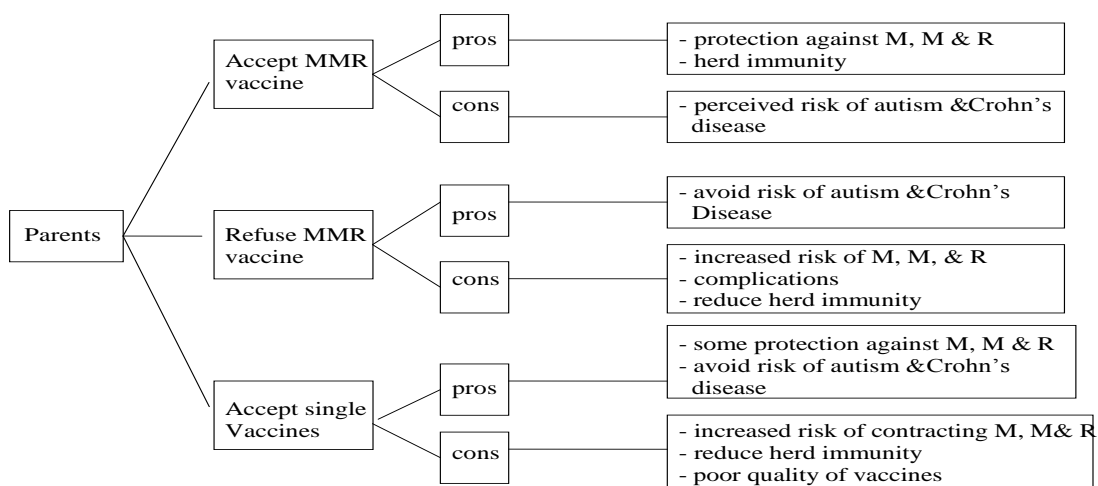
The sociocultural perspective places emphasis on the social and cultural context within which risks are perceived, understood and controlled. According to Lupton

(1999), risk has become a central aspect of human existence and plays a fundamental role in organising and regulating individuals, social groups and institutions. This approach is broken down into three major classes of sociocultural theory: i) the cultural symbolic perspective, ii) the risk society perspective, iii) the governmentality perspective. Douglas (1992) indicates that risk judgements are perceived as political, moral and aesthetic with the *cultural symbolic perspective*, and risk perception is related to an individual's position in a cultural system. The *risk society perspective* focuses on individualism, reflexivity, and globalisation (Giddens, 1990, 1991; Beck, 1992). Emphasis is placed on how risk is generated and managed at the macro-structural level of society, alongside political and social implications of the risk. Foucault (1991) describes the governmentality perspective as using risk strategies and discourses as a means to ordering the social and material world through rationalisation and calculation.

Due to the controversial nature of the vaccine, parents have to weigh up the risks and benefits when considering the MMR immunisation decision for their child. Risks perceived by parents to be associated to the vaccine included the threat of developing autism and/or Crohn's disease, overloading the child's immune system, and developing long-term side-effects. Benefits included protection against the childhood diseases, reduction in disease severity, and a contribution to herd immunity (Sze-Tho and Gill, 1982; Bennett and Smith, 1992; Strobino, Keane, Holt, Hughart and Guyer, 1996); Bond, Nolan, Pattison and Carlin, 1998; Pareek and Pattison, 2000; Evans et al, 2001; Ramsey, Yarwood, Lewis, Campbell and White, 2002; Flynn and Ogden, 2004; McMurray, Cheater, Weighall, Nelson, Schweiger and Mukherjee, 2004; Tickner, Leman and Woodcock, 2010). Parents

also perceived that non-immunisation would assist the child's physical and psychological development if the childhood diseases were contracted, and easily treated by health-care providers (Evans et al, 2001; Bond et al, 1998). Bond et al (1998) and McMurray et al (2004) report that some parents who refused childhood vaccinations were more concerned about the unknown side-effects of the vaccines than the diseases. Thus, the known risk of measles, mumps and rubella may be preferred to the indeterminate risk of autism/IBD (Spier, 2001). An alternative option of single vaccines was also available. However, single vaccines were not offered at NHS establishments and there was minimum requirement of a 6 weeks gap between each vaccine which increased the potential for children to develop the vaccine-preventable diseases (NHS Choices, 2008). Figure 1.2 shows a schematic representation based on the review of the literature above and highlights parents' perceptions of the associated risks and benefits related to the MMR vaccine.

Figure 1.2: Risks and Benefits of the MMR Vaccine



Risk management may also contribute to the decision-making process. The three primary goals of risk management consist of: i) controlling/reducing risks to an acceptable level; ii) reducing the risk of uncertainty in decision-making; and iii) increasing public trust (Petts, 1992). Berry (2004) states that the role of trust is particularly salient for effective risk management, and has further implications for risk communication. Successful communication between two or more groups with varying risk perceptions and attitudes is essential for effective risk management and reduction in potential mistrust. The role of trust and communication in the MMR immunisation decision will be discussed in further detail in Chapter 6.

1.9 Theory-Based Research

Engel (1977) first developed the biopsychosocial approach exemplified by social cognition models in understanding health behaviours. Thus, it is recognised that the bases of illness are biologically and genetically determined, psychological constructs play a key role in the development of illness, and health is impacted upon by social, economic and cultural settings (Pitts, 1998). Heuristic decision-making models (including Optimising Decision Theory, Satisficing Decision Theory) are used when understanding decisions based on rational risk/benefit analysis (Kurz-Milcke and Gigerenzer, 2007). However, Meszaros, Asch, Baron, Hershey et al (1996) report that parents' immunisation decisions involve more than a *rational* risk/benefit analysis but also reflect personal attitudes, beliefs and perceptions. Therefore, social cognition models would be more appropriate to use when understanding MMR decision-making.

Although many MMR-related studies focus on parental beliefs (e.g. Bennett and Smith, 1992; Evans et al, 2001; Smailbegovic, Laing and Bedford, 2003; Alfredsson, Svensson, Trollfors and Borres, 2004; Flynn and Ogden, 2004; McMurray et al, 2004; Petts and Niemeyer, 2004; Casiday, 2005; Poltorak, Leach, Fairhead and Cassell, 2005; Wroe, Bhan, Salkovskis, Bedford, 2005; Hilton, Petticrew and Hunt, 2006; Casiday, Cresswell, Wilson and Panter-Brick, 2006; Hilton, Hunt and Petticrew, 2007; Casiday, 2007; Tickner et al, 2010), a detailed literature search revealed only a handful of studies examining parents' MMR vaccine decision using social cognition models: Tickner, Leman and Woodcock (2010) and Pareek and Pattison (2000) used the Theory of Planned Behaviour (TPB), Bennett and Smith (1992) and Bond, Nolan, Pattison and Carlin (1998) utilised the Health Belief Model (HBM), and Strobino, Keane, Holt, Hughart and Guyer (1996) employed Protection Motivation Theory (PMT). These 'psychometric risk models (Berry, 2004) are important to utilise when applying the cognitive science approach to understanding risk perceptions and behaviour. Therefore, the focus of the literature review search was placed on studies using psychometric risk models. These five studies will be discussed in detail in the next section, and Table 1.3 provides a summary of the studies.

Table 1.3: Studies Employing Theoretical Models in MMR Research

Author/ Country	Study population – parents (n) and children (age)	Methodology	Theory	Findings
Bennett and Smith (1992); UK	228 parents Children aged 2 - 2.5 years	Structured interviews Focusing on the pertussis vaccine, and MMR as secondary focus	Health Belief Model	<p>Differences were examined between parents who had opted, refused or partially immunised their child with the pertussis vaccine.</p> <ul style="list-style-type: none"> • Parents refusing the pertussis vaccine reported greater concern with the MMR vaccine and associated health problems than the other groups (p<.05). • In comparison with the fully vaccinated group, non-immunising parents did not perceive importance of vaccination against measles (p<.05). • Significant differences were revealed between all groups in terms of HPM (p<.05). • Similar patterns of attitudes and beliefs held with the pertussis vaccine were illustrated with the MMR vaccine.

Author/ Country	Study population – parents (n) and children (age)	Methodology	Theory	Findings
Strobino, Keane, Holt, Hughart & Guyer (1996); US	525 parents (91% mothers) Age ranges of children not provided	Structured interviews and medical record audits Focusing on MMR, DTP (diphtheria, tetanus, pertussis) vaccines	Protection Motivation Theory	<ul style="list-style-type: none"> • Mixed attitudes - positive attitudes included: ‘vaccines do good’ (96%) and ‘child was safer’ (99%). Negative attitudes included: ‘did not think missing a vaccine was a problem’ (30%), ‘was not the norm to be up-to-date among friends’ (31%), and ‘multiple vaccines were not safe’ (50%). • Parents reported high vulnerability to the disease (71.2%), and believed vaccine-preventable diseases to be severe (88.8%). • High external self-efficacy was reported by the parents. • Logistic regression analysis was performed and only response efficacy predicted MMR vaccine uptake.

Author/ Country	Study population – parents (n) and children (age)	Methodology	Theory	Findings
Bond, Nolan, Pattison & Carlin (1998); Australia	45 mothers: immunisers, non-immunisers, incomplete & partial immunisers Children aged 3-30 months	Semi-structured interviews Focusing on MMR and DTP (diphtheria, tetanus, pertussis) vaccines	Health Belief Model	<ul style="list-style-type: none"> • Immunising parents believed the risk of disease was greater than the risks associated with vaccination. • Non-immunisers were concerned about the unknown long-term side-effects of vaccination. • Many parents expressed concerns relating to excess vaccines and harming the child's immune system. • Preference was given to building natural immunity to the diseases and vaccinating when the child was older and stronger. • Barriers to immunisation included lack of balanced information and dismissive health professionals. • Supportive health professionals acted as cues to immunisation.

Author/ Country	Study population – parents (n) and children (age)	Methodology	Theory	Findings
Pareek and Pattison (2000); England	<p>173 mothers: 89.5% in group 1 & 94.3% in group 2 received all primary vaccines (including MMR)</p> <p>Children aged 5-12 months in group 1 (pre-MMR) & 21-35 months in group 2 (pre-2nd dose MMR)</p>	<p>Cross-sectional. Postal questionnaires</p> <p>Focusing on MMR vaccine</p>	<p>Theory of Planned Behaviour</p>	<ul style="list-style-type: none"> • Good knowledge was reported of adverse effects and timing of immunisation. • Majority of parents perceived the MMR vaccine to be safe. • 29.8% believed the MMR vaccine caused autism. • 13% believed the vaccine caused Crohn’s disease. • In comparison with group 1, group 2 believed MMR caused serious neurological effects ($p < 0.05$), was unsafe ($p < 0.005$), rarely protected against diseases ($p < 0.05$), and had more negative outcome beliefs ($p < 0.0001$). • Both groups valued the opinion of health professionals. • The majority of parents consulted the health visitor for general vaccine information, whereas over 30% consulted media for information on the side-effects of the vaccine. • The findings from the regression analyses show that predictors of intentions for group 1 included: vaccine outcome belief; and for group 2: vaccine outcome beliefs, attitudes to MMR vaccine, and prior MMR status.

Author/ Country	Study population – parents (n) and children (age)	Methodology	Theory	Findings
Tickner, Leman and Woodcock (2010); UK	189 mothers & 4 fathers completed measurements for MMR vaccine, and 159 parents for dTAP/IPV vaccine	Cross-sectional Postal questionnaires	Theory of Planned Behaviour	<ul style="list-style-type: none"> • Parents with maximum immunisation intentions held positive beliefs about having the MMR vaccine, e.g. they believed the vaccine prevented/eliminated diseases, would not result in side-effects, and was less painful than single vaccines. • Regarding perceived control beliefs, parents with maximum immunisation intentions perceived less barriers to vaccine behavioural intentions, and found the following increased the likelihood of attendance: pre-arranged appointments, supportive health professionals, and having free time. • All parents perceived that if they were able to obtain single vaccines then they would be less likely to attend for the 2nd dose of MMR. • The findings from the logistic regression analysis show that predictors of 2nd dose MMR intentions included: attitudes and perceived behavioural control.

1.9.1 Psychometric Risk Models

To account for the differing intentions and behaviours concerning the perceived risk of the MMR vaccine, the application of Protection Motivation Theory (PMT: Rogers, 1975, 1983; Maddux and Rogers, 1983) may be more appropriate to utilise rather than Theory of Planned Behaviour (TPB, Ajzen, 1985; Ajzen and Madden, 1986; Ajzen, 1988) and the Health Belief Model (HBM, Rosenstock, 1966; Becker and Maiman, 1975). The models will be discussed below.

1.9.1.1 Health Belief Model (HBM)

The HBM focuses upon behavioural compliance and evaluation, and proposes that behaviour is determined by the following core constructs: demographic and psychosocial variables (e.g. personality, peer pressure), perceived susceptibility, severity, cost/benefit, and cues to action. There has been support for the model in research focusing on dietary compliance, sexual behaviours, regular dentist attendance, and exercise behaviours (Becker, 1974; Becker, Maiman, Kirscht, Haefner and Drachman, 1977; Becker and Rosenstock, 1984).

Two studies used the HBM when investigating parental immunisation attitudes and behaviours. Bennett and Smith (1992) used the HBM to understand parents' risk assessment of the pertussis vaccine, and also examined attitudes to the MMR vaccine. A total of 228 parents took part in the structured interviews and were categorised into one of three groups: full vaccination (FV), partial vaccination (PV: not completed the course), and no pertussis vaccination (NV). For the pertussis vaccine, NV parents reported negative attitudes and, in comparison with the other groups, perceived greater risk of the vaccine than the disease. However, when the 3

groups were compared in their risk assessment of the MMR vaccine, the NV parents reported greater anxiety about the MMR vaccine's associated health risks ($p < .05$) and did not perceive importance of vaccination against measles in comparison with the FV group ($p < .05$). Overall, the HBM revealed significant differences between all groups ($p < .05$), and a similar pattern of attitudes and beliefs reported for the pertussis vaccine was also illustrated with the MMR vaccine. The primary focus of this study was the pertussis vaccine rather than the MMR vaccine, and was conducted prior to the proposed link between the MMR vaccine and autism and IBD.

Bond et al (1998) used the HBM as a framework to investigate Australian mothers' perceptions of childhood vaccines (in general) and vaccine preventable diseases. They conducted 45 interviews and reported that mothers who had immunised their child with all vaccines (complete immunisers) perceived the risk of vaccinations to be lower than the risk of the diseases. Additionally, these parents perceived the risks related to vaccines to be a minor inconvenience in comparison to the vaccine-preventable diseases (eg polio and meningitis), and considered vaccine side-effects to be rare. However, parents who had not immunised their children with all vaccines reported concerns about the associated long-term side-effects of the vaccines and perceived the vaccines to be ineffective or partially ineffective in disease prevention. The majority of the parents reported concerns that some children were too fragile or vulnerable to receive vaccines at 2 months of age, and believed children should be robust before given the vaccines. One immunisation barrier highlighted by the partial/non-immunisers included concerns about the vaccine information provided; information was deemed biased and pro-vaccination, and

health professionals were considered to show lack of concern about children's welfare. These parents obtained anti-vaccine information from media resources. Although this study highlights important issues when investigating immunisation behaviour, the study did not focus on the MMR vaccine but instead examined all childhood vaccines collectively, and the study was conducted before the MMR and autism and IBD link.

Furthermore, the HBM has shown many limitations, including conflicting findings in past health-related studies. For example, associations between health behaviours and low perceived seriousness (instead of high seriousness as predicted by HBM), and low susceptibility (instead of high as predicted by HBM) were found in previous research (Becker, Kabach, Rosenstock and Ruth, 1975; Langlie, 1977; Janz and Becker, 1984). The methodological problems and heterogeneity of effect sizes highlight the problem with the conceptual bases of HBM components (Champion, 1984; Harrison, Mullen and Green, 1992; Sheeran and Abraham, 1999). It has been acknowledged by many theorists that the relationship between HBM components and behaviour are both fixed and linear, and the components unidimensional (Sheeran and Abraham, 1999). Furthermore, the constructs of the model suggest that individuals rationally process information and therefore prohibit the inclusion of fear components associated with some health behaviours, such as MMR immunisation behaviour.

1.9.1.2 Theory of Planned Behaviour (TPB)

The TPB, an extension of the theory of reasoned action, emphasises the saliency and role of intentions in health behaviours. It consists of the following core components

in understanding predictions of behavioural intention which are linked to behavioural performance: attitudes, subjective norms, and perceived behavioural control (this construct is also proposed to be directly linked to behaviour). The TPB has shown some success in predicting and understanding various health behaviours, including alcohol consumption, sexual behaviours, exercise behaviours and dietary choices (Schlegal, D'Avernas, Zanna and DeCourville, 1992; Lloyd, Paisley and Mela, 1993; Conner, Povey, Bell and Norman, 1994; Richard, van der Pligt and De Vries, 1995).

Pareek and Pattison (2000) used the TPB to investigate mother's MMR immunisation behaviour by focusing on intentions to immunise. Questionnaires were distributed to 2 cohorts of mothers: group 1 - mothers waiting for the first MMR vaccine, and group 2 - mothers waiting for the second MMR vaccine. Non-immunising mothers in group 1 reported 'fear of vaccine' as their reason for non-immunisation with the first MMR vaccine. 29.8% of the mothers reported the vaccine causes autism and 13.1% reported it causes Crohn's disease. The health visitor was reported as the commonest source of vaccine information, and mothers in group 2 tended to value the opinion of their GP as more important than mothers in group 1 ($p < .05$). However, in this study information about side-effects of the MMR vaccine was obtained from media sources rather than from health professionals. Regression analysis for group 1 indicates that 'vaccine outcome beliefs' was the only significant predictor of first MMR vaccine intention (accounting for 77.1% of the variance in the intention score); and for group 2 three significant predictors (accounting for 93% of the variance in the intention score) were reported: 'vaccine outcome beliefs', attitudes to MMR vaccine' and 'prior

MMR status'. Thus, the TPB presented differences between mothers waiting for the first dose MMR vaccine and those waiting for the second dose MMR vaccine.

Tickner et al (2010) investigated parents' immunisation behaviour (second dose MMR vaccine or the dTaP/IPV) using the TPB as a framework. In total, 348 parents completed the questionnaires and of these parents 193 completed the questionnaires relating to the MMR vaccine. Overall, parents had positive beliefs about the outcomes of immunisation. Parents with maximum immunisation intentions (parents were categorised into 'maximum intentions' and 'less than maximum intentions' based on their intentions scores) held positive beliefs that the second MMR vaccine was likely to prevent their child from developing the associated diseases, eradicate the diseases, not result in side-effects, be less painful than having three separate vaccines, and would not damage the relationship between the parent and child. Furthermore, cues to action for these parents included having sufficient information, support from health professionals, free-time, receiving reminders, and their child being '100% fit and well'. The results for the regression analysis indicate 'attitudes' and 'perceived behavioural control' as significant predictors of intentions to immunise (accounting for 48-64% of the variance).

Both of the studies described above were conducted after the autism/Crohn's disease link was proposed. These studies concentrated on intentions to immunise, and Tickner et al (2010) focused on the second dose MMR vaccine. Although the TPB has shown success in understanding a variety of health behaviours, including MMR immunisation behaviour, it does not however assess health threats which are

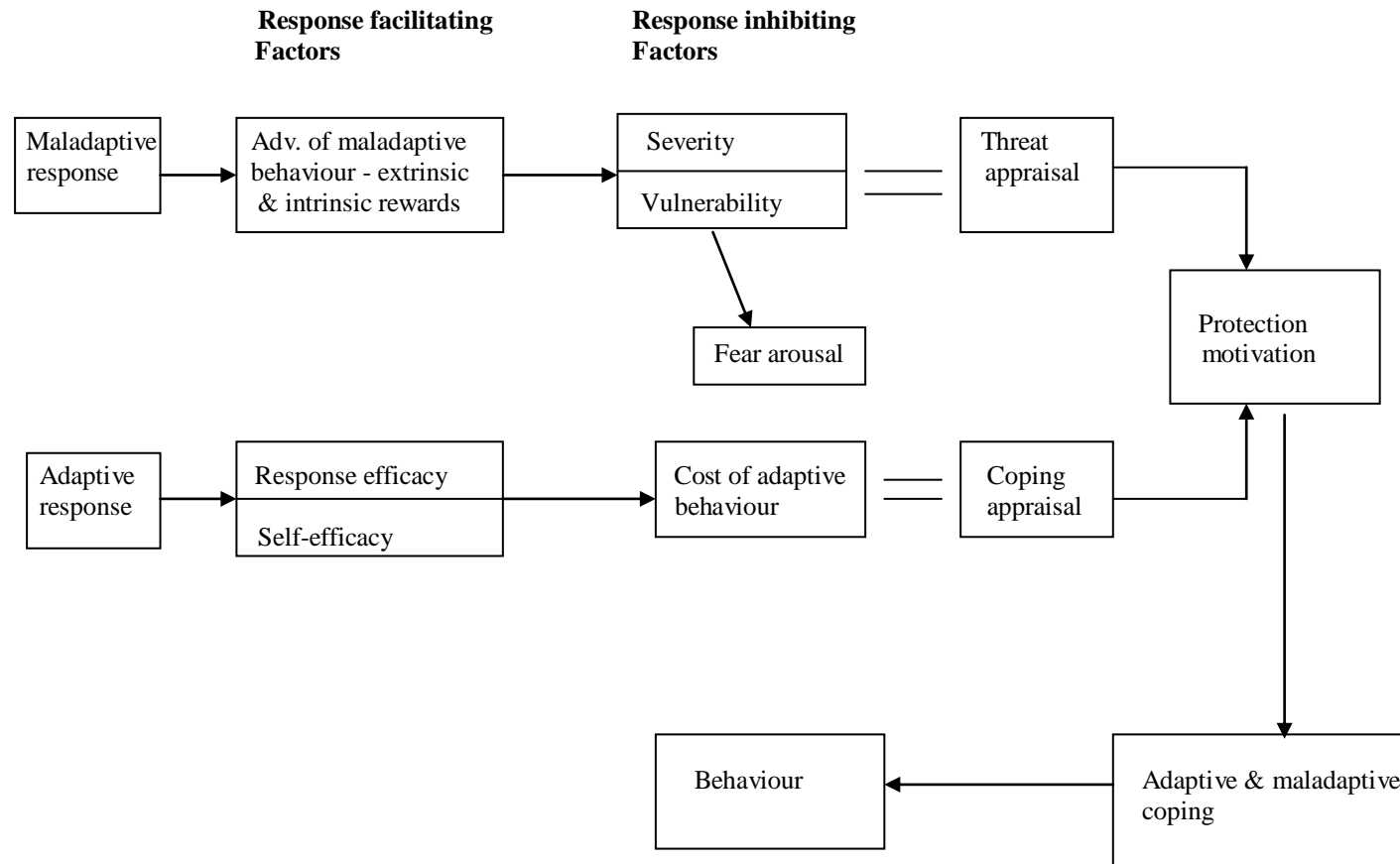
crucial when understanding behaviours associated with fear/threat, such as MMR immunisation and its proposed association with autism/Crohn's disease.

1.9.1.3 Protection Motivation Theory (PMT)

PMT has proven to be a valuable model when trying to understand fear appeals by placing emphasis on cognitive processes and message components relating to fear appeals (Rogers, 1975, 1983; Witte, 1992). According to Rogers, fear appeals have three basic components: the severity of the threat, the vulnerability of the individual, and an effective and adaptive approach (refer to Figure 1.3). However, PMT is seen as a model of health decision-making and, therefore, the term 'fear appeals' has been effectively replaced by 'health threats' (Wurtele and Maddux, 1987).

The PMT model (refer to Figure 1.3 for schematic representation) is based on Janis' (1967) 'fear-as-acquired-drive' model and Leventhal's (1970) 'parallel response model'. PMT proposes that self-protective behaviour is determined by protection motivation (PM; motivation to protect oneself against the health threat; often measured by 'intention', Rogers, 1983), which in turn is predicted by two appraisal processes: threat and coping appraisal. Threat appraisal refers to perceived severity of the threat, perceived vulnerability of the individual the threat is aimed at, and emotional fear of the threat. Coping appraisal refers to the belief that behavioural performance reduces the threat and perceived expectation of performing the

Figure 1.3: A Schematic Representation of Protection Motivation Theory



behaviour successfully. Together these appraisals can result in adaptive or maladaptive behaviour.

To date, PMT has been used as a theoretical framework focusing on MMR immunisation in only one study (Strobino, Keane, Holt et al, 1996). Strobino et al (1996) examined parental attitudes and knowledge of childhood immunisations and predictors of immunisation behaviour. Focus was placed on the MMR vaccine, as well as the four diphtheria, tetanus and pertussis vaccines (DTP) and the three oral polio vaccines (OPV). The authors report that only 53% of the participating parents had immunised their child with the (age-appropriate) MMR vaccine. Overall, parents reported positive attitudes towards immunisation (in general) and perceived them to be effective (86.1%), their child to be vulnerable if not up-to-date with immunisation (71.2%), and believed vaccine preventable diseases to be severe (88.9%). The results from the logistic regression analysis reported only one significant predictor of PM: response efficacy (the belief that it is not important if a child misses a shot as long as they catch up by pre-school) (confidence interval = 0.36-0.74, $p < .001$). Overall the results suggest that PMT does not fully explain MMR immunisation status, and parents with less favourable attitudes towards MMR immunisation tended to immunise as much as other parents. Nevertheless, methodological limitations may limit the generalisation of results as not all PMT components were used in the regression analysis, and therefore the full potential of PMT was not tested. The following constructs were not included: vulnerability, severity, and dimensions of response-efficacy, self-efficacy and response-costs. The researchers indicate that the constructs were excluded because they showed no significant association with immunisation status. Additionally, the authors did not

measure the construct relating to the rewards of the threat and state “*we assumed that there were no rewards for a child having a vaccine-preventable disease*”. However, in the present situation, since the associated link between the MMR vaccine and autism/Crohn’s disease, parents may feel the known risk of a vaccine-preventable disease may be preferable to an unknown risk (Spier, 2002). Moreover, the study was conducted in the US and prior to general fears associated with the vaccine (i.e. before the proposed autism/Crohn’s disease link), and so the results may not be applicable to the present situation in the UK. Attitudes in the US may differ from the UK where immunisation is free and voluntary (Colgrove and Bayer, 2005).

Previous studies have illustrated that PMT can be successfully used to understand an individual’s (i.e. parent) actions to protect another’s (i.e. child) health (Keane, Stanton, Horton, Aronson, Galbraith and Hughart, 1993; Searle, Vedhara, Norman, Frost and Harrad, 2000; McClain, Bernhardt and Beach, 2005; Norman, Searle, Harrad and Vedhara, 2003; Flynn, Lyman, and Prentice-Dunn, 1995). In their focus group study, Keane et al (1993) found that PMT helped to understand beliefs about childhood immunisations (not focusing on MMR). Parents reported negative beliefs regarding vaccine failure, efficacy, knowledge, and perceived vaccines to cause rather than prevent illness. Norman et al (2003) found that PMT was predictive of both parental intentions and behavioural adherence when investigating eye patching in children with amblyopia. Perceived vulnerability, response efficacy and self-efficacy were predictive of PM, and perceived vulnerability and response costs were significant predictors of behaviour. Similar results were reported by Searle et al (2000), however parents’ awareness of the benefits of patching and adherence were

limited by emotional distress in both child and parent. Overall, PMT has proven to be an effective model when understanding parents' motivational factors for protecting their child, and therefore could profitably be applied to understanding MMR immunisation intentions.

1.10 Subjective Norm

Although PMT has proven to be a successful model when understanding health decision making, it has also come under some criticism. One criticism of the model includes neglecting the role of social factors (Ogden, 2000).

Subjective norm (SN; also known as injunctive norm) is an important mechanism in the decision-making process, and is a core component of 'Theory of Reasoned Action' and 'Theory of Planned Behaviour' (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Ajzen, 1985, 1988, 1991). SN refers to perceived social pressures imposed upon individuals concerning their participation in certain behaviours. This cognitive mechanism is a function of normative beliefs and motivational compliance; the individual's perception regarding whether significant others (e.g. family, friends) think the particular behaviour should/should not be performed, coupled with the individual's motivation to comply with these others' expectations (Conner and Sparks, 1996).

However, the predictive power of SN has had varying success in health-related research. While it is seen as a relevant construct, overall it has been relatively weak in predicting behavioural intentions and performance when using the TPB model (Fekadu and Kraft, 2002). Instead, 'attitudes' have been the strongest predictor of

intentions and behaviour (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Farley, Lehmann and Ryan, 1981; Ajzen, 1991; Miniard and Cohen, 1991; van den Putte, 1991; Triandis, 1994; Kraus, 1995; Trafimow and Finlay, 1996; Conner and Armitage, 1998). The evidence relating to the relatively poor performance of SN has led Ajzen (1991) to suggest that intentions are primarily predicted by personal factors – e.g. attitudes and behavioural control. In the MMR context, subjective norm was reportedly not directly influential in intention and behaviour implementation. Tickner et al (2010) and Pareek and Pattison (2000) both conducted regression analysis and found that attitudes and/or perceived behavioural control were predictors of MMR intentions/behaviour.

Researchers have suggested that problems lie with the measurement of SN rather than the construct itself. For example, the lack of distinction between SN and attitudes constructs may explain the low predictive power often illustrated by SN (Sheeran and Orbell, 1999).

1.11 Relationships between Norms and Attitudes

Some researchers propose that ‘attitudes’ and ‘SN’ are similar constructs, both statistically and conceptually. Warshaw (1980), Oliver and Bearden (1985) and Vallerand, Deshaies, Cuerrier, Pelletier and Mongeau (1992) suggest that ‘crossover’ effects may occur, i.e. SN and attitudes may affect one another. Miniard and Cohen (1981) further debate whether individuals can actually distinguish between attitudinal beliefs and SN beliefs, e.g. attitudes: “*my father will disagree with me if I perform the behaviour*”, and SN: “*my father thinks I should not perform the behaviour*” (Trafimow and Finlay, 1996, pp821). Conversely, empirical research

which closely examined the two constructs has verified that they are in fact diverse (Trafimow and Fishbein, 1994a, 1994b, 1995). In earlier studies, Trafimow and Fishbein (1994a, 1994b) illustrated how attitudes and SN could be manipulated separately from behaviour. Through a series of later studies, Trafimow and Fishbein illustrate that individuals cognitively distinguish between attitude *and* normative beliefs when forming behavioural intentions. Using a series of intention/goal formation, recall and belief reporting tasks, Trafimow and Fishbein (1995) illustrate how participants' beliefs clustered into attitudinal beliefs and normative beliefs when asked to form intentions. Thus the findings suggest that participants were able to distinguish between the two types of beliefs. Further evidence emphasizing the distinction includes both attitudes and SN correlating more highly with intentions than with each other (Jaccard and Davidson, 1972; Bowman and Fishbein, 1978; Fishbein and Azjen, 1981). The evidence signifies that SN is an independent construct and the problems lie in the measurement/utilisation of the concept rather than the construct itself.

Subjective norm is an important construct as individuals often do not make health decisions alone but rather look for support from others, especially when relating to infant health. For example, research on infant feeding intentions indicates that mothers tend to look for support from significant others when making their breast/bottle-feeding decision (Freed, Fraley and Schanler, 1992; Littman, Mendendorp and Goldfarb, 1994). Although there has been no research regarding the contribution of SN towards PMT when focusing on MMR immunisation behaviour, Van der Velde and Van der Pligt (1991) have reported on SN's contribution to PMT when examining AIDS-related behaviour. Results indicated

that the inclusion of SN (and other additional variables, e.g. past behaviour) increased the variance explained (from 49% to 73% for heterosexuals and 22% to 44% for homosexuals). Therefore, it is hypothesised that SN will make a significant contribution to PMT in understanding parents' MMR immunisation intention and behaviour.

1.12 Summary

In light of the evidence presented, it was appropriate to investigate parents' risk assessment, MMR intentions and behaviour to gain an understanding of the decision-making process. The thesis aimed to highlight parents' attitudes, risks and normative beliefs regarding the MMR decision using a cognitive science approach. Four studies were undertaken to understand the decision-making process with parents in Scotland. The first study (Chapter 3) examined parents' intentions and immunisation behaviour by applying PMT and subjective norms. This study was undertaken in 2003 when the topic of MMR immunisation was controversial and the first dose MMR uptake rate in Scotland was estimated between 86-88% (NHS Grampian Report, 2004). The second study (Chapter 4) focused on students' MMR immunisation decision-making, and made comparisons between parents' decision-making for their child and students decision-making for themselves. This study was conducted in 2004 during a mumps outbreak in Scotland, and when the MMR uptake rate for children was below the recommended 95% (Information Services Division Scotland, 2008). The third study (Chapter 5) was conducted in 2004 - 2005 and extended the findings from the first studies to explore the contribution of subjective norm and other social norms in the decision-making process. Studies 2 and 3 were conducting during the period when MMR vaccine uptake rates were still

low, and during the period when a retraction was placed in the Lancet by ten of the original authors from Wakefield's 1998 paper. The results from all of the three studies identified the important role of health professionals during the decision-making process. Therefore, the final study (study 4; Chapter 6) investigated the role of trust in health professionals and the Government during the MMR decision. The final study was completed in 2006 when uptake rates were still below 95% and when the announcement regarding a disciplinary hearing against Andrew Wakefield was made by the General Medical Council.

Chapter 2

Methodological Issues

2.1 Introduction

“...qualitative researchers value the deep understanding permitted by information-rich cases and quantitative researchers value the generalizations to larger populations permitted by random and statistically representative samples.”

(Sandelowski, 1995, pp180)

The use of both qualitative and quantitative methodologies is considered advantageous as it permits a greater understanding of the phenomena under study (Bazeley, 2004). Different types of methods for data collection and different methodologies were employed to obtain as much information as possible to understand the MMR immunisation decision-making process. There are many benefits and limitations to both quantitative and qualitative research methods (refer to Table 2.1 for a summary of the differences between the two methods), and these will be discussed in detail below.

However, before discussing the different methods utilised it is important to firstly understand the philosophical, or epistemological, approach taken to understand the research questions posed by each study in the present thesis.

2.2 Epistemology

In all types of research the methodological approach tends to be based on both practical grounds and the epistemological, or philosophical, position. Epistemology refers to the theory of knowledge and is concerned with the nature and scope of the

Table 2.1: A Summary of Differences between Quantitative and Qualitative Research Methods

	Quantitative	Qualitative
<i>Aims</i>	<ul style="list-style-type: none"> - Testing hypotheses - Examination of causal relationships 	<ul style="list-style-type: none"> - Understanding of participants' experiences - Generating or contributing to theory
<i>Focus</i>	<ul style="list-style-type: none"> - Specific and product orientated 	<ul style="list-style-type: none"> - Broad and process orientated
<i>Data collection</i>	Including: <ul style="list-style-type: none"> - Questionnaires: time efficient, cost-effective, access to wider range of participants, obtain greater number of participants - Generalisable results 	Including: <ul style="list-style-type: none"> - Focus groups: examine commonalities and differences in experiences in a group, and dynamic group interactions to generate discussion, ideas and stimulate thinking - Non-standardised interviews: elicit experiences from individual participants, provide deeper understanding of individual's perceptions and meanings - Theory generation
<i>Analysis</i>	<ul style="list-style-type: none"> - Statistical analysis 	<ul style="list-style-type: none"> - Including: thematic analysis, content analysis, grounded theory, interpretative phenomenological approach
<i>Outcome</i>	<ul style="list-style-type: none"> - Measurable results 	<ul style="list-style-type: none"> - Theory
<i>Rigour</i>	<ul style="list-style-type: none"> - Generalisability, validity, reliability 	<ul style="list-style-type: none"> - Authenticity, inter-rater reliability, validity (memos)

knowledge, including the validity and reliability of claims to the knowledge (Willig, 2008). In summary, it attempts to answer the 'how, and what, we know' (Willig, 2008). Before selecting an appropriate research method it is important to adopt an appropriate epistemological stance to guide the research. These stances, or

paradigms, are described as the “*basic belief system or world view that guides the investigation*” (Guba & Lincoln, 1994). There are different epistemological paradigms which can be adopted and help to guide the research, including ‘interpretivism’, ‘empiricism’, ‘positivism’, and ‘realism’.

‘Interpretivism’ focuses upon the individual and how they make sense of their subjective reality (Holloway and Wheeler, 2002). Therefore the whole phenomenon is examined in order to gain a full understanding of the meanings and motives behind people’s actions. As a result, this epistemological stance rejects the notion of complete objectivity, i.e. that value-free data cannot be obtained. It accepts that human reflexivity and social identity affect the relationship between researcher and participant and are integral to the research (Smith, 1983). Walsham (1995) indicates that knowledge of reality and truth is ‘a social construction by actors’, whereby the researchers’ preconceptions guide the research process and the interaction between researcher and participant may change the perceptions of both parties. Qualitative research is often characterised by an interpretive approach (Denzin and Lincoln, 1995).

In contrast, ‘empiricism’ is based on the assumption that knowledge is obtained via sensory perceptions and experience, and is acquired through observations (Chinn and Kramer, 1995; Willig, 2008). The empiricist paradigm proposes that knowledge is grounded in the data, and theory follows from observations, i.e. theory is constructed once the data is collected through observations (Willig, 2008). The ‘scientific method’ is associated with this paradigm, and focuses on the experiment, control, objectivity, quantification of data, and statistical results (Monti and Tinggen,

2009). Criticisms of empiricism include the objectivity of the research which would decontextualise the human experience, i.e. humans would not be seen as having any interactions with the environment (Holmes, 1990). Additionally, criticism has arisen with the 'control' aspect of empiricism; it is difficult to control factors when conducting research with humans, such as controlling confounding variables, as this excessive control would result in distancing itself from reality and instead creating an artificial situation (Monti and Tingen, 2009).

'Positivism' is very closely related to 'empiricism' and proposes a relationship between the world (objects, events, phenomena) and perceptions relating to them (Willig, 2008). This paradigm follows a natural science approach by testing theories and hypotheses, and aims to increase the predictive understanding of phenomena and seek causal relationships whilst remaining objective (Hirschheim, 1985; Holloway and Wheeler, 2002). Positivism aims for objective knowledge without personal involvement from the researcher, i.e. value-free data. Positivists believe that reality can be observed and understood from an objective viewpoint (Levin, 1988). According to Healy and Perry (2000), positivism dominates in science and is used to guide quantitative research. The positivist approach has been criticised due to its objectivity and not accepting the contribution of the researcher's understanding of the world, and consequently neglecting subjective interpretations (Krauss, 2005). Due to the criticisms, there has been a paradigm shift from 'positivism' to 'post-positivism'. The post-positivist epistemology is less severe than 'positivism' and instead recognises that the researcher is not independent of the object under study (Cook and Campbell, 1979). One such paradigm is known as 'critical realism' (Krauss, 2005).

‘Critical realism’ is based on the concept that there is a reality of the world which is independent of our thinking and perception, and recognises there are differences between reality and people’s perceptions of reality (Bisman, 2002). This paradigm proposes that reality exists but the knowledge of reality cannot be fully discoverable or apprehended and that observations are fallible (Guba and Lincoln, 1994; Wollin, 1995). Unlike positivism, ‘critical realism’ shows awareness of the values of human systems and of the researchers (Krauss, 2005). A scientist may hold the belief that the world can be seen as it is, but a critical realist accepts that humans are biased and have their own observations which reflect on how the world is seen. Thus, the knowledge of reality cannot be understood independently of the social factors involved in the knowledge acquisition process (Dobson, 2002; Krauss, 2005). This epistemological paradigm illustrates awareness of human values and reflectivity, and takes the stance that data is ‘value cognizant’ (Krauss, 2005) rather than accepting that the data is value-free (as described by the positivist paradigm) or value-laden (as illustrated by the positivist paradigm).

The aim of the present thesis was to understand the contribution of Protection Motivation Theory and subjective norm in understanding MMR immunisation intentions and behaviour, and also to examine the role of norms and trust in the decision-making process in greater depth. The thesis was to be both confirmatory and exploratory, and although it used the quantitative PMT study as its framework, it was also aiming to further investigate issues which arose from the findings in greater depth and using different methodologies, e.g. examining subjective experiences via qualitative methods. Whilst ‘interpretivism’ favours a qualitative approach and ‘empiricism’ and ‘positivism’ favour quantitative methods, ‘critical

realism' recognises that observations and measurements are imperfect, and, therefore, the employment of both qualitative and quantitative methods are seen as appropriate to understand the mechanisms involved in actions and events and to come close as possible to discovering reality (Healy and Perry, 2000). Hence 'positivism' and 'empiricism' were rejected as approaches in this thesis as they would not permit the measurement of perceptions and subjective experiences due to their objective stance. 'Interpretivism' was also rejected as it would not permit the measurement and generalisation of the PMT findings due to its purely subjective stance. Thus a critical realist framework was used to guide the research. Critical realism does not focus on the distinctions between qualitative and quantitative research, but instead focuses upon the phenomenon and aims to understand the observable and non-observable mechanisms which drive actions and events (Outhwaite, 1983; Tsoukas, 1989).

2.3 Mixed Methods

A mixed method approach was used to understand the MMR phenomenon; a 'nested' strategy was employed whereby the quantitative PMT study was used as the main framework of the thesis and subsequently qualitative methodologies were incorporated to gain further understanding of the phenomenon (DePoy and Gitlin, 1993; Lieberman, 2005). For example, subjective norm was found to be an important factor in the decision-making process (studies 1 and 2), and therefore it was felt to be pertinent to focus on the role of norms in the MMR immunisation decision with the use of a qualitative methodology: focus groups using thematic analysis. The findings from the focus groups (study 3) illustrate the importance placed on the role of trust in health professionals by the participants, and this lead to

the final study (study 4) being conducted using semi-structured interviews and a grounded theory approach to understand the role of trust in the MMR immunisation decision in greater depth. The logical chain of evidence found in each study necessitated the use of mixed methods (Chen, 1997). The nested approach has been described as both pragmatic and synergistic through use of initiation and expansion of research and theory (Rossman and Wilson, 1985; Caracelli and Greene, 1997; Lieberman, 2005). Additionally, the use of mixed methods is considered acceptable as long as the methods are mixed within a paradigm (Leininger, 1992), also known as ‘intra-method triangulation’. According to Morgan (1998a), once an epistemological stance has been taken then the selection of appropriate methods becomes a ‘*largely technical task*’. As stated above, a ‘critical realism’ paradigmatic stance was taken as the framework of the thesis, and the following methods were selected: questionnaire surveys (with statistical analysis), focus groups (with thematic analysis) and interviews (with grounded theory). Table 2.1 outlines the differences between quantitative and qualitative methods, and further details are provided below.

2.4 Quantitative Research

Questionnaires are used when the researcher has a clear understanding of the area to be researched and the findings can be generalised. Postal questionnaires were used in the first study (Chapter 3) when investigating the contribution of Protection Motivation Theory (PMT) and subjective norm to decision-making for parents. There were many advantages to using postal questionnaires, including cost-effectiveness, time efficiency, increase in access to a wider range of participants, and the ability of participants to complete the questionnaires in their own time

(Seitz, 1944; Benson, 1946; Cahalan, 1951; Jahoda, Deutsch and Cook, 1962; Bachrack and Scoble, 1967; Hochstim and Athanasopoulos, 1970; Moser and Kalton, 1971). Additionally, postal questionnaires may be seen as preferable by some participants as they are anonymous and non-intrusive.

For the first study (refer to Chapter 3), a cross-sectional and retrospective design was used. It was recognised that a longitudinal approach (investigating the role of prior parental beliefs, attitudes and cognitive factors in the immunisation decision) would have been more methodologically robust, however ethical approval was obtained from Tayside NHS Research Ethics Committee on the condition that the study was cross-sectional and non-influential in parental decision-making during the first dose MMR vaccine. The study was conducted in 2003 when MMR uptake rates were at their lowest in Scotland (below 86%), and therefore the NHS board were reluctant to approve research which may potentially influence MMR attitudes and result in a further decline, i.e. any research which examined or mentioned the link between the MMR vaccine and autism or Crohn's disease. A longitudinal study which followed the parents' journey from intention formation to behavioural performance would have been ideal as it would have helped to understand the factors involved in transferring intentions into behaviour and identified causal links. Nevertheless, there are advantages to using a cross-sectional design because it provides useful descriptive information (Kasl and Amick, 1995), and determines prevalence and identifies associations between the factors under study (Mann, 2003). In Chapters 3 and 4, the cross-sectional design highlighted the significant relationship between subjective norms, PMT variables and MMR immunisation intentions.

Previous immunisation research have utilised models such as PMT (Strobino et al, 1996), Theory of Planned Behaviour (TPB; Pareek and Pattison, 2000; Tickner et al, 2010) and Health Belief Model (HBM; Bennett and Smith, 1992; Bond et al, 1998) (refer to Chapter 1, section 1.9.1, for details of the studies and models). However, the present thesis utilised PMT as a framework for the cross-sectional design used in chapters 3 and 4. PMT had not been used in previous research focusing on MMR decisions following Wakefield's proposed links. However, PMT was considered an appropriate model as it has been identified as an important 'psychometric risk model' used to understand risk perception, reaction and behaviour (Berry, 2004). Utilising this model enabled the cognitive science approach to be taken when understanding the factors involved in the MMR decision (refer to Chapter 1, section 1.8, for details of the cognitive science approach). PMT allows a rational risk/benefit analysis to be achieved and places emphasis on cognitive processes relating to fear appeals (Rogers, 1975, 1983; Witte, 1992; Meszaros et al, 1996), and the study of fear appeals is salient in the MMR context. Furthermore, previous research has reported PMT to be a successful model when examining the decision-making process made on behalf of others, i.e. parents' decisions for their children (Keane, Stanton, Horton, Aronson, Galbraith and Hughart, 1993; Flynn, Lyman, and Prentice-Dunn, 1995; Searle, Vedhara, Norman, Frost and Harrad, 2000; McClain, Bernhardt and Beach, 2005; Norman, Searle, Harrad and Vedhara, 2003). However a limitation associated with PMT includes not taking into account the role of social factors when understanding risk behaviours (Ogden, 2000) (refer to Chapter 1, section 1.10, for greater detail). Therefore, subjective norm was also examined in Chapters 3 and 4.

The present thesis did not use the HBM and TPB as previous research has illustrated limitations with these models. Conflicting findings have been reported when using HBM. The components have been described as unidimensional and the relationship between the components and behaviour as fixed and linear (Becker, Kabach, Rosenstock and Ruth, 1975; Langlie, 1977; Janz and Becker, 1984; Sheeran and Abraham, 1999). Furthermore, although the HBM model has been described as a ‘psychometric risk model’ (Berry, 2004), the constructs suggest that individuals rationally process information and therefore prohibit the inclusion of any fear components. Thus, the model would not be effective when understanding MMR immunisation behaviour and fear associated with autism and Crohn’s disease. Similarly, TPB does not also assess health threats or clearly illustrate risk evaluation. It is crucial to examine fear/threat when focusing on MMR immunisation behaviour in this context, and, therefore, PMT was considered appropriate to use when examining MMR immunisation and the decision-making process.

2.4.1 Chapter 3: Quantitative Study 1 (parents)

The aim of the Chapter 3 study was to understand parents’ MMR decision for first dose and second vaccine by using the PMT model. It also examined SN to determine whether the inclusion of this construct contributed to the overall model. The study was conducted in Dundee and participants were randomly selected to represent the parent population in Dundee; randomisation tables were used to select participants from the SIRS (Standard Immunisation Recall System) database. Parents with children born between 1999 and 2000 were purposefully chosen for three reasons: 1) Wakefield’s proposed hypothesis of the MMR vaccine and

autism/Crohn's disease link would have occurred prior to the parents having to make the MMR decision; 2) all parents had the opportunity to immunise their child with the first MMR vaccine (offered at 12-15 months); and 3) these parents were approaching (or had reached) the period whereby their child would be offered the second dose vaccine (offered at 3-5 years).

Postal questionnaires were sent to all parents. The questionnaire (refer to Appendix I) measured the following PMT constructs: behaviour for first dose and second dose MMR immunisation, protection motivation (intention) for first dose and second dose MMR immunisation, fear of the vaccine-preventable diseases, severity of the vaccine-preventable diseases, vulnerability to the vaccine-preventable diseases and autism and irritable bowel disease (IBD), response efficacy: 'immunisation efficacy and attitudes' and 'safety evidence' subscales, and internal and external self-efficacy (cues to action and barriers). Subjective norm was also included to understand the contribution of significant others (partner, child's grandparents, friends, GP, health visitor, and practice nurse) to the MMR immunisation decision.

A review was undertaken of the items used in previous studies which focused on the MMR vaccine given alone or alongside other childhood vaccines (see Table 2.2 for details). Three of the reviewed studies (Bennett and Smith, 1992; Strobino et al, 1996; Bond et al, 1998) were conducted prior to the MMR and autism/Crohn's disease link. Nonetheless, these papers were still reviewed as the issues raised are still of concern to many parents, regardless of the autism and Crohn's disease concerns. The questionnaire in the present study was developed by adapting items/themes from these previous studies.

'Fear' was highlighted in previous qualitative studies (Bond et al, 1998; Evans et al, 2001) as themes relating to risks or dangers associated with the vaccine-preventable diseases, and therefore the present study used these themes to construct an item measuring fear relating to the vaccine-preventable diseases. However, 'fear' was considered a potentially negative affect-inducing word and may have resulted in the item not being sensitive enough to measure the underlying construct, and thus was replaced with 'worry' in the final questionnaire. The majority of the reviewed studies related 'severity' to the vaccine preventable diseases, and the present study mirrored this construct. 'Vulnerability' was related to the associated risks of developing the vaccine preventable diseases or autism/Crohn's disease by opting for or declining the MMR vaccine. Again, the present study adapted this construct and included risks of measles, mumps, rubella, autism and IBD associated with MMR immunisation and non-immunisation. The previous studies indicated that 'response efficacy' referred to the efficacy of the vaccine and associated safety issues. The present study included 10 items to cover these relevant issues (using both positively and negatively phrased questions to minimise response bias). The items were categorised into either the 'immunisation efficacy and attitudes' subscale or the 'safety evidence' subscale. Due to the large number of items in the 'response efficacy' variable, a variable reduction procedure, i.e. a principle component analysis, was conducted to determine whether any of the items were redundant. In total only 4 items, with loadings of over 0.6, were retained, with two items in each of the response efficacy subscales (refer to Chapter 3, section 3.33 for further details). The literature review also highlighted two types of self-efficacy issues – internal issues relating to the parents' own anxiety and ability to look after the child post-vaccination, and external issues relating to barriers preventing them from

attending the immunisation procedure (e.g. problems with transport, time, caring for other family members, and child/parents' health). Two subscales were created to reflect both internal and external self-efficacy issues related to MMR immunisation behaviour. SN was reviewed and the following referents were illustrated as important: family, friends and health professionals (GP, nurse and health visitor). In the present study, 'family' was represented by partner and child's grandparents; both referent groups have been reported as salient referents during decisions related to own children. For example, support from the partner and the child's grandparents have been reported as salient when deciding to breast or bottle-feed (Freed, Fraley and Schanler, 1992; Littman, Mendendorp and Goldfarb, 1994; Baranowski, Bee, Rassin, Richardson, Brown, Guenther and Nader, 2002).

Tayside NHS Research Ethics Committee provided ethical approval on the condition that the research was conducted retrospectively. Therefore, parents with children aged 3 or over (born in 1999 and 2000) were specifically recruited to participate. This provided the opportunity to examine both the first dose and second dose vaccine decision. The same items were used to explore both behavioural decisions to determine whether similar issues were relevant for both behaviours and whether the model (PMT and SN) significantly contributed to explaining both behaviours.

The media, in particular, has been highlighted as an important source of information when obtaining information about the MMR vaccine's links with autism and IBD (Bond et al, 1998; Pareek and Pattison, 2000; Evans et al, 2001), and thus it was important to include an item relating to media sources. However, 'media' was not

included as a referent in the SN measure as this construct examined the active contribution of significant others and associated behavioural motivations (Conner and Sparks, 1999), whereas the media cannot be considered as a 'significant other'. Therefore, an additional item was included in the questionnaire measuring the importance of receiving information from the media (TV, newspapers) and the following resources: family, friend, GP, health visitor, and internet.

Table 2.2: Review of Items Used in Immunisation Studies

Construct	Reviewed papers	Items/constructs/themes from previous research*	Items included in Chapter 3 (parents)	Items included in Chapter 4 (students)
<i>Fear</i>	Bond et al (1998)	Themes: risks associated with developing vaccine-preventable diseases.	‘How worried would you be if this child were diagnosed with measles/ mumps/ rubella?’	‘How worried would you be if you were diagnosed with measles/ mumps/rubella?’
	Evans et al (2001)	Themes: side-effects, dangers and risks associated with the vaccine-preventable diseases.		
<i>Severity</i>	Bennett and Smith (1992)	General area: severity of disease if not vaccinated.	‘How serious are the following illnesses for children in general who have not been immunised with the MMR vaccine: measles/ mumps/ rubella?’	‘How serious are the following illnesses for students who have not been immunised with the MMR vaccine: measles/ mumps/ rubella?’
	Strobino et al (1996)	General area: measurement of the severity of measles		
	Bond et al (1998)	Themes: severity of vaccine-preventable diseases.		
	Pareek and Patitson (2000)	Item: ‘How serious do you feel measles is?’		
	Evans et al (2001)	Themes: severity of measles and vaccine-preventable diseases.		

Construct	Reviewed papers	Items/constructs/themes from previous research*	Items included in Chapter 3 (parents)	Items included in Chapter 4 (students)
<i>Vulnerability</i>	Bennett and Smith (1992)	General area: likelihood of child developing a disease if vaccinated/not vaccinated.	i) ‘What would be the risk of developing the following illnesses with children in general who are not immunised with the MMR vaccine: measles/ mumps/ rubella/?’	i) ‘What would be the risk of developing the following illnesses with students who are not immunised with the MMR vaccine: measles/ mumps/ rubella?’
	Strobino et al (1996)	General area: measurement of the likelihood of developing measles if the child is not immunised.	ii) ‘What would be the risk of developing the following illnesses with children in general who are immunised with the MMR vaccine: autism / IBD?’	
	Bond et al (1998)	Themes: the risk of vaccination in comparison with the risk of vaccine-preventable diseases; concerns for unknown side-effects of vaccines.		
	Evans et al (2001)	Themes: risks associated with immunisation – autism and Crohn’s disease; dangers of vaccine-preventable diseases.		
	Pareek and Patitson (2000)	Item: ‘Vaccination protects my child against the diseases measles, mumps and rubella.’		

Construct	Reviewed papers	Items/constructs/themes from previous research*	Items included in Chapter 3 (parents)	Items included in Chapter 4 (students)
<i>Response efficacy</i>	Bennet and Smith (1992)	General area: risk of permanent health problems with vaccines.	i) 'Immunisation efficacy and attitudes' subscale: - 'It is more dangerous for a child to have the MMR immunisation than to have measles.'	i) 'Immunisation efficacy and attitudes' subscale: - 'It is more dangerous for a student to have the MMR immunisation than to have measles.'
	Strobino et al (1996)	General area: measurement of belief whether 'shots' for measles were effective;	- MMR immunisation weakens a child's immune system.'	- MMR immunisation weakens the immune system.'
	Bond et al (1998)	Themes: efficacy or failure of vaccines in the prevention of diseases.		- 'It is more dangerous for a student to have rubella than to have MMR immunisation.'
	Pareek and Patitson (2000)	Item: 'How safe do you think the MMR vaccine is?'; 'vaccinations protect my child against the diseases measles, mumps and rubella.'	ii) 'Safety evidence' subscale: - 'There is strong evidence of a link between MMR immunisation and autism.'	- 'It is more dangerous for a student to have the MMR immunisation than to have mumps.'
	Evans et al (2001)	Themes: benefits of immunisation – MMR and single vaccines; risk of autism/Crohn's disease from immunisation; side-effects related to vaccines (eg triggers allergies and development of future diseases).	- 'There is no strong evidence that MMR immunisation causes inflammatory bowel disease.'	- 'There is no strong evidence that MMR immunisation causes inflammatory bowel disease.'
			Items which were excluded by principle component analysis: - MMR immunisation may result in a severe allergic reaction.	

Construct	Reviewed papers	Items/constructs/themes from previous research*	Items included in Chapter 3 (parents)	Items included in Chapter 4 (students)
	Ramsay et al (2002)	General area: safety of vaccines.	<ul style="list-style-type: none"> -MMR immunisation reduces the risk of developing meningitis. -MMR immunisation is not effective. -Giving 3 separate vaccines for measles, mumps and rubella may reduce the risk of side-effects. -MMR immunisation will prevent the occurrence of measles, mumps and rubella. -MMR immunisation will reduce the risk of side-effects from measles, mumps and rubella. 	
<i>Self-efficacy</i>	Bennett and Smith (1992)	General area: child's distress following vaccinations; concerns of illness following vaccinations; obtaining a convenient appointment; transport to attend appointment.	i) 'External self-efficacy' subscale: 'At the time you were considering the first MMR immunisation, how easy or difficult was it for you to take this child to have the MMR immunisation with regard to the following: the time of appointment, taking time out to attend, other children to care for, transport problems, your own health, this child's health, your capability of looking after this child after the	i) 'External self-efficacy' subscale: 'If you have had the MMR immunisation – how easy or difficult was it for you to have the immunisation with regard to the following:/ If you have not had the MMR immunisation – how easy or difficult can you foresee the following to be: the time of appointment, taking time out to attend, university work (essays, exams etc), transport problems, your own health, your capability of looking after yourself after the immunisation.'
	Strobino et al (1996)	General area: parents' capability of immunisation the child in relation to: making an appointment, having money to pay for the vaccines, having		

Construct	Reviewed papers	Items/constructs/themes from previous research*	Items included in Chapter 3 (parents)	Items included in Chapter 4 (students)
		time, transport to attend the appointment, and ‘hassles’ associated with bringing other children to the clinic.	immunisation.’	
	Bond et al (1998)	Themes: minor illnesses in the child/family as a major barrier; laziness; anxiety; side-effects from previous immunisations.	ii) ‘Internal self-efficacy’ subscale: ‘At the time you were considering the first MMR immunisation, how easy or difficult was it for you to take this child to have the MMR immunisation with regard to the following: this child’s distress (from previous injections), your anxiety regarding the immunisation.’	ii) ‘Internal self-efficacy’ subscale: ‘If you have had the MMR immunisation – how easy or difficult was it for you to have the immunisation with regard to the following:/ If you have not had the MMR immunisation – how easy or difficult can you foresee the following to be: your distress (regarding your experiences from previous injections), your anxiety regarding the immunisation.’
	Pareek and Patitson (2000)	Item: ‘Taking my child for vaccination is very easy.’		
<i>Subjective norm</i>	Bennett and Smith (1992)	General area: social influences – family, friends.	i) ‘Please circle a number (between 0-10) for each person listed regarding whether or not the following people wanted this child to have the MMR immunisation: partner, child’s grandparents, friends, GP (doctor), health visitor, practice nurse.’	i) ‘If you have had the MMR immunisation: please circle a number (between 0-10) for each person listed regarding whether or not the following people wanted you to have the MMR immunisation// If you have not had the MMR immunisation: please circle a number (between 0-10) for each person listed regarding whether or not the
	Strobino et al (1996)	General area: having up-to-date immunisations is a community norm.		

Construct	Reviewed papers	Items/constructs/themes from previous research*	Items included in Chapter 3 (parents)	Items included in Chapter 4 (students)
	Bond et al (1998)	Themes: discussions with health professionals and motivation to comply.		following people want you to have the MMR immunisation: partner, family, friends, GP (doctor), practice nurse.’
	Pareek and Patitson (2000)	Item: My GP wants my child to have the MMR vaccine’ and general area: motivation to comply with others.	ii) ‘Please circle a number (between 0-10) for each person listed regarding how much you followed their advice: partner, child’s grandparents, friends, GP (doctor), health visitor, practice nurse.’	ii) ‘If you have had the MMR immunisation: please circle a number (between 0-10) for each person listed regarding how much you followed their advice// If you have not had the MMR immunisation: please circle a number (between 0-10) for each person listed regarding how much you will follow their advice: partner, family, friends, GP (doctor), practice nurse.’
	Evans et al (2001)	Themes: discussions with doctors, nurses and health visitors; pressure from health professionals.		
	Ramsay et al (2002)	General are: discussions with health professionals.		

* Some of the papers did not provide the actual items used in their questionnaire, and therefore the ‘general area’ relating to the items are provided. The themes from the qualitative research papers are also provided.

2.4.2 Chapter 4: Quantitative Study 2 (students)

An opportunity to investigate students' MMR decision-making and behaviour was provided during the thesis research. There had been outbreaks of both measles and mumps across the UK, including an outbreak of mumps at the University of Stirling. In total 18 students, from the University of Stirling, were diagnosed with mumps during 2004. As a result, the university began a mass campaign, with poster and leaflets distributed on campus, to immunise all students aged 17-24 with the MMR vaccine. Therefore, a similar study to the one undertaken in Chapter 3 was conducted using university students as the participant population rather than parents. Students who were also parents were excluded in the study as the aim was to investigate students' MMR decision (parents were investigated in Chapter 3). It was important to obtain the two distinct population groups in order to permit MMR immunisation comparisons between the groups. Data triangulation was performed whereby two different population groups were compared to understand the one phenomenon – MMR immunisation behaviour (Denzin, 1989). The use of similar questionnaires but with different populations determined whether MMR immunisation intentions and behaviour differ depending on the population under study. Students had to make the MMR decision based on risk perceptions for themselves, whereas parents had to make the MMR decision on behalf of their child. Thus, the study would identify the risk assessment process for both groups. Additionally, the present study would provide greater understanding of whether PMT explains students' MMR decision, and whether SN further contributes to the model with this population group. The questionnaire used in Chapter 3 (detailed above) was used in the present study but adapted accordingly (refer to Appendix II for the questionnaire and Table 2.2 for details of the items). The following items

were identical apart from the instructions whereby ‘this child’ and ‘children in general’ was replaced with ‘you’ or ‘students’: ‘fear’, ‘severity’, ‘vulnerability’, ‘external self-efficacy’, ‘internal self-efficacy’ and subjective norms’. Additional modifications to the ‘external self-efficacy’ items included replacing the statement ‘other children to care for’ with ‘university work (essays, exams etc.)’ which was seen as more relevant to students. The item ‘this child’s health’ was also removed as it was not relevant to the participants. The ‘vulnerability’ items only focused on measles, mumps and rubella; autism and IBD were excluded as no link between adults and these conditions have been identified in the medical literature. The two response-efficacy subscales identified in Chapter 3 were also included; the items in the ‘immunisation attitudes and efficacy’ subscale were changed to refer to students: ‘It is more dangerous for a student to have the MMR immunisation than to have measles’ and ‘MMR immunisation weakens the immune system’. Furthermore, due to the mumps outbreak on campus, the following item was also included: ‘It is more dangerous for a student to have the MMR immunisation than to have mumps’. It was considered prudent to include an item on ‘rubella’ in order to cover all three of the vaccine-preventable diseases: ‘It is more dangerous for a student to have rubella than to have MMR immunisation.’ No changes were made to the ‘response efficacy: safety evidence’ subscale. Although the autism and IBD links were associated with children and not students, this subscale was still included to allow comparisons of safety perceptions with parents. The subjective norm items remained similar apart from the referent ‘child’s grandparents’ was changed to ‘family’ which was judged to be of greater relevance to students. Additionally, two sets of instructions were provided each for immunised and non-immunised students on the following questions: ‘internal self-efficacy’, ‘external self-efficacy’ and ‘subjective norms’

(refer to Table 2.2 for details). Items relating to intentions and behaviour were also asked in the questionnaire. Some of the students may have been immunised as young children with the MMR vaccine, and, therefore, two items were asked relating to whether they had been immunised with the MMR vaccine: if they answered 'yes' then they were requested to answer when they had been immunised, and if they answered 'no' then they were asked whether they intended to immunise. Students were also asked an item about whether they thought they needed to be immunised with the MMR vaccine (regardless of previous immunisation status). The response options included 'yes', 'no' and 'unsure'. A question relating to whether they intended to immunise future children was also asked. It was important to assess students' awareness of the mumps outbreak, and therefore two items were included to examine whether they were aware of the mumps outbreak on campus and that the MMR vaccine was being offered on campus at the medical centre. Two additional items were asked about whether they knew someone with mumps on campus and if this influenced their own MMR decision. Both of the latter items include the following response options: 'yes' and 'no'. Lastly, an identical item relating to important sources of information which was included in Chapter 3 was also included in the student questionnaire.

Postal questionnaires were not used for this population group as the students were approached directly and recruited on campus at the University of Stirling (see Chapter 4, section 4.3.2, for further details). This allowed the whole procedure to be both cost-effective and time-efficient.

2.5 Qualitative research

“The ultimate aim of qualitative research is to offer a perspective of a situation.... One of the strengths of the qualitative approach is the richness and depth of explorations and descriptions.”

(Myers, 2002)

Qualitative research attempts to gain an insight into individuals' attitudes, beliefs, motivations, relationships, culture and behaviours by interpreting the meanings people attach to the phenomena under study (Jones, 1995). As a result, this approach provides greater understanding of the individual's experience in a contextual setting. One of the advantages of qualitative research over quantitative research is that it attempts to understand the full dimensional picture of the phenomena, whereas quantitative research focuses on specific variables and aims to confirm hypotheses about the phenomenon (Mack, Woodsong, MacQueen, Guest and Namey, 2005). According to Dowell, Huby and Smith (1995) there are three reasons for conducting qualitative research: 1) to access the processes involved in the changing or sustaining of behaviours, systems and relationships; 2) to study beliefs to understand intentions and behaviours; and 3) to understand the meaning people attach to phenomena within a specified context. In the present thesis, the qualitative studies were undertaken to examine in greater detail the findings from the previous studies, and thus used a nested approach (refer to section 2.3 for details).

According to Reicher (2000), there are two types of approaches to qualitative research: 'experiential' and 'discursive'. An experiential approach aims to

understand experiences, cognitions and actions, whereas a ‘discursive’ approach focuses on the role of language in the construction of reality. Discourse analysis and conversation analysis would be fitting methodologies when employing a discursive approach, and thematic analysis, content analysis, grounded theory and interpretative phenomenological analysis would be appropriate methodologies if taking on an experiential approach. An experiential approach was selected in the present thesis as it would permit a greater understanding of parents’ MMR behaviour via their subjective experiences. Two types of qualitative methodologies were undertaken in Chapters 5 and 6: thematic analysis and modified grounded theory approach (discussed below in detail), and both methods allowed different questions and theories to be formed and evolved.

“In-depth interviews are useful for learning about the perspectives of individuals, as opposed to, for example, group norms of a community, for which focus groups are more appropriate”

(Mack et al, 2005: 42)

Both focus groups and interviews were used in Chapter 5 and 6, respectively, and these two different qualitative methods are associated with many advantages. Focus groups help to understand the variety of norms and opinions within a population, whereas interviews focus on individual experiences and provide the individual perspective of events, focusing on phenomena and beliefs (discussed below in greater detail). It is widely acknowledged that data familiarisation is salient in qualitative analysis in order to build a deeper insight into understanding the data (Howitt and Cramer, 2007), and therefore the researcher carried out the data

collection, analysis, and transcription for both studies. Additionally, transcripts were read and re-read to familiarise the content and identify the regularly occurring themes in the data.

2.5.1 Chapter 5: Thematic Analysis Approach

The findings from Chapter 3 identified SN as an important contribution to the MMR immunisation decision. However, the narrow conceptualisation of normative influences (refer to Chapter 5) suggests it is pertinent to explore normative influences rather than solely focusing on SN. Thus, the following norms were examined in the present study: group norms, identity, SN, descriptive norms, private/collective self, and moral norms (refer to Appendix III for the interview guide). Two types of analysis were deemed appropriate for this chapter – ‘content analysis’ and ‘thematic analysis’.

Content analysis proposes the content to be inherent in a text, and involves the objective, systematic and quantitative description of the content (Berelson, 1952; Krippendorff, 2004). According to Joffe and Yardley (2004), content analysis is concerned with establishing categories and calculating the number of times they make an appearance in the text. Inferences are made from the data to their context in a systematic and objective process (Krippendorff, 2004). However, this analysis has come under criticism because of its focus on frequency outcomes and neglect of meanings attached to the context (Silverman, 1993; Joffe and Yardley, 2004). In contrast, thematic analysis, although it shares many of the principles of content analysis, overcomes the criticism of the latter analysis by systematically combining the frequency of the themes in the text and combining this with the analysis of their

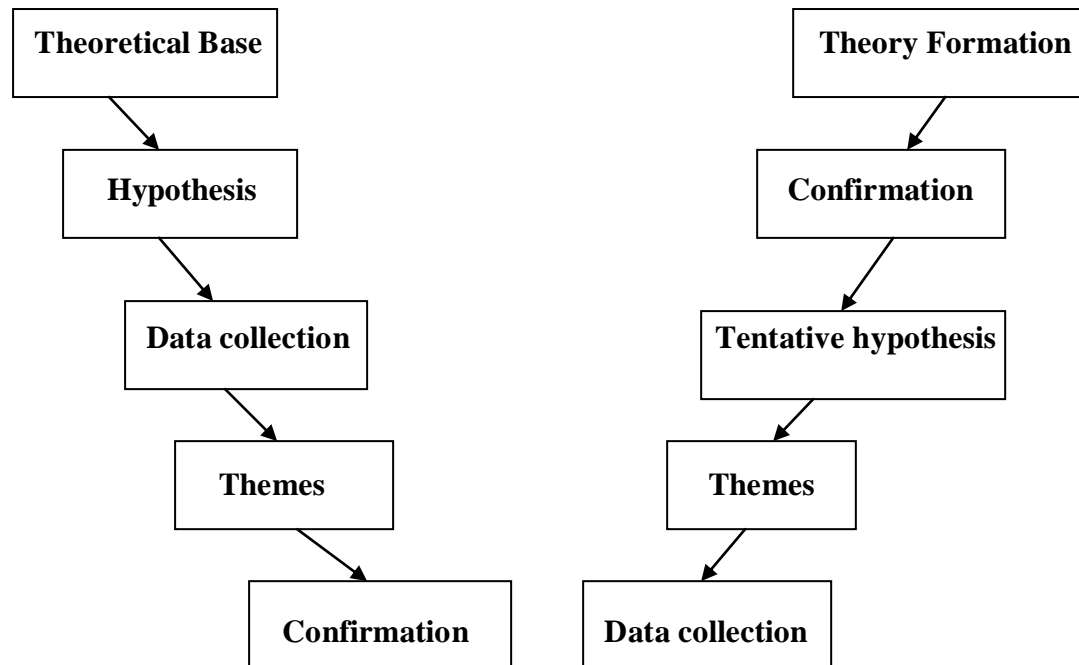
meaning in context (Joffe and Yardley, 2004). The goal of thematic analysis is to discover meaning and understanding of the phenomenon (Benner, 1999), and an additional advantage of this analysis includes the ability to summarise key features of large bodies of data (Braun and Clark, 2006).

Thematic analysis was employed when exploring the role of norms during the MMR immunisation decision. This type of analysis is appropriate for both inductive ('bottom-up') and deductive ('top-down') analysis as the themes and patterns emerge from the data (Boyatzis, 1998). Deductive analysis refers to the theoretical ideas the researcher brings to the data, in this case it was from a critical realist epistemology, and inductive analysis refer to the raw information collected (refer to Figure 2.1). A deductive approach was taken in Chapter 5 as the themes were drawn, identified and confirmed from existing theoretical ideas relating to social norms. Using theoretically-derived themes as a framework for the questions allowed for a deeper understanding of the theory (Boyatzis, 1998).

Figure 2.1: Deductive and Inductive reasoning

*Deductive Reasoning:
Top-down Approach*

*Inductive Reasoning:
Bottom-up Approach*



This figure has been based on Trochim's (2006) work

An essential phase of thematic analysis process is the coding, or categorising, of the data and involves abstracting relevant details (Dey, 1993). Codes were created as the data was studied, and throughout all stages of the analysis process the coding was changed and modified as new ideas developed and themes emerged from the data (Charmaz, 1995; Howitt and Cramer, 2007). The analysis involved the identification of themes which reflected their context. According to Aronson (1994) and Taylor and Bogdan (1998), themes are defined as units of meaning which are derived from various elements of interviews (e.g. conversation topics, vocabulary meanings, feelings, proverbs). The themes were identified using a semantic level analysis (Boyatzis, 1998; Braun and Clarke, 2006), whereby patterns were identified from the semantic content in all focus groups and then interpreted to elicit their contribution to parental decision-making. The transcripts were first coded into broad

themes and these were then catalogued into sub-themes. This hierarchical coding, also known as tree coding, allowed for a greater understanding of the influence and components of norms involved in the MMR decision; the broad higher order codes provided a general overview of the themes, and the detailed lower order codes were more specific and enabled distinctions within and between groups (King, 2004).

In order to obtain some form of reliability of the analyses, inter-rater reliability techniques were used to ensure the data was analysed correctly. Two psychology post-graduate students, with undergraduate training of qualitative methods, were briefed on the aim of the study and were then provided with randomly selected samples of the transcripts to code the data. A coding frame/grid was provided to aid the process (refer to Appendix III). Disagreements were discussed and the data was reanalysed until agreement was reached.

2.5.2 Chapter 5: Focus Group Method

Focus groups were the method of choice for the Chapter 5 study as they are ideal for generating new ideas previously not explored in-depth, and thus this method was utilised to understand normative influences in the context of discussion about parents' MMR decision. Focus groups are a popular method when assessing public knowledge and understanding of illness and health behaviours, and allow for accurate data to be obtained on specific issues within a social context (Basch, 1987; Khan and Manderson, 1992; Duke, Gordon-Sosby, Reynolds and Gram, 1994; Ritchi, Herscovitch and Norfor, 1994; Kitziinger, 1995; Robinson, 1999). This type of methodology is useful for individuals who do not either like the isolation and formality associated with one-to-one interviews, and those who are more likely to

engage in discussions when generated by other group members (Kitzinger, 1995). Focus groups rely on dynamic group interactions to stimulate thinking about specific topic areas and explore issues based on shared perceptions, whereas interviews focus on interactions between moderator and participant on the individual's ideas (Carlsen and Glenton, 2011). They help participants to explore, elucidate and clarify their own ideas. Focus groups generate discussions and interactions which assist participants to generate their own questions, explore new ideas and concepts in a social context, and develop and extend statements which result in rich data (Willig, 2008). Additionally, group interactions permit the generation of data whilst simultaneously being time efficient (Kitzinger, 1995). The richness of the data emerges from this group dynamic, and therefore it is the role of the moderator to direct the discussion and cultivate a relaxed and positive atmosphere where participants are able to express their opinions freely (Kitzinger, 1995).

Participants were selected on the basis of their common experiences related to MMR decision-making (Carey, 1994). All participants shared the same experience of being a parent during Wakefield's hypothesised MMR and autism/Crohn's disease link and having to go through the MMR immunisation decision-making process. Focus groups generally consist of 2 to 12 participants (Dowell, Huby and Smith, 1995), but small focus groups tend to be more appropriate when the topic under discussion is personal, controversial and complex, whereas larger groups tend to be less involved with such intense and complex topics (Morgan, 1998b). Therefore, due to the controversial nature of the MMR vaccine and its associated

links with autism and Crohn's disease, the groups comprised of small numbers of participants, i.e. 3-4 participants in each group.

2.5.3 Chapter 6: Grounded Theory Approach

Chapter 6 aimed to further investigate findings from Chapter 5 which reported the importance of health professionals in the MMR decision-making process as trustworthy referents. The present study investigated the role of trust in the MMR decision in relation to health professionals in their local medical practice, health professionals in general, the Government and the single vaccine health centres. Two types of methodologies would have been appropriate to use for the present study: 'interpretative phenomenological analysis' (IPA) and 'grounded theory' (GT). Phenomenological research studies peoples' lived experience within a context (Van Manen, 1990), and similarly IPA examines the individual's lived experience and how they make sense of the phenomenon by understanding the quality and texture of their experience (Eatough and Smith, 2008; Willig, 2008). IPA recognises the interaction between the researcher and how the researcher's own view of the world will impact upon their engagement with the text and the subsequent interpretation of data (Willig, 2008). However, the present study's focus was to understand the social processes involved in the MMR decision in relation to trust, whereas IPA focuses solely on the individual and gaining an insight into their world. Thus, a Grounded Theory (GT) approach (Glaser and Strauss, 1967; Strauss and Corbin, 1990) was used to explore parents' feelings of trust in relation to MMR immunisation.

GT allows researchers to study social processes in order to explain and understand the processes, identify and integrate categories of meaning from the data and

consequently generate theory (Willig, 2008). In the GT context, theory has been described as:

“Identifying the relationship between and among concepts, and presenting a systematic view of the phenomena being examined, in order to explain what is going on.”

(Wiener and Wismans, 1990)

The processes of induction, deduction and verification are used to generate the theory (Strauss, 1987; refer to figure 2.1), and ultimately the theory aids understanding of the phenomenon. Initially, GT was seen as objective whereby the researcher’s role was passive and simply involved documenting the findings without any prior assumptions (Charmaz, 1990). However, the social constructionist version of GT accepts that the researcher plays a role in the theory generation process from the beginning via their epistemological stance, use of methodologies to obtain the data, and their interaction with the data (Charmaz, 1990, 2000; Willig, 2008). Chapter 6 documents the body of work and theory relating to trust in general health care, but such theory has not been applied in the MMR immunisation context. Thus, the existing theory was extended to understand the role trust in the MMR immunisation context with the use of GT (Holloway and Wheeler, 2002; Cutcliffe, 2005). The GT approach was based on a critical realist foundation whereby contextualised theory was favoured over the scientific/objective theory, i.e. the positivist paradigm (Oliver, 2011).

GT shares many similarities with IPA but differs in its practical and analytical process. For example, during IPA, a step-wise iterative process is applied during analysis; a single case will first be analysed and themes will be identified, and comparisons will then be made with other cases in the group and as further themes are identified this will lead back to further analysis of the original case (Smith, Jarman and Osborn, 1999). However, GT encourages questions to be revised throughout the interview process; previous interviews and questions tend to guide and modify further interviews in order to achieve a greater understanding of the phenomena under study in the analysis process (Cutcliffe, 2000). According to Alvesson and Sköldbberg (2000), the research process is controlled by the emerging theory throughout the whole process. This study applied a modified GT approach where the theory relating to trust in the health context was extended and applied to the MMR context (Cutcliffe, 2005).

During the interview process, data collection and analysis were performed in parallel and interacted throughout. The interviews were intentionally semi-structured and as the interviews continued and themes emerged, focus was purposefully diverted to the emerging themes. Data was coded as soon as possible after it was obtained. A three-level process was used to code the data: 1) line-by-line analysis was carried out to identify as many codes as possible and in-vivo coding was used²; 2) the coding was then conceptualised and categories were identified; and 3) axial coding was used in which categories were linked to subcategories via inductive and deductive thinking and theoretical coding enabled the emergence of

²In-vivo codes relate to the words or phrases used by participants to describe a phenomenon.

major categories (Strauss, 1987; Hutchinson, 1993). Glaser and Strauss (1967) describe this type of theory as substantive theory as it was set in one context, i.e. with parents' describing their MMR decision-making.

Memos were also used throughout the interviews to help the interviewer develop and formulate initial theory; memos are defined as '*records of analysis, thoughts, interpretations, questions and directions for further data collection*' (Strauss and Corbin, 1998, pp110). Memos are also used as validity checks as any changes in direction, prompted by earlier interviews, can be linked to the data. For the purpose of validity checks, a second coder was employed during the analysis process in this study. The coder, who had undergraduate experience of qualitative research (including GT) and interview skills, was provided with an initial brief of the study and topic area and sat in on four interviews (interview 1, 5, 8, and 16). The second-coder wrote memos during the interviews, identifying categories and additionally assessing the adequacy of the research questions. A coding frame/grid was used to aid the process (refer to Appendix IV). These memos were compared with the researcher's memos to achieve reliability and validity of the categories/codes identified, and also to identify important categories to guide the next interview.

2.5.4 Chapter 6: Interview Method

Interviews were used as the main method of collecting data to understand parents' experience of trust during the MMR immunisation decision. The previous studies conducted with parents in this thesis (see Chapter 3 and 5) had largely represented parents who opted for MMR immunisation, and under-represented those who either rejected the immunisation or opted for single vaccines. This may be due to the fact

that non-immunising parents were a minority group, and therefore were simply difficult to contact. Also, MMR immunisation is a personal decision and is associated with risks (i.e. autism and Crohn's disease), and therefore some parents may have been reluctant to discuss their decision in a group format. Additionally, media reports on the low MMR uptake rates and the increase in measles and mumps in the UK may have caused some parents to be reluctant to discuss their choice not to immunise with 'authority' figures and in a group format. Therefore, face-to-face interviews were purposefully chosen to encourage all parents (immunising and non-immunising) to share their decision-making experiences. This also enabled confidentiality and trust to be developed between participant and interviewer. Parents with children born between 2001 and 2003 were selected to take part to ensure they could more readily recall their reasons for arriving at their particular MMR decision.

Interviews are not simply used as a method of transmitting knowledge from informant to interviewer (Holstein and Gubrium, 1997), but also elicit experiences, opinions and feelings from the participant and allow for an in-depth understanding of the information provided and how the interviewee interprets and orders the world around them (Kvale, 1996; Mack et al, 2005). There are many methods of conducting interviews, for example, face-to-face, telephone, and internet-based (including social-networking sites and emails) interviews (Mann and Stewart, 2000; Morton Robinson, 2001; Burnard, 2004; Opdenakker, 2006). However, face-to-face interviews were considered appropriate due to the sensitive topic of MMR immunisation, and also to help promote trust between the interviewer and participant (Mack et al, 2005). Another advantage of the face-to-face approach

includes the ability of the interviewer to pick up on social cues, such as voice, intonation and body language (Opdenakker, 2006). Social cues can provide extra information to the interview which may not be identified if other approaches were taken.

Semi-structured interviews were used in Chapter 6. This method is flexible and focuses on the participant's experience rather than following a rigid procedure (Sarantakos, 1998). For example, broad and general questions were initially used at the start of all interviews and then the sequence of the questions varied or the questions were modified depending on the earlier responses of the participants. An interview guide was used as this ensured that all relevant topics and issues relating to MMR immunisation and trust were covered, but, as described above, questions were revised as new ideas and themes arose (refer to Appendix IV for the interview guide). Additionally, the use of an interview guide ensured that the interviewer had control of the interview so that the purpose of the study was achieved and the relevant issues relating to trust and MMR immunisation were explored (Holloway and Wheeler, 2002).

In summary, a critical realist paradigmatic stance was taken to guide the thesis. A mixed method approach with a nested strategy was employed to understand the MMR immunisation phenomenon in-depth. Quantitative methods were used to understand the contribution of PMT and SN in the MMR decision, and qualitative methods were selected to obtain greater knowledge of the further insight of the influence of social norms and trust in the MMR immunisation context.

Chapter 3

The Role of Protection Motivation Theory and Subjective Norm in Parents' MMR Decision-Making

3.1 Abstract

The MMR immunisation decision has been difficult for parents since Wakefield et al's (1998) proposed causal association between the MMR vaccine and autism and Crohn's disease. In the current study, a psychometric risk model, Protection Motivation Theory, was used to examine MMR decision-making for parents who opted for the vaccine and for parents who refused the vaccine. Additionally, important sources of information were investigated to determine whether the media played an important role in parents' decision. A cross-sectional within-subjects design was used to investigate retrospective immunisation behaviours for the first dose MMR vaccine and prospectively for second dose MMR vaccine. In total, 423 parents (399 immunising parents and 24 non-immunising parents), with children born between 1999 and 2000, participated in the study. The results indicate that PMT was a useful model to use when examining first-dose and second-dose MMR immunisation and associated risks. However, the inclusion of subjective norms increased the robustness of the model, suggesting subjective norm also played a major role in the decision-making process. Differences between immunisers and non-immunisers were highlighted; immunisers perceived the vaccine-preventable diseases to be severe and reported greater susceptibility and fear in relation to the diseases, whereas non-immunisers reported more concern about the associated risks of autism and IBD. Immunisers were more likely to follow the advice of the health professionals and reported them to be important sources of information, whereas non-immunisers were less likely to follow their advice and reported the media and internet as important sources of information. Findings suggest a social normative element needs to be incorporated in the PMT to provide a greater insight into first and second-dose MMR immunisation behaviour. Health professionals and the

media can play a pivotal role in MMR immunisation uptake and perception of associated risks.

3.2 Introduction

Since Wakefield et al's (1998) proposed hypothesis linking the MMR vaccine with autism and Crohn's disease, parents started questioning the safety of the vaccine (Evans et al, 2001). Vaccine uptake rates in Scotland dipped below 86% in 2003, prior to the retraction of the study by ten of Wakefield's colleagues, and national rates in the UK fell to 72% (Deer, 2006). The decrease in MMR uptake rates has resulted in outbreaks of measles across the UK (English, 2006). It is unclear why majority of the parents opted for the vaccine despite its associated risks, and why others rejected the vaccine. The aim of the present study was to understand the MMR immunisation decision-making process using a 'psychometric risk model' (Berry, 2004), i.e. Protection Motivation Theory (PMT). PMT allows a rational risk/benefit analysis to be undertaken and also reflects personal attitudes, beliefs and perceptions, which are important when understanding parents' immunisation decision-making (Meszaros et al, 1996).

Only two theoretically-driven studies (refer to Chapter 1, section 1.9) with relevance to the current MMR immunisation situation in the UK have been conducted: Pareek and Pattison (2000) and Tickner, Leman and Woodcock (2010). Both studies used the Theory of Planned Behaviour (refer to Chapter 1, section 1.9.1.2 for details) to understand first dose and second dose vaccine behaviours (Pareek and Pattison, 2000) and parents' intentions for the second-dose MMR vaccine (Tickner et al, 2010). Pareek and Pattison (2000) found that 'beliefs about vaccine outcomes' was the only significant predictor of MMR intentions for the first dose, accounting for 77.1% of the variance in the regression analysis, and for the second dose the following accounted for 93% of the variance in the intention score: 'vaccine

outcome beliefs', attitudes to MMR vaccine' and 'prior MMR status'. Tickner et al (2010), using the TPB, found both 'attitudes' and 'perceived behavioural control' were significant predictors of second dose intentions, accounting for 48-64% of the variance. However, it can be argued that TPB does not clearly illustrate risk evaluation in its theoretical framework, which is crucial when understanding behaviours associated with risk, such as MMR immunisation and its proposed causal association with autism and Crohn's disease. Therefore, in the current study PMT was used as a framework to understand the threat of autism and Crohn's disease versus the threat of developing vaccine preventable diseases during the MMR immunisation decision. One of the limitations of PMT is its neglect of social influences in understanding behaviours, and therefore a measurement of subjective norm (SN) was also included to assess the social influences involved in the MMR decision (refer to Chapter 1, section 1.10).

In order for 'virtual' elimination of measles, mumps and rubella to be achieved there needs to be a 95% uptake rate for both first MMR vaccine *and* second dose vaccine (Pareek and Pattison, 2000). In Scotland, reports indicate that MMR second dose rates are below the 95% uptake rates, with recent reports indicating an uptake of 90.6% (Information Services Division Scotland, 2010). A report from the House of Commons indicates the uptake rates in England are lower, with the uptake of both vaccines (combined) at 74% in 2007-2008 (Thompson, 2009). Results from Pareek and Pattison's (2000) study illustrate differences between the two vaccine behaviours, whereby intentions for the second dose vaccine were lower than intentions for the first vaccine (78% and 87%, respectively). This evidence highlights the importance of examining the psychological processes and risk

association for both the first and second-dose MMR vaccine. Thus, the present study focused on both doses of MMR vaccine.

The media has been highlighted as an important source of information for parents when making the MMR decision. For example, it has been reported that the media and press coverage motivated parents to examine the risks associated with MMR immunisation (Evans et al, 2001; McMurray et al, 2004; Tickner, Leman and Woodcock, 2009). Bond et al (1998) also reports similar results in relation to general childhood vaccines. Intensive media coverage of the MMR immunisation has been reported in the UK, with less than a third of the news coverage reporting scientific evidence which indicates the vaccine to be safe (Thompson, 2009). Although the media have been accused of being sensationalist and scaremongering (Thomas et al, 1998; Evans et al, 2001), information from health professionals and the Department of Health have also been perceived as biased, lacking balanced information, and taking a pro-vaccination stance (Bond et al, 1998; Evans et al, 2001). Thus it is suggested that parents may attempt to acquire information about MMR immunisation side-effects from sections of the media (Pareek and Pattison, 2000) as well as from health professionals. Information from the media may act as a barrier for some parents; Pareek and Pattison (2001) report that 29.8% of their participants believed the MMR vaccine caused autism, and 13.1% believed it caused Crohn's disease. Results from Flynn and Ogden's (2004) study indicate that this perception of bias in information from health authorities has resulted in confusion for parents, whereby parents have reported uncertainty regarding whether to trust health professionals and also whether to trust the media. In light of the evidence, it is important to examine media influences on normative views of MMR

immunisation risk in the present study. Although the media cannot be considered an important ‘significant other’, a construct requirement for SN, it clearly has the potential to affect parents’ risk perceptions. It will therefore be examined as an independent variable in the current study. It is hypothesised that there will be significant differences between immunisers and non-immunisers for the importance of different normative sources of information, including the media.

This study aimed to investigate theoretical risk factors associated with MMR immunisation. PMT and SN were examined in relation to first dose and second dose immunisation, and the importance associated with different sources of information was also investigated.

3.3 Method

3.3.1 Design

This was a cross-sectional questionnaire-based survey aimed at investigating parents’ decision-making for the MMR vaccine. Parents in Dundee were recruited to take part in the study, and in total 423 parents opted in to the study - 24 parents who refused the MMR vaccine and 399 parents who had their child immunised with the vaccine.

3.3.2 Participants

Parents of children born in Dundee in the years 1999 and 2000 were identified using the SIRS (Standard Immunisation Recall System) database, and were selected as participants. The study was conducted in 2003, but parents with children born between 1999 and 2000 were purposefully selected for three reasons: 1) the 1998

autism/Crohn's disease controversy would have occurred before their child was born; 2) all parents had the opportunity to immunise their child with the first MMR vaccine (offered at 12-15 months); and 3) these parents were approaching (or had reached) the period whereby their child would be offered the second dose vaccine (offered at 3-5 years). A total of 3268 children were born in Dundee between 01/01/99 to 31/12/00, of whom 178 were not immunised (either refused the MMR vaccination, refused all childhood vaccines, or were still undecided) and 3090 were immunised (refer to Figure 3.1 for details of the recruitment process). As the study used an opt-in design (see 'procedure' section), a low participation rate (of around 20%) was anticipated as parents were first expected to return consent slips and then return questionnaires. For this reason the aim was to target 2000 parents to take part in the study. Participants were labelled as follows: parents who had immunised their child with the first MMR vaccine = 'immunisers' and those who had not immunised = 'non-immunisers'. As there were only 178 non-immunisers identified on the database all of these parents were initially included to ensure an adequate participation rate. The remaining selected participants therefore consisted of 1822 immunisers, who were chosen from 3090 immunising parents identified on the SIRS database, using randomisation tables. A total of 706 parents opted to take part in the study, and 423 parents returned completed questionnaires: 24 non-immunisers and 399 immunisers (52% and 60% response rate of opt-in questionnaires returned, respectively).

The majority of the questionnaires were completed by mothers (92.2%) and 6.8% by fathers. Two questionnaires were completed by both parents and grandparents, and 2 were filled out jointly by parents (all participants will be referred to as parents

for brevity). The questionnaires completed by both parents and grandparents were retained in the analysis as it was made clear in the questionnaires that they were completed by parents with the help of the grandparents, and it could be assumed that parents had the final say when completing the questionnaire. For 155 (36.6%) parents, the index child was their first child, and 262 (61.9%) parents had other children. Nearly all respondents (95%) were 'British White', with the remaining as follows: 'White Other' (n=7), 'Irish-White' (n=3), 'African-Black' (n=3), 'Chinese-Asian' (n=3), ('Pakistani-Asian' (n=2), 'White and Asian Mix' (n=2), and 'Indian-Asian' (n=1). Mean age for the immunisers was 33.4 (SD=5.03) and for non-immunisers 35.6 (SD=4.24).

Deprivation Category data (indication of socio-demographic status) was obtained from the consent forms returned by the immunisers and non-immunisers invited to take part (refer to Stage 4 of Figure 3.1). The majority (44.6% and 48.8%, respectively) were classified as 'deprivation category' (DepCat) 6 which is labelled as 'deprived' (Public Health 2002: Annual Report of the Director of Public Health). Table 3.1 highlights the distribution of the participants in terms of DepCat data (values range from 1 = very affluent, 7 = very deprived). No other socio-economic data was collected in the questionnaires on request of the NHS study collaborators.

Figure 3.1: Flow Diagram of the Recruitment Process

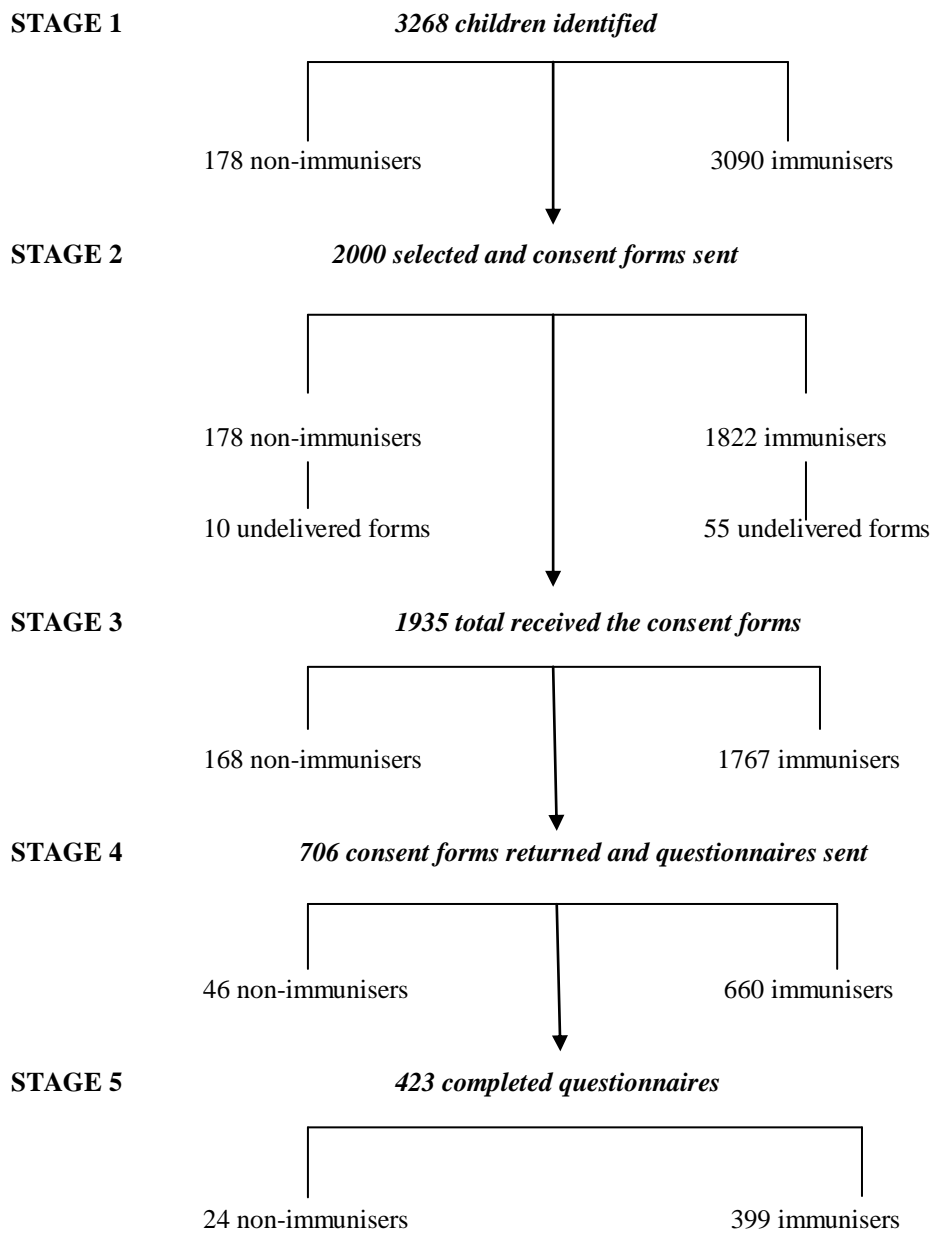


Table 3.1: DepCat Percentages for Immunisers and Non-Immunisers

DEPCAT	DepCats % for immunisers (n)	DepCat % for non-immunisers (n)
<i>1</i>	6.7 (122)	6.4 (11)
<i>1.5</i>	6.3 (114)	5.2 (9)
<i>2</i>	12.7 (232)	12.2 (21)
<i>2.5</i>	.1 (2)	0
<i>3</i>	8.8 (160)	4.7 (8)
<i>4</i>	14.7 (267)	13.4 (23)
<i>5</i>	5.9 (107)	9.3 (16)
<i>6</i>	44.6 (811)	48.8 (84)
<i>7</i>	.3 (5)	0

(1=very affluent, 7=very deprived)

3.3.3 Procedure

A Data Protection Form (relating to issues of patient confidentiality) was initially obtained in order to access the NHS SIRS database. Ethical approval was obtained from Tayside NHS Research Ethics Committee (number: 042/03) and Stirling University Department of Psychology Ethics Committee (approval sent via email), and was conditional on the study being cross-sectional, using an ‘opt-in’ design, and replacing the word ‘attitudes’ with ‘views’. NHS support was also obtained from the Head of Public Health, NHS Tayside for this study, and all letters and information sent to parents were headed on NHS paper with his signature. Parents were first contacted by a letter explaining the study and were asked to sign a consent slip if they would like to participate (see Appendix I). Following consent, a study pack (containing a thank-you letter, questionnaire, information sheet and return pre-paid envelope) was sent out (see Appendix I). Parents were asked to complete

questionnaires in relation to the index child (i.e. the one identified from the SIRS database). No follow-up letters or telephone calls were made to parents at the request of the NHS collaborator.

3.3.4 Measures

A questionnaire was designed to measure parents' attitudes, threat appraisal, coping appraisal, intentions and behaviour using PMT with SN as a framework (see Chapter 2 for details). It was piloted on 20 parents attending a university playgroup for content validity. No changes to the items were recommended by the pilot group participants, but suggestions were made relating to the layout; preferences were indicated for fewer questions on each page. The pilot respondents reported the issues raised in the questionnaire as relevant and easy to understand.

In order to ensure reliability and internal consistency of each subscale developed, reliability analysis was conducted and Cronbach's alpha is reported for all subscales below.

i) PMT components:

Protection motivation to immunise with the first MMR vaccine was measured retrospectively by one item: 'When this child was born did you intend to have him/her immunised with the first MMR vaccine?' Three response options were available – 'yes', 'no' and 'unsure'.

Behaviour for the first MMR vaccine was measured exclusively by three items indicating whether the child had received the triple vaccine, single vaccines or

whether they had not yet reached a decision. Two response options were available for each item – ‘yes’ and ‘no’.

Protection motivation to immunise with the second dose MMR vaccine was measured by one item asking whether participants intended to have the child immunised. Three response options were available – ‘yes’, ‘no’ and ‘unsure’.

Behaviour for the second dose MMR vaccine was measured by one item asking whether the child had received the second dose vaccine. Two response options were available – ‘yes’ and ‘no’.

Fear of measles, mumps and rubella was measured by three items on worry: ‘How worried would you be if this child were diagnosed with measles, mumps and rubella’ ($\alpha=.88$). A 4-point scale was used, ranging from ‘not at all worried’ to ‘very worried’. A mean score of the 3 items was calculated to provide an overall measure of fear.

Severity of measles, mumps and rubella were measured by three items: ‘How serious are the following illnesses for children in general who have not been immunised with the MMR vaccine – measles, mumps and rubella’ ($\alpha=.81$). The responses were measured on a scale ranging from ‘0’ (not at all serious) to ‘10’ (very serious). A mean score of the 3 items was calculated to provide an overall measure of severity of disease.

Vulnerability to measles, mumps and rubella (diseases), autism and IBD were measured by 5 items which were separated into two subscales. Three items examined vulnerability to the vaccine-preventable diseases if a child was not immunised: ‘What would be the risk of developing the following illnesses with children in general who are not immunised with the MMR vaccine – measles, mumps and rubella’ ($\alpha=.96$). Two items focused on the vulnerability to autism and bowel disease if a child was immunised: ‘What would be the risk of developing the following illnesses with children in general who are immunised with the MMR vaccine’ ($\alpha=.98$). Item responses were measured on a 4-point scale ranging from ‘no risk’ to ‘high risk’. Subscale mean scores were calculated to provide 2 measures of perceived vulnerability of immunisation and non-immunisation.

Response efficacy was measured by two factors generated by a principal component analysis (PCA; with varimax rotation) of initially 10 items relating to the efficacy of the vaccine or immunisation. The ten items focused on different aspects of response efficacy and therefore a PCA was performed to determine whether the items were measuring more than one dimension of response efficacy. The Kaiser-Meyer-Olkin Measure of Sample Adequacy reported a value of .86, and Barlett’s Test of Sphericity value was significant ($p<.001$), indicating the data was suitable for PCA. The output reported four components with eigenvalues above 1, with a total of 52.8% of the variance explained (see Table 3.2).

Table 3.2: Principal Component Analysis: Eigenvalues and Total Variance Explained for Response Efficacy

Component	Initial Eigenvalue Total	% of variance explained
1	4.31	28.76
2	1.46	9.73
3	1.08	7.23
4	1.07	7.10

The component matrix was examined and the results indicated that 4 items loaded strongly on the first two factors (see Table 3.3). Very few items loaded on components 3 and 4 and with loadings below .6, which suggested a two-factor solution was appropriate. Further support for the two factor solution was provided by a scree-plot (see Figure 2), whereby a break was illustrated after the second factor. A four-factor rotation was also examined, and similar to the component matrix, the results supported the notion of a two-factor solution – both components showed strong loadings of over .6 by 4 of the items.

These components were labelled: 1) ‘immunisation attitudes and efficacy’, which consisted of 2 statements: ‘it is more dangerous for a child to have the MMR immunisation than to have measles’ and ‘the MMR immunisation weakens a child’s immune system’ ($\alpha=.60$); and 2) ‘safety evidence which consisted of 2 statements: ‘there is strong evidence of a link between the MMR immunisation and autism’ and ‘there is no strong evidence that MMR immunisation causes inflammatory bowel disease’ ($\alpha=.61$). The items were scored from -2 to +2, and were recoded when totalled for the subscales so they were scored in the same direction (pro-

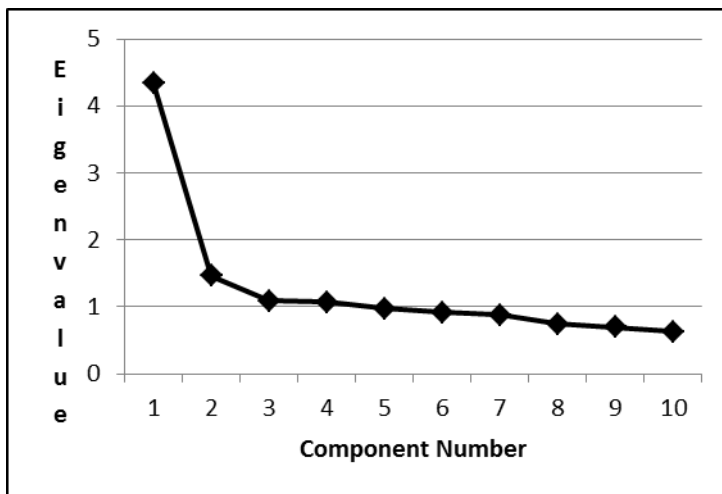
immunisation). A mean score of the items were calculated for each factor to provide 2 measures of response efficacy.

Table 3.3: Principal Component Analysis for Response Efficacy: Component Matrix

	1	2	3	4
<i>It is more dangerous for a child to have the MMR immunisation than to have measles.</i>	.66			
<i>MMR immunisation weakens a child's immune system.</i>	.64			
<i>There is strong evidence of a link between MMR immunisation and autism.</i>	-.38	.64		
<i>There is no strong evidence that MMR immunisation causes inflammatory bowel disease.</i>	.37	-.61		
<i>MMR immunisation may result in a severe allergic reaction.</i>	.38			
<i>MMR immunisation reduces the risk of developing meningitis.</i>			.39	.34
<i>MMR immunisation is not effective.</i>		.37		
<i>Giving 3 separate vaccines for measles, mumps and rubella may reduce the risk of side-effects.</i>		-.38		.32
<i>MMR immunisation will prevent the occurrence of measles, mumps and rubella.</i>			.39	.31
<i>MMR immunisation will reduce the risk of side-effects from measles, mumps and rubella.</i>		-.30		.38

NB: Only loadings above .3 are reported.

Figure 2: Scree-Plot for Response Efficacy



External self-efficacy was measured by 7 statements on how easy/difficult the participant found the external barriers to immunisation: ‘At the time you were considering the first MMR immunisation, how easy or difficult was it for you to take this child to have the MMR immunisation with regard to the following: the time of appointment, taking time out to attend, other children to care for, transport problems, your own health, this child’s health, your capability of looking after this child after the immunisation’ ($\alpha=.74$). The responses were scored by a -2 to +2 scale. A mean score of the 7 items were calculated to provide an overall measure of external self-efficacy.

Internal self-efficacy was measured by 2 statements on how easy/difficult the participant found the internal barriers to immunisation: ‘At the time considering the first MMR immunisation, how easy or difficult was it for you to take this child to have the MMR immunisation with regard to the following: own anxiety; child’s distress from previous injections’ ($\alpha=.62$). The responses were scored by a -2 to +2

scale. A mean score of the 2 items were calculated to provide an overall measure of internal self-efficacy.

ii) Subjective Norm

SN was measured in two parts using the following referents: partner, child's grandparents, friends, GP, health visitor and practice nurse. Six items asked participants whether they perceived each referent wanted the child to be immunised with the MMR vaccine or not. Responses were measured on a 10-point scale ranging from '0' (definitely didn't want you to immunise) to '10' (definitely did want you to immunise). Six items asked participants whether they followed the advice concerning the MMR vaccine of each referent. Responses were measured on a 10-point scale ranging from '0' (definitely didn't follow their advice) to '10' (definitely did follow their advice). All parents indicated that they had not talked to their practice nurse about the MMR decision and therefore this referent was excluded from the subscale. For the remaining referents, the two parts were multiplied for each referent to provide a subjective norm total for each referent. Not all parents necessarily discussed the vaccine with the stated referents and, therefore, in order to minimise any lost data, the SN variables were aggregated for the regression analyses ($\alpha=.84$); a mean score of the 5 referents SN scores were calculated to provide an overall measure of SN.

iii) Second Dose MMR vaccine PMT and SN Subscales:

The same PMT and SN subscales detailed above were also used to examine second dose vaccine intentions.

iv) Important Sources of Information

An item focusing on important sources of information during the MMR decision was asked: ‘How important to you is information about MMR immunisation from the following: family, friend, GP (doctor), health visitor, media (TV, newspapers), and internet. The responses were scored on a 0-4 scale (from ‘not at all important’ to ‘very important’). Each referent was focused on individually, i.e. no subscale was created, and descriptive data was examined.

iv) Additional Items

General background questions were also asked, relating to age, gender, ethnic origin and relationship with the child.

3.4 Preliminary Analysis

Preliminary analysis testing was conducted to inspect the data file and to determine the specific statistical testing required, including parametric and non-parametric testing.

Missing Data: Firstly, missing data was examined, and the results indicate that missing values ranged from 0 - 2.8% for each variable, except for external self-efficacy whereby 16.8% of the data was missing. All of the variables were investigated in detail for missing data, and no patterns were identified except for the external self-efficacy item. The frequency results for this variable show that majority of the missing data was from the item: ‘how easy or difficult was it for you to take this child to have the MMR immunisation with regard to other children to care for’; 16.1% of the data was missing for this item. This question may have been

irrelevant for parents with no other children and thus this would explain the missing values. The 'exclude case pairwise' option was taken for this item and all variables, and therefore cases would only be excluded if they were missing the data for any of the analyses.

Normality testing: Normality testing was conducted to determine the normality distribution of the scores on the dependent variable. The following statistics were investigated: 5% trimmed mean, skewness, kurtosis, Kolmogorov Smirnov test, histograms, normal Q-Q plots, and box plots. The 5% trimmed mean was compared with the original mean of each of the variables; the results showed no differences between the two means, which suggests there were no extreme scores influencing the means. Skewness, kurtosis and Kolmogorov Smirnov statistics were also investigated (see Table 3.4 for results). The findings indicated negative skewness for all of the variables, except for response efficacy: safety evidence and internal self-efficacy, and positive kurtosis for all variables. However, due to the large sample size of the participant sample (n=423) this was not considered problematic; Tabachnick and Fidell (2001) report that with large sample sizes (e.g. over 200) when looking at skewness, a deviation from normality will not make a substantive difference. Similarly, with kurtosis, the impact of deviation from normality also diminishes when large sample sizes are used; the underestimation of variance associated with positive kurtosis disappears with a sample sizes of over 100, and similarly the underestimation of variance disappears with a sample of 200 or more (Wateraux, 1976; Tabachnick and Fidell, 2001). Instead Tabachnick and Fidell (2001) recommend inspecting the shape of the distribution (e.g. histogram) to examine normal distribution. The histograms for each variable illustrated normal

distribution curves, and this normal distribution was supported by the normal Q-Q plots whereby relatively straight lines of the scores were plotted by the expected values from the normal distribution. In light of this evidence, it can be argued that parametric testing is permitted due to the normal distribution of the scores and the large sample size used. Therefore, logistic regression was performed to examine predictors of first dose and second dose immunisation behaviours, However, non-parametric testing, Spearman's Rho correlations and Mann-Whitney U tests, were used to examine mean differences for immunisers and non-immunisers for each variable.

Table 3.4: Normality Testing

	Skewness	Kurtosis	Kolmogorov-Smirnov (sig)
Severity	-.708	.03	.000
Fear	-1.05	1.09	.000
Vulnerability of vac. diseases: not immunised	-2.11	4.67	.000
Vulnerability of autism/IBD: immunised	-.354	-1.15	.000
Response efficacy: efficacy and attitudes	-.63	.85	.000
Response efficacy: safety evidence	.09	1.20	.000
Self-efficacy: external	-.68	.66	.000
Self-efficacy: internal	.02	-.67	.000
Subjective norm	-.69	-.23	.000

Outliers: Box-plots and histograms were examined to identify any outliers. The findings indicate there were no extreme outliers but there were outliers present for all of the variables except for internal self-efficacy, vulnerability to autism/IBD if immunised, and subjective norm. Frequency of all of the variables with outliers were checked for any errors, i.e. the variables were checked to determine whether

they were in the range of possible scores, and the results indicated there were no errors. Additionally, the 5% trimmed mean scores for all the variables indicated no difference from the original means. Given the evidence presented, the outlying cases were retained, especially as they were not too different (i.e. extreme) from the remaining distribution.

Coding: Coding of the scores was changed so that the ‘don’t know’ were excluded from the analysis. This exclusion produces a greater volume of accurate data and also tends to show no differences in response rates for inclusion or exclusion of this option (Walonick, 1997-2010).

3.5 Results for the First Dose MMR Vaccine

3.5.1 Descriptive Statistics

Behaviour: Among the 423 participants who took part in the study, 399 (94.3%) had immunised their child with the MMR vaccine, 10 (2.4%) had refused the vaccine, 9 (2.1%) were still undecided about their immunisation decision and 5 (1.2%) had opted for the single vaccines. All parents who had not opted for the triple MMR vaccine (including single immunisers and parents who were unsure) were labelled as ‘non-immunisers’ for brevity. The sample recruited (94.3% immunisers and 5.7% non-immunisers) reflected the population of parents in Tayside with children born between 1999 and 2000 where 94.6% (n=3090) had immunised their child and 5.4% (n=178) had refused MMR immunisation.

Protection motivation: Overall, 74% (313) of parents reported that when their child was born they had intended to immunise, and 22.7% (96) had been unsure whether they would opt for the immunisation. Only 2.8% (12) reported they had not intended to have their child immunised (see Table 3.5). Table 3.5 presents immunising and non-immunising parents and their past immunisation intentions. The majority of the immunisers had intended to immunise, but surprisingly 21.3% had been initially unsure whether they would opt for the immunisation. Also, the majority of the non-immunisers had been unsure whether they would opt for immunisation, and 37.5% had intended to refuse the immunisation.

Table 3.5: Immunisers' and Non-Immunisers' Past Intentions (%)

Present Immunisation Status	Past Intention (PMT)		
	<i>Will immunise</i>	<i>Will refuse</i>	<i>Not sure</i>
<i>Immunisers</i>	309 (77.4)	3 (.8)	85 (21.3)
<i>Non-Immunisers</i>	4 (16.7)	9 (37.5)	11 (45.8)

PMT variables and SN: Mean scores between the two groups were compared on all the PMT constructs and SN, with all items scored in the same direction (pro-immunisation) (see Table 3.6). The scores highlight differences between the immunisation groups. In comparison with non-immunisers, immunisers showed greater fear of the vaccine-preventable diseases, perceived these diseases to be severe, believed in the efficacy of the vaccine, and were likely to be motivated by significant others. In comparison, non-immunisers perceived children were more

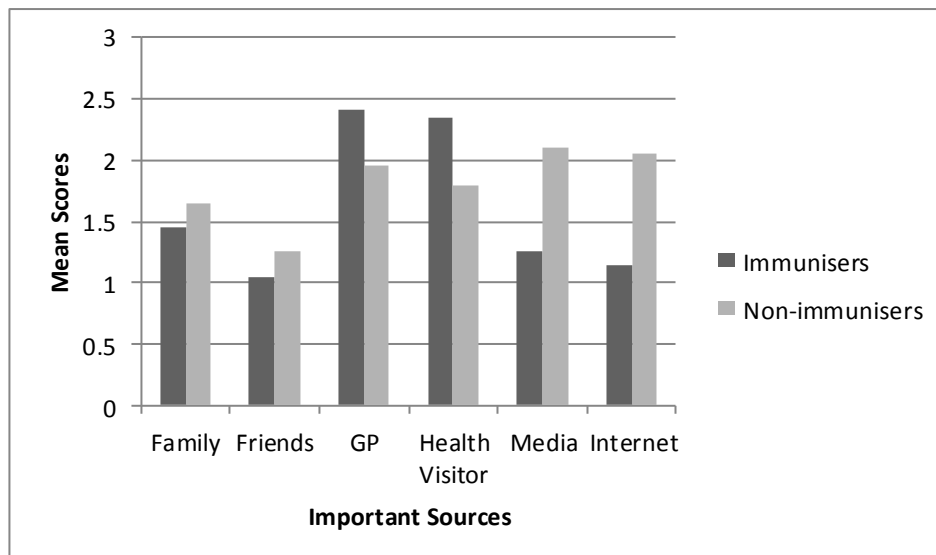
vulnerable to autism and bowel disease if immunised with the vaccine than the vaccine-preventable diseases if they were not immunised with the vaccine. Although non-immunisers reported relatively high levels of fear and reported the vaccine preventable diseases to be severe, the means were lower than those reported by the immunisers. They also reported low levels of SN.

Table 3.6 Mean Scores for All Variables

Variable	Scoring range	Immuniser mean (SD)	Non-Immuniser mean (SD)
<i>Fear</i>	0=not worried, 3=very worried	2.2 (.77)	1.9 (.71)
<i>Severity</i>	0=not serious, 10=vary serious	8.96 (1.63)	7.3 (2.0)
<i>Vulnerability to vaccine-preventable diseases: non-immunised</i>	0=no risk, 3=high risk	2.53 (.55)	2.3 (.47)
<i>Vulnerability to autism/IBD: immunisation</i>	0=no risk, 3=high risk	1.19 (.66)	2.4 (.67)
<i>Response efficacy: safety evidence</i>	-2= strongly disagree, +2=strongly agree	.28 (.63)	-.85 (.74)
<i>Response efficacy: attitudes and efficacy</i>	-2= strongly disagree, +2=strongly agree	1.05 (.65)	-.35 (.79)
<i>Self-efficacy: internal</i>	-2= very difficult, +2= very easy	.40 (.94)	-.19 (.40)
<i>Self-efficacy: external</i>	-2= very difficult, +2= very easy	1.17 (.66)	1.33 (1.17)
<i>Subjective Norm</i>	Greater the score the higher the SN	88.4 (21.68)	21.68 (15.5)

Important Sources of Information: Figure 3.3 highlights the mean differences between immunisers and non-immunisers. The findings show that immunisers reported health professionals as most important sources of information. However, non-immunisers reported the media and internet as the most important sources of information, closely followed by the health professionals. ‘The family’ was reported to be an equally important source of information for both groups, and ‘friends’ were the least important source of information.

Figure 3.3: Important Sources of Information Reported by Parents



Age: The mean age of participants was 33.5, ranging from 20 to 49 years of age. The age groups were split into parents aged 33 and below (labelled ‘young parents’) and parents aged 34 and above (labelled ‘older parents’). Amongst the immunisers, 52.5% were younger parents, and 47.5% were older parents. Interestingly, 79.2% of non-immunisers were older parents and 20.8% were younger. A Chi-square test for independence (with Yates Continuity Correction) indicated a significant association between age and immunisation behaviour, $\chi^2 = (1, n=420) = 7.87, p < .01, \phi = -.15$

3.5.2 Inferential Statistics

Non-parametric tests were conducted to look at significant differences between immunisers and non-immunisers for each item in the subscales.

Important sources of information: Mann-Whitney U tests were performed to investigate differences between immunisers and non-immunisers for important sources of information (see Table 3.7). The results revealed that immunisers perceived health professionals (GP and health visitor) as ‘very important’ sources of information, whereas non-immunisers perceived health professionals as equally ‘important’ sources of information as the media and internet. Significant differences between the groups were illustrated for GP, health visitor, media and internet. Small effect sizes were reported for all, ranging from .14 to .17. Although the effect sizes were relatively small, the results highlight important differences in sources of information for both groups of parents.

Table 3.7: Mann-Whitney U Tests for Important Sources of Information

	Median: Immunisers	Median: Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2-tailed)
Important source:					
<i>Family</i>	1	1	4392.	-.05	.96
<i>Friend</i>	1	1	4236.	-.58	.56
<i>GP</i>	3	2	3024.	-3.19	.001
<i>Health visitor</i>	3	2	2836.	-3.56	.00
<i>Media</i>	1	2	2936.	-2.80	.005
<i>Internet</i>	1	2	2470.	-2.83	.005

Scores were out of a possible ‘3’: ‘0’ = not at all important, ‘3’ =very important.

Fear: Table 3.8 shows that both immunisers and non-immunisers reported they would be worried if their child was diagnosed with measles or mumps. In

comparison with immunisers, non-immunisers reported low levels of fear if their child was diagnosed with rubella. Immunisers showed greater concern if their child was to contract measles than the other diseases, whereas non-immunisers reported equal concern for measles and mumps. Mann-Whitney U tests revealed significant differences between immunisers and non-immunisers for fear of rubella: $p \leq .00$, and with a small effect size: $r = .2$

Table 3.8: Mann-Whitney U Tests for Fear

	Median: Immunisers	Median: Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2-tailed)
Fear:					
<i>Measles</i>	3	2	3990.	-.69	.49
<i>Mumps</i>	2	2	3848.	-.60	.55
<i>Rubella</i>	2	1	2223.	-3.75	.00

Scores were out of a possible '3': '0' = not at all worried, '3' =very worried.

Severity: As anticipated, immunisers reported measles mumps and rubella to be more serious diseases than did non-immunisers, although significant differences were only reported for rubella (refer to Table 3.9). Measles was regarded as the most serious disease by both immunisers and non-immunisers. Non-immunisers perceived measles and mumps to be relatively severe diseases, but rubella was not considered a very serious disease. Mann-Whitney U tests revealed significant differences between immunisers and non-immunisers for severity of rubella: $p \leq .00$, and a small (approaching medium) effect size: $r = .25$

Table 3.9: Mann-Whitney U Tests for Severity

	Median Immunisers	Median Non-immunisers	Mann-Whitney U	Z	Asymp. Sig (2-tailed)
Severity:					
<i>Measles</i>	10	8.5	3720.	-1.83	.07
<i>Mumps</i>	9	8	3688.	-1.86	.06
<i>Rubella</i>	9	5.5	1889.	-5.00	.00

Scores were out of a possible '10': '0' = not at all serious, '10' =very serious.

Vulnerability: Table 3.10 shows that in comparison with non-immunisers, immunisers were more likely to believe non-immunised children to be at a greater risk of measles, mumps and rubella. Non-immunisers perceived immunised children to be significantly more vulnerable to autism and IBD than immunisers. They perceived the level of risk of autism/IBD for immunised children was similar to the risk of non-immunised children developing measles, mumps and rubella. Mann-Whitney U tests illustrated significant differences between immunisers and non-immunisers for all of the vulnerability items (see Table 3.10), with vulnerability to the vaccine-preventable diseases reporting small effect sizes (ranging from .12 to .13), and vulnerability to autism and IBD reporting medium effect sizes (ranging from .39 to .41).

Table 3.10: Mann-Whitney U Tests for Vulnerability

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2- tailed)
Vulnerability (if not immunised):					
<i>Measles</i>	3	2	3273.	-2.56	.01
<i>Mumps</i>	3	2	3113.	-2.55	.01
<i>Rubella</i>	3	2	3141.	-2.44	.02
Vulnerability (if immunised):					
<i>Autism</i>	1	2	620.	-6.16	.00
<i>IBD</i>	1	2	551.	-6.14	.00

Scores were out of a possible '3': '0' = no risk, '3' =high risk.

Response efficacy: Table 3.11 highlights a consistent pattern of differences between immunisers and non-immunisers in relation to response efficacy. Immunisers were more likely to perceive MMR immunisation as effective throughout, whereas non-immunisers believed more strongly in the link between the MMR vaccine and autism/IBD. When asked directly about the associated risks of autism and bowel disease ('safety evidence' subscale), immunising parents did not report strong views either way and tended to report 'neither disagree nor agree'. Non-immunisers reported stronger beliefs about the links between immunisation and autism and IBD, but did not report similar strength of beliefs regarding the efficacy of the immunisation. Mann-Whitney U tests showed significant differences between immunisers and non-immunisers for all of the items, with near-medium and medium effect sizes (ranging from .27 to .32).

Table 3.11: Mann-Whitney U Tests for Response Efficacy

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2-tailed)
Response efficacy: attitudes and efficacy					
<i>More dangerous to have MMR immunisation than to have measles</i>	-1	.50	1285.	-6.55	.00
<i>MMR immunisation weakens a child's immune system</i>	-1	.00	1499.	-6.03	.00
Response efficacy: safety evidence					
<i>Strong evidence of a link between MMR immunisation and autism</i>	.00	1	1381.	-6.29	.00
<i>No strong evidence that MMR causes IBD</i>	.00	-1	2028.	-5.52	.00

The items were scored using a -2 (strongly disagree) to +2 (strongly agree) scale.

Internal and external self-efficacy: The results surprisingly indicate that non-immunisers perceived fewer external barriers than the immunisers (see Table 3.12). However, these results may reflect the fact that non-immunisers did not physically take their child to be immunised, and therefore these barriers were not encountered. Thus, external self-efficacy may only be relevant to parents who intended to immunise their child. Both immunising and non-immunising parents reported that their own anxiety created the greatest difficulty in immunising their child, with the level of difficulty reported to be greater for the non-immunising parents. Mann-Whitney U tests revealed significant differences between immunisers and non-immunisers for the latter item only: $p < .01$, and a small effect size: $r = 0.15$

Table 3.12: Mann-Whitney U Tests for Self-Efficacy

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2- tailed)
External self-efficacy:					
<i>Time of appointment</i>	1	2	2024.	-1.45	.15
<i>Taking time out</i>	1	2	2234.	-.91	.364
<i>Other children to care for</i>	1	1.5	1425.	-1.89	.06
<i>Transport problems</i>	1	2	1916.	-1.28	.20
<i>Own health</i>	1	2	1698.	-1.89	.06
<i>Child's health</i>	1	2	2146.	-.64	.53
<i>Looking after the child</i>	1	2	2081.	-.31	.76
Internal self-efficacy					
<i>Child's distress</i>	1	1	2114.	-.72	.47
<i>Own anxiety</i>	.0	-1	1338.	-3.05	.002

The items were scored using a -2 (very difficult) to +2 (very easy) scale

Subjective Norms: Table 3.13 shows that immunisers reported that all referents had wanted them to immunise their child with the MMR vaccine, whereas non-immunisers reported that the health professionals had wanted them to immunise their child more than any other referent group. Non-immunisers perceived the health visitor as wanting them to immunise their child to a lesser extent than the GP. Immunisers reported a greater motivation to comply with the advice given by the health professionals (especially the GP) than non-immunisers, and non-immunisers were less likely to follow the advice of health professionals (especially the GP) than any other referent group. Results suggest that family members (partner, child's grandparents) did not want non-immunisers to opt for MMR immunisation, and both groups reported high levels of motivation to follow the advice of their partners. Both groups of parents did not associate a strong preference for following advice from their friends.

Table 3.13: Mann-Whitney U Tests for Subjective Norm

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2- tailed)
Subjective norm (wanted you to immunise):					
<i>Partner</i>	9	.0	316.5	-7.80	.00
<i>Child's grandparents</i>	8	.0	843.	-4.07	.00
<i>Friend</i>	7	5	466.	-4.23	.00
<i>GP</i>	10	9.25	1123.	-1.92	.06
<i>Health visitor</i>	10	7.0	2050.	-3.90	.00
Subjective norm (followed their advice):					
<i>Partner</i>	9	9.75	3939.	-.59	.56
<i>Child's grandparents</i>	8	6	1724.	-.34	.74
<i>Friend</i>	6	5	794.	-2.22	.03
<i>GP</i>	10	.0	202.	-6.11	.00
<i>Health visitor</i>	9	1.5	739.	-6.55	.00

Scores were out of a possible '10': section 1 - '0' = definitely didn't want the parent to immunise, 10 = definitely did want the parent to immunise. Section 2 - '0' = definitely didn't follow their advice, 10 = definitely did follow their advice.

Correlation between PMT components (first dose MMR vaccine) and SN

Spearman Rho (SR) correlations were conducted since variables were ordinal. Table 3.14 shows the Spearman Rho correlation matrix computed to examine the relationships between PMT variables (for the first vaccine) and SN. Results indicate that intention and vaccine behaviour are significantly correlated (SR=.28, $p<.01$) for the first-dose MMR. Both PM and immunisation behaviour were significantly correlated with all variables except fear and external self-efficacy. SN was significantly related to all PMT variables except fear, and was the most highly correlated variable with both intention (SR=.43, $p<.01$) and behaviour (SR=.34, $p<.01$), and negatively correlated with vulnerability to autism/IBD if immunised (SR= -.38, $p<.01$) (all reporting medium effect sizes). This suggests SN is an important variable when looking at MMR immunisation decision-making.

Table 3.14: Spearman Rho Correlations between PMT Components, Subjective Norm and First Dose MMR Behaviour

	1.PM	2.Behr	3.Fear	4.Severity	5.Disease vulnerability	6.Autism/IBD vulnerability	7.RE: imm efficacy & attitudes	8.RE: safety evidence	9.Int. SE	10.Ext. SE	11.SN
1		.275**	.042	.158**	.180**	-.340**	.333**	.270**	.339*	.077	.434**
2			.076	.185**	.121*	-.362**	.304**	.328**	.116*	-.049	.337**
3				.380**	.162**	-.066	.134**	.023	-.034	.107*	.040
4					.432**	-.159*	.241**	.077	.008	.075	.267**
5						-.116	.192**	.104*	.095	.083	.281**
6							-.403**	-.444**	-.243**	-.179**	-.377**
7								.420**	.294**	.172**	.308**
8									.321**	.132**	.322**
9										.458**	.331**
10											.216**

*=p<.05 **=p<.01

1=protection motivation, 2=MMR behaviour, 3=fear, 4=severity of diseases, 5=disease vulnerability if not immunised, 6=autism/IBD vulnerability if immunised, 7=response efficacy: immunisation attitudes, 8=response efficacy: safety evidence, 9=internal self-efficacy, 10=external self-efficacy, 11=subjective norm.

Predicting MMR vaccine behaviour for first dose MMR vaccine

Although the study used a retrospective design, the variables measured cognitions which were relevant to intentions rather than post-behaviour, i.e. attitudes to immunisation are likely to change when parents proceed with immunisation and encounter no problems. Therefore, the variables were investigated in relation to intentions (Protection Motivation) for the regression analysis. Age was also examined as this is an important factor. Additionally, external self-efficacy was excluded from the regression analyses as this construct was only relevant for the immunisers.

Table 3.15 shows the results for two sets of hierarchical logistic regression analyses, predicting immunisation intentions. The first logistic regression analysis was conducted with intention as the dependent variable, and age of parent entered in the first block and PMT variables (except external self-efficacy which was not applicable to non-immunisers) in the second block. The results for first MMR vaccination indicate the model was significant $\chi=52.9$, $df=8$, $p<.001$. The -2 log likelihood value reduced from 247.9 to 195.1, and 79.1% of the participants overall were predicted correctly (93% immunisers and 35.2% non-immunisers). Two variables were significant predictors of protection motivation: response efficacy: immunisation attitudes and internal self-efficacy. The odds ratio for response efficacy: immunisation attitudes was 2.55 and the B value was positive, and thus indicating that parents with positive MMR immunisation attitudes were over twice as likely to immunise their child than parents with negative attitudes. The positive B value and odds ratio of 1.89 for internal self-efficacy indicates that parents reporting greater internal self-efficacy (e.g. less anxiety) were nearly twice more likely to immunise their child than parents reporting lower internal-self efficacy.

The second regression included the SN variable, which was entered in a third block. This model was also significant: $\chi^2=64.6$, $df=9$, $p<.001$, and a greater number of participants than in the first regression were predicted correctly: 81.3% (92.2% immunisers and 47.2% non-immunisers). The -2 log likelihood value reduced from 242.4 to 177.7. This regression produced three significant predictors of protection motivation: internal self-efficacy, response efficacy: immunisation attitudes, and SN. The positive B value and the odds ratio for response efficacy: immunisation attitudes (OR=2.09) indicates that parents with positive MMR immunisation attitudes were over twice as likely to immunise their child than parents who reported negative attitudes. The B value and odds ratio (OR=1.85) for internal self-efficacy suggest that parents reporting greater internal self-efficacy were nearly twice more likely to immunise their child than parents reporting low internal self-efficacy. The positive B value and the odds ratio for subjective norm indicate that parents motivated by others are 1.03 times more likely to immunise their child than parents who were not motivated by others.

Table 3.15: Logistic Regressions: Predicting First Dose MMR Immunisation Intentions

		1 st MMR: Protection Motivation without SN		1 st MMR: Protection Motivation with SN	
		B	OR	B	OR
Block 1	<i>Age</i>	.01	1.0	.03	1.03
Block 2	<i>Fear</i>	-.15	.86	-.13	.88
	<i>Severity of diseases</i>	-.02	.98	-.09	.91
	<i>Disease vulnerability if not immunised</i>	.46	1.58	.25	1.29
	<i>Autism/IBD vulnerability if immunised</i>	-.167	.86	-.08	.92
	<i>Response efficacy: immunisation attitudes</i>	.94**	2.55	.74*	2.09
	<i>Response efficacy: safety evidence</i>	.36	1.43	.06	1.06
	<i>Self-efficacy: internal</i>	.63**	1.89	.61**	1.85
Block 3	<i>SN</i>	-		.032***	1.03

*p<.05, **p<.01, ***p<.001

3.6 Results for Second Dose MMR Vaccine

3.6.1 Descriptive statistics

Intentions and Behaviour: The second dose is offered to children aged 3 to 5 years of age, and the present study focused on children 3 to 4 years of age and therefore the majority had either received the vaccine or were approaching the immunisation stage. The results indicate that 98 (25%) of the first vaccine immunisers had already immunised the child with the second dose vaccine, and a further 228 (57%) intended to have their child immunised with the second dose vaccine. However, 46 (12%) parents were still unsure and 11 (2.8%) had refused the vaccine (16 parents did not answer the question).

3.6.2 Inferential Statistics

Correlation between PMT components and SN (second dose MMR vaccine)

Table 3.16 shows the Spearman Rho (SR) correlations between the PMT variables and SN with second dose intention and second dose behaviour. All PMT variables were tested except the internal and external self-efficacy variables as these variables were specifically related to the first MMR vaccine. Non-significant correlations were shown for fear and vaccine-preventable disease vulnerability. Strongest correlations with intentions were illustrated by response efficacy: safety evidence (SR=.466, $p<.01$) and SN (SR=.455, $p<.01$), and SN showed the strongest correlation with behaviour (SR=.620, $p<.01$). These findings show medium to large effect sizes, and provide further support for the inclusion of SN alongside PMT when investigating MMR second dose immunisation intentions.

Table 3.16: Spearman Rho Correlation between PMT Components, Subjective Norm and Second Dose MMR Behaviour

Variables	Intention	Behaviour
<i>Fear</i>	.019	.076
<i>Severity of diseases</i>	.116*	.265**
<i>Disease vulnerability if not immunised</i>	.063	.144
<i>Autism/IBD vulnerability if immunised</i>	-.422**	-.493**
<i>Response efficacy: immunisation efficacy and attitudes</i>	.402**	.477**
<i>Response efficacy: safety evidence</i>	.466**	.441**
<i>Subjective Norm</i>	.455**	.620**

Predicting the second dose MMR vaccine intentions

Tables 3.17 shows the results for the two hierarchical logistic regression analyses performed predicting second dose immunisation intentions. Non-immunisers from the first MMR vaccine were excluded from this analysis. Regressions were performed for individuals still in the ‘intentions’ stage (n=285) (ie those who had either not yet had the opportunity to have the second dose vaccination, or had positive intentions, but had not had the vaccine).

The first regression was conducted with second dose intention as the dependent variable, and age entered in the first block and PMT variables in the second block. The model was significant: $\chi^2=91.8$, $df=7$, $p<.001$, where 85.3% of the participants were predicted correctly (92.2% immunisers and 66.7% non-immunisers). The results show -2 log likelihood value reduced from 206.9 to 115.1. Significant predictors included response efficacy: immunisation attitudes and response efficacy: safety evidence. The positive B values and the odds ratios for the response efficacy

variables indicate that parents were 5.84 times more likely to immunise their child if they perceived the vaccine to be safe and 4 times more likely to immunise if they had positive immunisation attitudes than parents reporting negative response efficacy attitudes.

The second regression was similar to the above regression but with the inclusion of SN which was entered in a third block. This model was also significant: $\chi^2=97.5$, $df=8$, $p<.001$, with 89.1% of participants predicted accurately (94.5% immunisers and 74.5% non-immunisers). The -2 log likelihood value reduced from 203.6 to 106.1. This regression produced four significant predictors: response efficacy: immunisation attitudes, response efficacy: safety evidence, vulnerability to disease if not immunised, and SN. The positive B values and odds ratios for the response efficacy variables suggest that parents are 2.73 times more likely to immunise their child if they had positive MMR immunisation attitudes and nearly 5 times more likely to immunise if they perceived the vaccine to be safe than parents reporting negative response efficacy attitudes. The negative B value and odds ratio of 0.36 for vulnerability to disease if not immunised suggests that parents were 0.36 times less likely to immunise their child if they perceived children were not vulnerable to measles, mumps and rubella if not immunised. Lastly, the positive B value and the odds ratio for subjective norm indicate that parents motivated by others are 1.03 times more likely to immunise their child than parents who were not motivated by others.

Table 3.17: Logistic Regressions: Predicting Second Dose MMR Immunisation Intentions

		2 nd MMR: Protection Motivation without SN		2 nd MMR: Protection Motivation with SN	
		B	OR	B	OR
Block 1	<i>Age</i>	.09	1.10	.128	1.13
Block 2	<i>Fear</i>	-.37	0.69	-.30	0.74
	<i>Severity of diseases</i>	.26	1.3	.20	1.23
	<i>Disease vulnerability if not immunised</i>	-.77	0.46	-1.02*	0.36
	<i>Autism/IBD vulnerability if immunised</i>	-.58	0.56	-.47	0.62
	<i>Response efficacy: immunisation attitudes</i>	1.39***	4.0	1.0*	2.73
	<i>Response efficacy: safety evidence</i>	1.77***	5.84	1.59**	4.95
Block 3	<i>SN</i>	-	-	.03**	1.03

*p<.05, **p<.01, ***p<.001

3.7 Discussion

PMT was found to successfully predict first MMR vaccine and second dose vaccine intentions. Regressions for first vaccine and second dose vaccine PM were significant, but the addition of subjective norms clearly increased the robustness of both models. These findings indicate that PMT is an important risk model to use when examining MMR immunisation behaviour. Analyses of individual PMT components illustrate clear differences between immunisers and non-immunisers: immunisers held positive attitudes towards the MMR immunisation, reported greater fear if their child was diagnosed with one of the vaccine-preventable diseases, perceived children to be at greater risk of these diseases if not immunised, and reported the diseases as severe. Non-immunisers tended to show concern with the efficacy of the vaccine and its links with autism and IBD. Additionally, immunisers were most likely to follow the advice of the health professionals and reported them as important sources of information, whereas non-immunisers were least likely to follow their advice and reported the media and internet as important sources of information.

SN is traditionally employed as part of TPB but this study suggests that it may also be useful when incorporated in PMT. The PMT model is important when understanding fear appeals, but subjective norm is also an important construct as individuals often do not make health decisions alone but rather look for support from others. In the present study, family members (especially partners) were perceived to be supportive during the MMR immunisation decision-making, and thus parents were likely to accept advice from these referents. Past studies suggest that mothers also tend to accept advice and find support from partners and close

family members when deciding on infant feeding methods (Giugliani, Caiaffa, Vogelhut et al, 1994; Littman et al, 1994; Rempel and Rempel, 2004; Seibold, 2004). Obtaining support from significant others may act as a coping mechanism when faced with the MMR vaccine decision-making, particularly where the decision involves a risk assessment, and referent groups are behaviourally relevant (Terry and Hogg, 1996). If parents seek encouragement and support from significant others, then it is important for these individuals to be targeted alongside parents when promoting the uptake of MMR immunisation. The present study only focused on one aspect of social influences (social norm), so it is unclear whether other social influences, such as descriptive norm or moral norms, play an equal or greater role in the MMR decision. Further research needs to be conducted to understand the role of significant others in the decision-making process.

Findings suggest that non-immunisers are more likely to endorse the autism/IBD link than immunising parents. They were more likely to believe the MMR vaccine increased a child's susceptibility to autism/IBD, and that there was enough evidence to suggest a link between the vaccine and proposed conditions. This may in part be due to the media coverage which has been extensive in the UK context since the paper was first published (Thompson, 2009). A review of the media response to the proposed association suggests the media misrepresented the evidence relating to the links which resulted in declines in vaccine acceptance (Colgrove and Bayer, 2005), and also under-reported scientific evidence supporting the vaccine (Thompson, 2009). The media's influence has been illustrated by Evans et al (2001), who report that parents who previously had no doubts concerning the safety of the MMR vaccine refused immunisation due to the media coverage. Previous research has also

identified that parents turn to the media to acquire information which is not provided by health authorities (including health professionals) (Pareek and Pattison, 2000). The findings from the present study support these findings. Immunising and non-immunising parents considered the media and the internet as relatively important sources of information. Although a causal association cannot be inferred, the findings suggest a relationship between media influence and non-immunisation. Media campaigns supporting MMR immunisation have reported positive results. In Finland a mass media campaign (television, radio and newspapers) increased MMR immunisation rates from 89.3% to 96.5% (Paunio, Virtanen, Peitola et al, 1991). This indicates that the media can act as a motivational cue to immunisation as well as a barrier and alter risk perceptions (Berry, 2004). Although the controversy surrounding Wakefield's claims may have died down, immunisation rates are still below 95% and concerns about the safety of the vaccine may still be present for some parents. The media could be used as a tool in the future to provide additional objective and accurate information about MMR immunisation which may not always be provided by health professionals

Non-immunisers did not perceive rubella to be a severe disease and were less worried if their child was diagnosed with the disease, whereas immunisers feared all three of the diseases and reported them as severe. Nevertheless, immunisers showed greater fear of measles than the other diseases, and both parent groups perceived this disease to be more severe in comparison with mumps and rubella. Rubella is regarded as a mild virus with little consequence and often goes unnoticed in children, whereas measles and mumps have more severe consequences (NHS Immunisation Information, 2004). However, rubella infection is seriously damaging

for unborn babies, resulting in Congenital Rubella Syndrome (CRS), and can be passed on from young children to pregnant mothers, hence the increasing concern that lack of immunisation may increase the cases of CRS. If rubella is not viewed as a severe illness this may result in parents neglecting the rubella vaccine when opting for the single vaccines. Unfortunately, the response efficacy items relating to rubella were not retained in the present study following the principal component analysis, and therefore only comparisons were made with measles. Future research needs to examine all of the diseases to understand the risk associations perceived by parents. Additionally, further education is needed on this disease to highlight the potential dangers for pregnant mothers, and to ensure MMR (rubella) vaccine uptake.

Pareek and Pattison (2000) report that parents were less likely to immunise their child with the second dose vaccine than the first MMR vaccine, and those with children ready for the second dose vaccine intended to have more negative vaccine attitudes than parents approaching the first dose. Some parents question the necessity of the second dose vaccine (Tickner et al, 2009), doubt the efficacy of the first dose due to the requirement of the second dose (Evans et al, 2001), or perceive their child to be protected with the first dose and therefore do not require a second (Tickner et al, 2009). Additionally, parents are less likely to have contact with health visitors at the age when they are approaching the second dose, and therefore have less opportunity to discuss the immunisation benefits. However, findings in the present study indicate that the majority of parents were positive about the vaccine and had either immunised their child or intended to (82%), and only 2.8% reported they would refuse the second immunisation and 12% were unsure about their

decision. Furthermore, the regression results show that positive attitudes, regarding the efficacy and safety of the vaccine, and subjective norm predicted second dose intentions. Response-efficacy: safety evidence and vulnerability of autism and IBD if immunised were seen to be predictor variables for the second vaccine intentions but not the first vaccine intentions. The positive attitudes about the vaccine's safety may be explained by the fact that parents are likely to gain confidence in relation to safety issues surrounding the second dose vaccine after having already immunised their child with the first vaccine and experienced no problems. Additionally, concerns expressed by some parents about the child's 'immature' immune system being overloaded with multiple vaccines at a young age (Bond et al, 1998; Evans et al, 2001; Casiday, 2007) will no longer be relevant as the child grows older and approaches the second vaccine. This may explain why the present sample indicated positive attitudes, intentions and behaviour towards the second dose. Nonetheless, the results from the present finding need to be viewed tentatively as it unclear whether the 57% who intended to immunise actually went ahead and performed the behaviour. Also, the study did not examine whether parents had been approached about the second dose by health authorities (children are offered the vaccine at 3 to 5 years of age, and the present study focused on children aged 3 to 4), and therefore it is unclear whether parents had the opportunity to think about their second dose decision. This may have also resulted in a change in attitudes from earlier expressed intentions to later behaviour. Therefore, the results for the second dose MMR intentions may need to be cautiously interpreted as they only predict intentions which may not predict actual behaviour.

Although parents perceived health professionals as pro-immunisation, non-immunisers perceived the health visitor as wanting them to immunise their child to a lesser extent than the GP. This may be due to parents spending a greater period of time with health visitors about the time of the birth, whereas time spent with GP's is often less frequent and more rushed (McMurray et al, 2004). Thus, parents may perceive health visitors to be more supportive and sympathetic to their concerns, more accessible, and less pressurising in recommending the vaccine than GPs (Evans et al, 2001; McMurray et al, 2004; Petts and Niemeyer, 2004; Petrovic, Roberts and Ramsey, 2005). Furthermore, the issue of trust is seen as pertinent in this context. Many non-immunising parents perceive that GPs have financial incentives for promoting the MMR vaccine (McMurray et al, 2004; Evans et al, 2001) which may explain why non-immunisers perceive health visitors to be less pro-immunisation than GPs. Also, in the present study the immunisers reported that they were more motivated to follow the GPs' advice more than the health visitors, whereas non-immunisers were more likely to follow the health visitor's than the GPs' advice. The health visitor's role leading up to the MMR vaccines is important and a good health visitor-parent relationship is needed to ensure that parents are receiving medically validated information which will allow for a more effective evaluation of the MMR decision. Interestingly, immunisers and non-immunisers both perceived GPs as being marginally more important sources of information than health visitors. Parents may differentiate between 'objective' medical information about immunisation and side-effects, and more subjective 'advice' about making their personal immunisation decision. The role of health professionals needs to be examined to understand how they can best offer information and advice to parents with different attitudes and different needs.

There is evidence to suggest immunisation rates and behaviour differ depending on socio-economic status. ISD Scotland report that 60% of affluent parents (DepCat 1 and 2), of children born in 1997, are likely to immunise their child with the MMR vaccine earlier, i.e. by 15 months of age, in comparison with 47% and 30% in DepCat 6 and 7, respectively. Socially disadvantaged parents are more likely to delay their decision-making (Friederichs, Cameron and Robertson, 2006). Findings from the present study reveal that during stage 4 of the recruitment process (see Figure 3.1), affluent (DepCat 2) and deprived parents (DepCat 6) were equally represented in the consenting non-immunising group (24% and 22%, respectively), whereas immunising parent consisted largely of deprived parents (DepCat 6, 35%). However, the socio-economic status of the parents who participated in the study cannot be determined due to ethical constraints (the Head of Public Health, NHS Tayside, requested that no socio-economic data was collected). Thus it is difficult to determine whether participants were equally represented in term of socio-economic status.

Although the findings suggest that PMT is an important model, it is important to note that the majority of participants were immunising parents, and therefore the regression results need to be cautiously viewed as they indicate significant predictions largely for immunisers. The uneven sample sizes of the two groups of parents comprised of 399 (94.3%) immunisers to 24 (5.7%) non-immunisers. With that caveat, this imbalance reflected the population of parents in Tayside with children born between 1999 and 2000 where 94.6% (n=3090) had immunised their child and 5.4% (n=178) had refused MMR immunisation.

The same PMT and SN constructs were used to assess first and second dose MMR immunisation intentions. Due to ethical constraints, the study was cross-sectional and parents who already had the opportunity of immunising their child with the first vaccine were targeted. This provided an opportunity to examine both first and second dose immunisation intentions. The first dose immunisation intentions were assessed retrospectively with parents who had already immunised their child with the MMR vaccine or refused the vaccine, and future intentions of the second dose vaccine were assessed by only using parents who had immunised their child with the first vaccine but not the second vaccine and therefore were still in the 'intentions' stage of decision-making. No time anchors were attached to the constructs and the constructs were purposefully developed to apply to both doses of vaccine rather than specify issues related to only one of the vaccines, thus allowing for both retrospective and prospective investigation of MMR intentions. The retrospective design in this study may have resulted in recall bias as parents were asked to recall their intentions made approximately 3 years ago. Additionally, many of the parents had since opted for the MMR immunisation and therefore it needs to be taken into account that the attitudes present prior to immunisation may have changed post-immunisation when the parents' concerns would have been alleviated due to encountering no problems with immunisation. However, the findings for the second dose MMR vaccine are likely to be accurate reports of parents' current perceptions of risk and attitudes towards the second dose vaccine. Although a longitudinal prospective design would have been methodologically appropriate, the current study design allowed for a cross-sectional over view of attitudes and perceptions for parents who had the opportunity to immunise their child with the first MMR vaccine and were now faced with the second dose vaccine.

A positive and significant correlation between first dose MMR intentions and behaviour suggests a relationship between past intentions and behaviour. However intentions were measured retrospectively and therefore the findings must be tentatively approached as memory recall may have resulted in bias. For example, any worries or concerns experienced by parents may have subsequently been reduced if they opted for the vaccine and no illnesses were then experienced, thus suggesting that parents are less likely to report the anxieties and distress retrospectively.

From a theoretical perspective, this study has highlighted the usefulness of PMT as a risk assessment model when explaining parents MMR immunisation intentions for their child, and furthermore supports the notion of the inclusion of social factors to provide a greater insight into first and second dose MMR immunisation behaviour. Concerns held by some parents about the vaccine associations with autism and bowel disease need to be addressed, with the option of providing health visitors with a more pivotal role as health educators. Health visitors, alongside GPs, are crucial in the distribution of information about the severity of measles, mumps and especially rubella. Further education is required about rubella to equip parents with knowledge of the dangers of the disease. The media has also been highlighted as an important source of information which needs to be utilised in order to disseminate MMR information to parents and increase uptake rates.

Chapter 4

The Role of Protection Motivation Theory and Subjective Norm in Students' Decision-Making

4.1 Abstract

An opportunistic study was undertaken to understand students' MMR immunisation decision process during a mumps outbreak on campus. At the time of the study in 2004, there was a mumps epidemic throughout the UK, with 18 cases of mumps reported on campus. Therefore, a study was undertaken to understand students' risk perceptions using Protection Motivation Theory and subjective norm as a framework. Additionally, the results from this study permitted for comparisons to be made with findings reported in Chapter 3 (with parents) to determine whether MMR risk perceptions differ depending on the population group. A cross-sectional design was utilised and non-parent students were recruited. Amongst the 231 students who took part in the study, only questionnaires from 90 students were relevant for the analysis as the remaining 141 had already been immunised with the MMR vaccine at a younger age and indicated they did not require the vaccine again. The results of the study highlight the importance of PMT variables and SN when examining students' immunisation behaviour. In comparison with non-immunising students, immunising students perceived greater fear of the vaccine-preventable diseases, the diseases to be more severe, non-immunised students to be at greater risk of the diseases, and immunisation to be effective. Both groups of students perceived health professionals as important sources of information and were likely to follow their MMR advice. When comparing the students' results with the parents' results, parents reported greater levels of fear and reported the vaccine-preventable diseases to be more serious, which suggests making a decision on behalf of a child differs vastly from making it for oneself as an adult. The risk of autism and IBD were not seen as relevant for students; parents had to contend with weighing the risks and benefits for immunisation and non-immunisation in relation to the vaccine

preventable diseases and autism and Crohn's disease, whereas students only need to assess the risks relating to the vaccine-preventable diseases, and in particular the mumps virus. The results from the two population groups indicate the importance of PMT and SN in understanding MMR immunisation behaviour for different population groups.

4.2 Introduction

At the time of the thesis research, there was a mumps epidemic throughout the UK from 2004 to 2005. Although the MMR vaccine link with autism was related to childhood vaccines only, the decline in uptake rates and reduction in herd immunity effected the population at large with measles and mumps outbreaks. In 2004, Scotland experienced a mumps outbreak where there were over 400 reported cases of individuals aged from 14 - 25 years diagnosed with clinical mumps, and amongst these were 18 students from the University of Stirling. As a result, there was a mass campaign to immunise students at the University of Stirling. Although the study in Chapter 3 details MMR immunisation behaviour, the results can only be used to describe parents' behaviour on the behalf of their child and cannot be used to describe adults own behaviours. Parental behaviour has important consequences for the child's rather than the parent's health (Casiday, 2007), whereas students' immunisation behaviour would only have consequences for themselves. Furthermore, Fishbein and Ajzen (1975) report that some behaviours are determined by the population under study, i.e. not all population groups will display similar attitudes to the same behaviour. Therefore, an opportunistic study was undertaken to determine whether students' immunisation risk assessment differed from the parents' risk assessment (described in Chapter 3) in the MMR context.

Mumps is more severe in adults than in young children (Gupta, Best and MacMahon, 2005), and can result in pancreatitis, meningitis, encephalitis, and orchitis (swelling of the testes which can cause sterility). Between 2004 and 2005 there were more than 56,000 reported cases of mumps across the UK (Savage,

White, Brown and Ramsay, 2006). Mumps is a highly infectious disease and teenagers/adults born between 1980 and 1992 were considered to be most susceptible to mumps because they would have not either received the MMR vaccine or only received one dose (which provides 95-97% coverage) (Health Protection Agency, 2009b). According to the Health Protection Agency (2004), 70% of 18 year old were vulnerable to the mumps virus. As these individuals had received either no dose of the MMR vaccine or only one dose, and due to periods of low incidences of the vaccine-preventable disease, they would not have developed natural immunity (Health Protection Agency, 2004). Young adults living in close proximity, e.g. university students living on campus, military establishments, and in young offenders units, are considered to be at greatest risk (Stevenson, Murdoch, Riley, Duncan, Whirter and Christie, 1998). In 2004, 41 universities in the UK were reportedly affected with a mumps outbreak on campus (Press Association, 2004), and it became increasingly important to prevent further spread by increasing MMR immunisation in this population group.

There is a paucity of research relating to university students' immunisation-seeking behaviours (Pielak and Hilton, 2003). Focus is generally placed parents' childhood immunisation-seeking behaviours, health-care workers in relation to immunisation with hepatitis B and influenza vaccines, or the elderly and pneumococcal and influenza vaccines (Pielak and Hilton, 2003). Pielak and Hilton (2003) conducted research with university students during a measles outbreak in British Columbia, Canada. This study used the Health Belief Model (refer to Chapter 1, section 1.9.1.1, for details of this theory) to understand measles vaccine uptake amongst students during the outbreak. The results suggest that vaccine uptake was predicted

by 'susceptibility to disease', 'barriers to immunisation', 'cues to action', and 'health motivation'. However, the study focused on the measles vaccine rather than the triple MMR vaccine. It has been documented in research with parents that there are greater concerns about combination vaccines placing stress on the immune system in comparison with single vaccines (Elliman and Bedford, 2003; Hilton, Casiday, 2007; Petticrew and Hunt, 2007). Therefore, it is unclear whether the results of this study can be used to understand UK students' immunisation behaviour when they are faced with the triple MMR vaccine. Furthermore, attention was placed on the measles outbreak, whereas in the UK focus was placed on a mumps outbreak amongst university students.

Only one study to date, with university students, has been conducted in the UK and since Wakefield's MMR hypothesis. Hamilton-West (2003) focused on MMR attitudes and risks in a university student population following a mumps outbreak at the University of Kent. The results of this study indicated that the uptake of the MMR vaccine was significantly related to three items – 'having the MMR jab is beneficial to my health', 'most of my friends/colleagues had the MMR jab during the recent immunisation program', and 'it was difficult to attend due to practical reasons'. Although these items could be hypothesised to relate to attitudes, descriptive norms and external control, unfortunately, the research was not based on theoretical or social cognition models. Cognition models, such as Protection Motivation Theory, are important for use in health-related research as they help to describe and identify key cognitions and their inter-relationships in the regulation of health behaviours, provide insight into the determinants of behaviour, and further provide targets for use in interventions (Conner and Norman, 1999). Therefore, the

findings from Hamilton-West's (2003) study do not provide a theoretically-based understanding of the cognitions involved in MMR vaccine uptake amongst the student population. Additionally, the author did not determine whether the participants in the study were parents although the age range of the sample, 18-57, suggests a possibility of the inclusion of parents in this study. Students who were parents may have different attitudes in comparison with non-parent students; parents may have a greater motivation to protect their child from exposure to the vaccine-preventable diseases via self-immunisation whereas non-parent students will not hold similar concerns.

Due to the mumps outbreak in 2004, the University of Stirling started a mass campaign to immunise students aged 17-24 years with the MMR vaccine. Posters were placed all around the university and leaflets were delivered to all students living on campus. The aim of the present study was to understand the factors influencing MMR immunisation uptake in the student sample.

4.3 Method

4.3.1 Design

This was a cross-sectional questionnaire-based survey aimed at investigating students' decision-making for the MMR-vaccine. Students were approached in public areas on campus by the researcher, including outside the university library, canteen and sports centre, and asked whether they would like to participate in the study. On approaching the students, the researcher clarified whether 1) they were

students, and 2) whether they were parents (parents were excluded from the analysis to permit comparisons with the parents' results from Chapter 3). Students who agreed to participate and met the inclusion criteria were included in the study and provided with a letter and a questionnaire to complete (refer to Appendix II). In total, 231 students participated in the study but the MMR vaccine decision was only relevant for 90 students at the present time (i.e. those who indicated that they may require the MMR vaccine), and therefore only the results from these 90 students were included in the analysis.

4.3.2 Participants

Two hundred and thirty-one students from the University of Stirling, out of 250 students who were initially approached, participated in the study. Eleven students declined due to time constraints, and 8 students who were approached were parents and therefore excluded from the study. A greater proportion of female participants took part (58%) in comparison to males (38%), which was representative of the university student population which has a male:female ratio of 37:63 (SUSA Website, 2007). Ages ranged from 17-30 years (mean age = 20.5 years). The majority of participants placed themselves in the 'White British' category (79.2%). Only 36.4% lived on campus and 90.9% were undergraduate students. As the study was only concerned with immunisation behaviour in response to the recent mumps outbreak, only 90 were included in the analysis, as the remaining participants had been immunised at a younger age or prior to the mumps outbreak and indicated they did not require the vaccine again (further details provided in the results section).

4.3.3 Procedure

Ethical approval was obtained from the Stirling University Department of Psychology Ethics Committee (approval provided by an internal email by the committee Chair). Students were approached in public areas on campus. The inclusion criteria included: i) all participants must be University of Stirling students; ii) aged 18 or over; iii) were not parents, and iv) believed they may require the MMR vaccine (even if immunised as a child) or had been immunised recently. Students who were either under the age of 18, were not students at the University of Stirling, were parents, or indicated they would definitely not require the MMR vaccine were excluded from the study. Once verbal consent to take part was received, potential participants were provided with letters, questionnaires and pens with the option of completing them immediately or submitting them to the psychology department reception. Only 2 participants opted for the latter and of these one of the questionnaires were returned to the researcher (returned 2 hours later).

4.3.4 Measures

The questionnaire was similar to the parents' questionnaire (see Appendix I) but adapted for students (see Appendix II). The questionnaire focused on students' own immunisation intentions, behaviours, attitudes, threat appraisal, and coping appraisal using PMT with SN as a framework.

i) PMT components:

Behaviour for the MMR vaccine was measured by two items and a sub-item. The first item asked whether they had been immunised with the MMR vaccine. Two response options were available – ‘yes’ and ‘no’. If the students answered ‘yes’, then they were asked a sub question and requested to state when they had been immunised. Students were then asked a second item about whether they thought they needed to be immunised with the MMR vaccine. The response options included ‘yes’, ‘no’ and ‘unsure’. Students who answered ‘yes’ to the first item and ‘no’ to the second item were excluded from analysis as these students did not go through the MMR decision-making process. Students who answered ‘unsure’ to the second item were still included in the analysis.

Protection motivation to immunise was measured by one item: ‘Do you intend to be immunised with the MMR vaccine?’ This item was only asked of students who answered ‘no’ to the above item.

Future (child’s) Protection Motivation was measured, asking students ‘If you had children in the future do you intend to have them immunised with the MMR vaccine?’ Two response options were available – ‘yes’ and ‘no’.

Fear of measles, mumps and rubella was measured by three items on worry: ‘How worried would you be if you were diagnosed with measles, mumps and rubella’ ($\alpha=.89$). A 4-point scale was used, ranging from ‘not at all worried’ to ‘very worried’. A mean score of the 3 items was calculated to provide an overall measure of fear.

Severity of measles, mumps and rubella were measured by three items: ‘How serious are the following illnesses for students who have not been immunised with the MMR vaccine – measles, mumps and rubella’ ($\alpha=.91$). The responses were measured on a scale ranging from 0 (not at all serious) to 10 (very serious). A mean score of the 3 items was calculated to provide an overall measure of severity of disease.

Vulnerability to measles, mumps and rubella was measured by 3 items examining susceptibility to the illnesses if not immunised: ‘What would be the risk of developing the following illnesses for students who are not immunised with the MMR vaccine - measles, mumps and rubella.’ ($\alpha=.95$). Item responses were measured on a 4-point scale ranging from ‘no risk’ to ‘high risk’. A mean score of the items was calculated to provide an overall measure of vulnerability.

Response efficacy of the vaccine and immunisation were measured by two subscales developed in Chapter 3: ‘Safety evidence’ subscale and ‘immunisation attitudes and efficacy’ subscale. The safety evidence subscale was not perceived as directly relevant for students’ own immunisation behaviour but was included to investigate students’ beliefs regarding the side-effects and to allow comparisons with the parents’ results. Therefore two items were asked in this subscale: ‘There is a strong evidence of a link between MMR immunisation and autism’ and ‘There is no strong evidence that MMR immunisation causes inflammatory bowel disease’ ($\alpha=.12$). The second subscale on attitudes and efficacy included two of the items identified in the principal component analysis in Chapter 3, but adapted for a student population: ‘It is more dangerous for a student to have the MMR immunisation than to have

measles' and 'MMR immunisation weakens the immune system'. However, as the student study was conducted due to the mumps outbreak on campus, it seemed prudent to include an item on mumps: 'It is more dangerous for a student to have the MMR immunisation than to have mumps'. As both measles and mumps were covered by the response efficacy item, rubella was also included to cover all the vaccine-preventable diseases: 'It is more dangerous to have rubella than to have MMR immunisation'. The alpha level for the first two items (used in the parent's questionnaire) was .57, but with the inclusion of the new items the reliability of the subscale increased ($\alpha=.63$). The items were scored from -2 to +2, and were recoded when totalled for the subscales so they were scored in the same direction (pro-immunisation). A mean score of the items was calculated for each factor to provide 2 measures of response efficacy.

External self-efficacy was measured by 6 statements on how easy/difficult the participant found the external barriers to immunisation: 'If you have had the MMR immunisation – how easy or difficult was it for you to have the immunisation with regard to the following...' or 'If you have not had the MMR immunisation – how easy or difficult can you foresee the following to be: the time of appointment, taking time out to attend, university work (essays, exams etc), transport problems, your own health, your capability of looking after yourself after the immunisation' ($\alpha=.91$). The responses were scored with a -2 to +2 scale. A mean score of the 6 items were calculated to provide an overall measure of external self-efficacy.

Internal self-efficacy was measured by 2 statements on how easy/difficult the participant found the internal barriers to immunisation: 'If you have had the MMR

immunisation – how easy or difficult was it for you to have the immunisation with regard to the following...’ or ‘If you have not had the MMR immunisation – how easy or difficult can you foresee the following to be: your anxiety regarding the immunisation and your distress (regarding your experiences from previous injections’ ($\alpha=.89$). The responses were scored by a -2 to +2 scale. A mean score of the 2 items were calculated to provide an overall measure of internal self-efficacy.

ii) Subjective Norm

SN was measured in two parts using the following referents: partner, family, friends, GP, and practice nurse. Five items asked participants whether they perceived each referent wanted them to be immunised with the MMR vaccine or not. Responses were measured on a 10-point scale ranging from ‘0’ (definitely didn’t want you to immunise) to ‘10’ (definitely did want you to immunise). Five items asked the students whether they followed the advice concerning the MMR vaccine from each referent. Responses were measured on a 10-point scale ranging from ‘0’ (definitely didn’t follow their advice) to ‘10’ (definitely did follow their advice). The two parts were multiplied for each referent to provide a subjective norm total for each referent. Not all of the students discussed the vaccine with the stated referents, especially as many of the participants indicated they did not have partners, and, therefore, in order to minimise any lost data, the SN variables were aggregated for the correlations and regression analyses ($\alpha=.94$); a mean score of the 5 referents SN scores were calculated to provide an overall measure of SN.

iii) Important Sources of Information

A series of items focusing on important sources of information during the MMR decision were asked: 'How important to you is information about MMR immunisation from the following: family, friend, GP (doctor), practice nurse, media (TV, newspapers), and internet?' The responses were scored on a 0-4 scale (from 'not at all important' to 'very important').

iii) Additional Items

Four additional items relating to the mumps outbreak on campus were also asked. The first item asked: 'Do you know someone on campus who has mumps'. Two response options were available – 'yes' and 'no'. If they answered 'yes', then they were asked: 'Did knowing someone with mumps on campus influence your own decision to have/not have the MMR vaccine'. Again two response options of 'yes' and 'no' were available, and an option to provide further details was available (although no student provided any details). Students were also asked about their awareness of the mumps outbreak: 'Do you know if there have been cases of mumps on campus in the past month or so'. Two response options were made available – 'yes' and 'no'. A final item asked: 'Do you know if Airthrey Medical Centre (on campus) is offering students the MMR vaccine'. Response options included 'yes' and 'no'. General back ground questions were also asked, relating to age, gender, ethnic origin, whether living on campus, and year of study.

4.4 Preliminary Analysis

Preliminary analysis testing was conducted to inspect the data file and determine the normality distribution.

Missing Data: Missing data was examined for each subscale. Missing values ranged from 2.6 - 17.7% with the largest percentage of data missing for the vulnerability subscale, and internal and external self-efficacy. It is proposed that the relatively large amounts of missing data may be due to the fact students were approached during the exam period at the university, and therefore may have not had sufficient time to complete the questionnaires. Additionally, students were approached in public areas sometimes surrounded by friends/colleagues and therefore may have not focused fully on the questionnaire. In relation to the self-efficacy subscales, these items were not relevant for students who had been immunised at a younger age, and were also not relevant for students who had decided to refuse the vaccine and therefore had not encountered external barriers to immunisation. With regard to the subjective norm subscale, there were many students who had not discussed MMR immunisation with the referents, and this was especially seen with the 'partner' subscale (some students indicated that they did not have a partner). Table 4.1 indicates the number of students who had not discussed MMR immunisation with each of the referents. Many students had reported that they discussed MMR immunisation with their family. Individuals who did not discuss MMR immunisation with any of the referents did not answer the SN items. As a result, a decision was made to exclude cases on this variable and all other variables if there were missing any data for any of the analyses.

Table 4.1: Percentage of Students who Discussed MMR Immunisation with Referents

Referents	Did Discuss - % (n)	Did not discuss - % (n)
<i>Partner</i>	30.7% (71)	67.1% (155)
<i>Family</i>	77.1% (178)	21.2% (49)
<i>Friends</i>	45.9% (106)	51.9% (120)
<i>GP</i>	50.2% (116)	48.1% (111)
<i>Practice Nurse</i>	40.3% (93)	58 (134)

Normality testing: The normality distribution of the scores was examined using the following statistics: 5% trimmed mean, skewness, kurtosis, Kolmogorov Smirnov test, histograms, normal Q-Q plots, and box plots. There were no differences between the 5% trimmed mean and the original mean of each of the variables, and thus suggesting there were no extreme scores which were influencing the means. Skewness, kurtosis and Kolmogorov Smirnov statistics were also investigated (see Table 4.2 for results). The table reports negative skewness for all of the variables apart from the response efficacy subscales, suggesting a ‘ceiling’ effect. Five of the variables also illustrated negative kurtosis scores. Additionally, the significant values from the Kolmogorov-Smirnov statistics suggest a violation of the assumption of normality. However, the shape of the distribution was inspected to determine the normality of the distribution (refer to Figures 4.1 to 4.8 for histograms). Apart from internal and external self-efficacy, the histograms for each variable illustrated relatively normal distribution curves, and this normal distribution was supported by the normal Q-Q plots, whereby relatively straight lines of the scores were plotted by the expected values from the normal distribution.

Table 4.2: Normality Testing

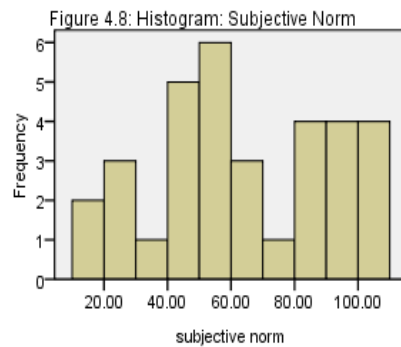
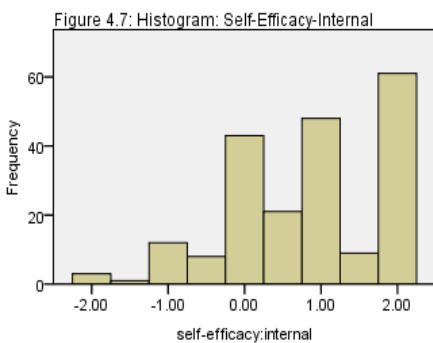
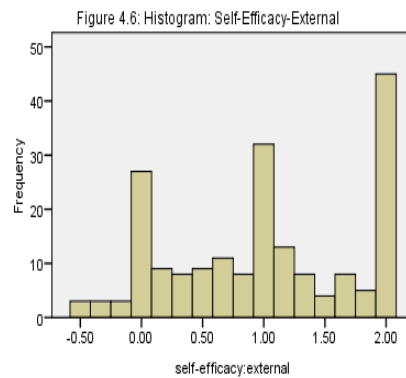
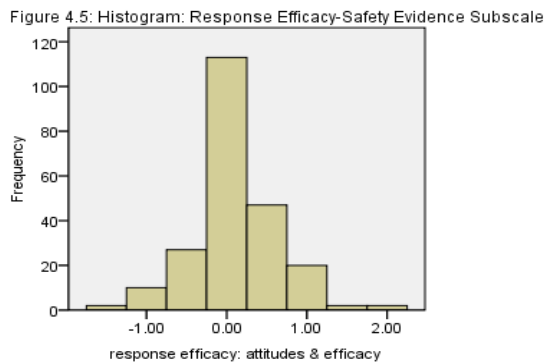
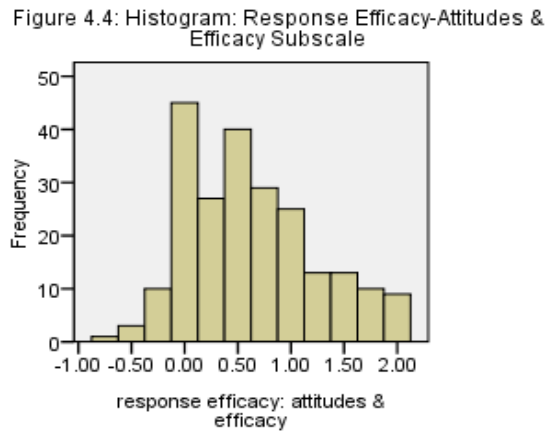
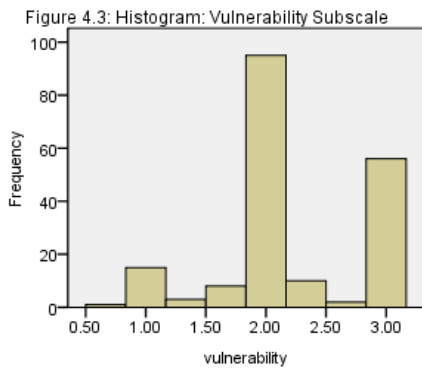
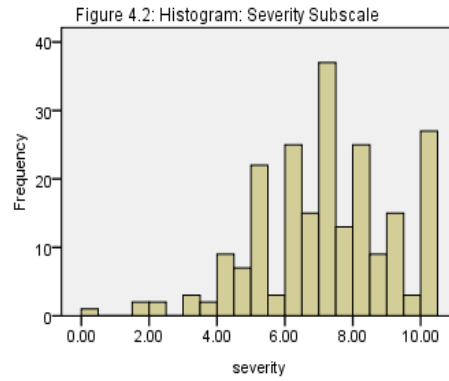
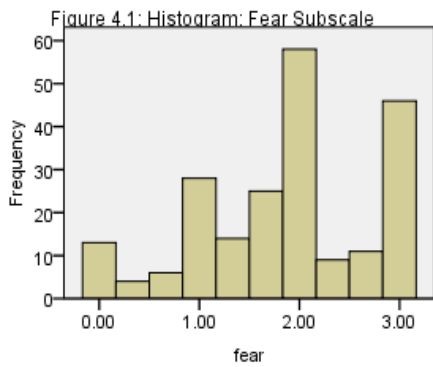
	Skewness	Kurtosis	Kolmogorov-Smirnov (sig)
<i>Severity</i>	-.490	.286	.000
<i>Fear</i>	-.391	-.524	.000
<i>Vulnerability</i>	-.155	-.472	.000
<i>Response efficacy: efficacy and attitudes</i>	.501	-.425	.000
<i>Response efficacy: safety evidence</i>	.238	1.52	.000
<i>Self-efficacy: external</i>	-.085	-1.197	.000
<i>Self-efficacy: internal</i>	-.476	-.436	.000
<i>Subjective norm</i>	-.012	-1.217	.046

In light of this evidence, non-parametric tests, e.g. Spearman’s Rho correlations and Mann-Whitney U tests, were used to examine differences between immunisers and non-immunisers for each variable.

Outliers: Box-plots and histograms were examined to identify any outliers. The findings indicate no extreme outliers, and normal outliers were only present for severity and response efficacy: safety evidence subscales. These variables were checked for errors to determine whether they were in the range of possible scores, and the results indicated there were no errors. The comparisons between the 5% trimmed mean scores for all the variables indicated no difference from the original means. Therefore, the outlying cases were retained, especially as they were not too different (i.e. extreme) from the remaining distribution.

Coding: Coding of the scores was changed so that the ‘don’t know’ were excluded from the analysis. This exclusion produces a greater volume of accurate data and also tends to show no differences in response rates for inclusion or exclusion of this option (Walonick, 1997-2010).

Figures 4.1 - 4.8: Histograms to Illustrate the Normality of the Distribution for Each Subscale



4.5 Results

4.5.1 Descriptive Results

(Due to the missing data, only valid percentages will be reported)

A large proportion of student participants had been immunised with the MMR vaccine - 178 (77.4%), and 52 (22.6%) had not been immunised. The majority of the immunised students (n=112) were immunised at a younger age, and only 44 (26%) had been immunised recently. Table 4.3 indicates the breakdown of the time students were immunised. All of the students who reported they had been immunised prior to the mumps outbreak indicated they would not require the MMR vaccine again.

Table 4.3: Immunisation Periods for Students

Time immunised	N (%)
<i>Young child</i>	9 (5.3)
<i>Primary school</i>	33 (19.5)
<i>High school</i>	29 (17.2)
<i>'Younger' (general)</i>	47 (27.8)
<i>Before studying abroad</i>	1 (.6)
<i>2 years ago</i>	3 (1.8)
<i>1 year ago</i>	3 (1.8)
<i>Recently</i>	44 (26)

Concerning the 52 (22.6%) students who had not been immunised, the majority did not intend to be immunised with the MMR vaccine (n=26, 46.4%), followed by students who were unsure (n=20, 35.7%) and a small minority still intended to opt for the immunisation (n=6, 10.7%). Among the students included in the analysis

(n=90), 54.1% (n=49) were aware of the mumps outbreak on campus and 23.8% (n=21) had not heard of any outbreak (22.1% missing data), although 65.8% (n=59) were aware that the MMR vaccine was being offered on campus. Only a small minority knew someone on campus who had mumps (24.2%, n=22), and amongst these students only 10% (n=2) reported that this influenced their own decision to obtain the MMR vaccine. When asked about intentions to immunise any future children with the MMR vaccine, the majority of students reported they intended to immunise future children with the MMR vaccine (91%, n=82), whereas 8.1% (n=7) reported they would refuse the vaccine, and 1 student indicated they were unsure about their decision.

For all of the analyses, only the students who had been recently immunised (labelled 'immunisers') and those who had not been immunised or were unsure whether they would opt for immunisation (labelled 'non-immunisers') but still perceived they may need to be immunised were included. In total, data from 46 non-immunisers and 44 immunisers was analysed. Comparisons were made with the results from the student population with the results from the parent population (from Chapter 3). However, as the questions differed between the two groups, no statistical analysis was conducted between parents and students and only descriptive data was compared. Analysis was only carried out within groups.

PMT variables and SN: Mean scores between the two groups were compared on all the PMT constructs and SN, with all items scored in the same direction of pro-immunisation (see Table 4.4). The scores illustrate differences between the two groups on all PMT variables and SN. In comparison to non-immunisers, immunisers

showed greater fear of the vaccine-preventable diseases, perceived these diseases to be severe, perceived greater vulnerability to the diseases if not immunised, believed in the efficacy of the vaccine, reported greater internal and external barriers to immunisation, and were likely to be motivated by significant others. The mean results for the two response efficacy subscales were very low for both groups, which suggest that neither group had formed a strong opinion on the efficacy of the vaccine/immunisation. These subscales will be examined in greater detail in the 'inferential statistics' section.

Table 4.4 compares the students' results with the parents' results (from Chapter 3). The results indicate that in comparison with the students, both immunising and non-immunising parents reported greater worry if their child was diagnosed with the vaccine-preventable diseases. Immunising parents perceived the diseases to be more severe, and reported greater response efficacy in relation to the safety of the vaccine and immunisation. Non-immunising parents reported lower levels of response efficacy, internal self-efficacy and subjective norm than the other three groups. All of the participating groups reported relatively high levels of disease risk associated with non-immunisation. Both immunising parents and students reported greater levels of subjective norm in comparison to the non-immunising groups.

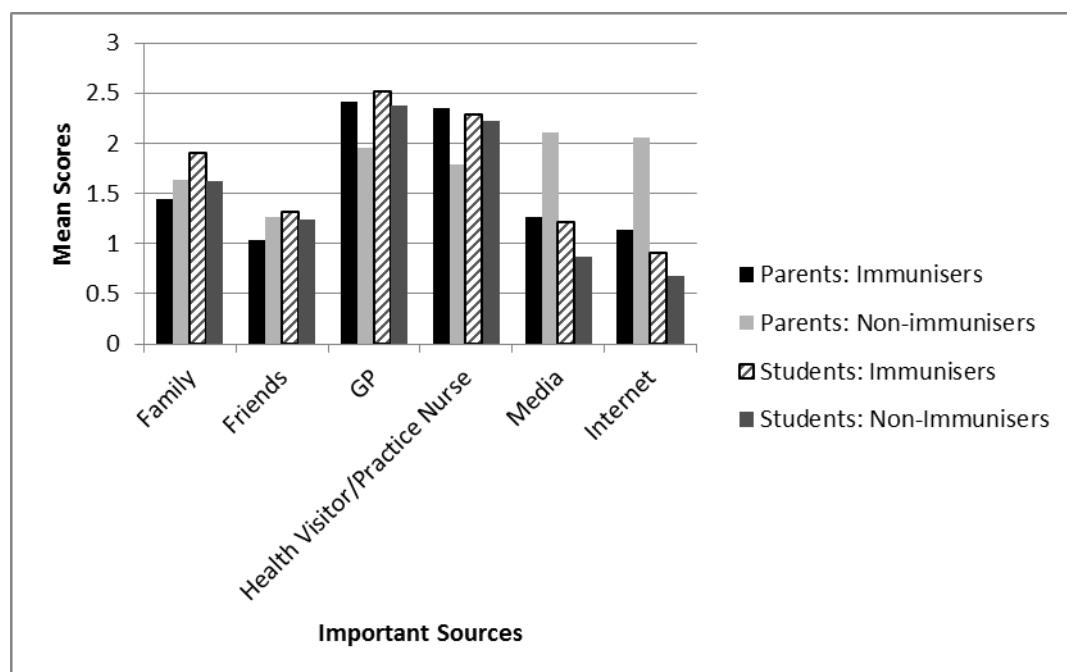
Table 4.4: Mean PMT Subscale Scores for Students and Parents

Variable	Scoring range	Student Imm Means (SD)	Student Non-Imm Means (SD)	Parent Imm Means (SD)	Parent Non-Imm Means (SD)
<i>Fear</i>	0=not worried, 3=very worried	1.94 (.91)	1.38 (.91)	3.2 (.77)	2.91 (.71)
<i>Severity</i>	0=not serious, 10=vary serious	7.12 (2.11)	6.0 (1.72)	8.96 (1.63)	7.3 (2.0)
<i>Vulnerability to vaccine-preventable diseases: non-immunised</i>	0=no risk, 3=high risk	2.27 (.63)	2.0 (.49)	2.53 (.55)	2.3 (.47)
<i>Response efficacy: safety evidence</i>	-2= strongly disagree, +2=strongly agree	.14 (.57)	.02 (.55)	.28 (.63)	-.85 (.74)
<i>Response efficacy: attitudes and efficacy</i>	-2= strongly disagree, +2=strongly agree	.77 (.60)	.53 (.65)	1.05 (.65)	-.35 (.79)
<i>Self-efficacy: internal</i>	-2= very difficult, +2= very easy	1.14 (1.08)	.59 (1.03)	.40 (.94)	-.19 (.40)
<i>Self-efficacy: external</i>	-2= very difficult, +2= very easy	1.55 (.56)	.53 (.67)	1.17 (.66)	1.33 (1.17)
<i>Subjective Norm</i>	Greater the score the higher the SN	70.8 (18.53)	47.88 (24.26)	88.4 (21.68)	21.68 (15.5)

(Imm = immunisers, Non-imm = non-immunisers)

Important Sources of Information: Figure 4.9 highlights the mean differences between student and parent immunisers and non-immunisers for important sources of information. The graph illustrates that all groups perceived health professionals to be the important sources of information. For the students, the least important source of information was the internet, followed closely by the media and friends. In comparison with the results for the parent population, student non-immunisers reported the media and internet to be less important sources of information than health professionals. The findings indicate that the media and internet were considered more important sources of information by students who had recently been immunised than those who had not opted to be immunised. Similar to the parent groups, both groups of students perceived family and friends as less important sources of information, although greater importance was reported for these sources than for the media or internet.

Figure 4.9: Important Sources of Information Reported by Students and Parents



4.5.2 Inferential Statistics

In order to compare the results of the present sample with the parents' results, non-parametric tests were performed to examine differences between immunisers and non-immunisers for each item in the subscales. Mann-Whitney U tests were conducted and median values are reported. As indicated previously, no between-group analysis was conducted due to differences in the questions for both groups.

Important sources of information: Mann-Whitney U tests were conducted to determine any differences between immunisers and non-immunisers for important sources of information (see Table 4.5). The results show no significant differences between the two groups. The GP was reported as the most important source of information by both groups. Non-immunisers tended to rate the practice nurse as slightly more important than the immunisers and the media as less important, however these results were non-significant. This suggests no significant differences between the student groups, whereas the two parent groups reported differences with the following sources: GP, health visitor, media and internet (refer to Chapter 3, Table 3.7).

Table 4.5: Mann-Whitney U Tests for Important Sources of Information

	Median: Immunisers	Median: Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2-tailed)
Important source:					
<i>Family</i>	2	2	725.	-1.65	.09
<i>Friend</i>	1	1	822.	-.37	.71
<i>GP</i>	3	3	797.	-1.09	.27
<i>Practice nurse</i>	2	3	853.	-.08	.93
<i>Media</i>	1	.5	714.	-1.40	.16
<i>Internet</i>	1	2	621.	-1.05	.29

Scores were out of a possible '3': '0' = not at all important, '3' =very important.

Fear: Table 4.6 shows that in comparison with non-immunisers, immunisers would be more worried if they were diagnosed with measles or mumps. Although the median results do not indicate the direction of the difference for the fear or rubella score, the mean results indicate that immunisers reported greater worry if diagnosed with rubella in comparison with non-immunisers (immuniser mean = 2.02, SD = 1.01, non-immuniser mean = 1.49, SD = 1.02). Mann-Whitney U tests revealed significant differences between immunisers and non-immunisers for fear of all three illnesses, with small to medium effect sizes: measles: $p \leq .05$, effect size = .21; mumps: $p \leq .001$, effect size = .37, rubella: $p < .05$, effect size = .26. These results differ from those reported by parents (see Chapter 3, Table 3.8) where significant differences were only indicated for rubella. Non-immunising parents reported similar levels of worry for measles and mumps as immunising parents, whereas immunising students reported greater levels of worry for all three diseases than non-immunising students.

Table 4.6: Mann-Whitney U Tests for Fear

	Median: Immunisers	Median: Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2- tailed)
Fear:					
<i>Measles</i>	2	1	705.	-1.96	.05
<i>Mumps</i>	2	1	496.	-3.32	.001
<i>Rubella</i>	2	2	566.	-2.34	.019

Scores were out of a possible '3': '0' = not at all worried, '3' = very worried.

Severity: Immunisers reported measles, mumps and rubella to be more serious diseases than non-immunisers, with significant differences for all three groups (refer to Table 4.7). Surprisingly, measles was reported as the least serious disease and mumps and rubella as more serious by the immunisers. Non-immunisers reported

mumps as the most serious disease. Mann-Whitney U tests revealed significant differences between immunisers and non-immunisers for all three diseases: measles: $p < .01$, effect size = .32; mumps: $p < .01$, effect size = .31; rubella: $p < .05$, effect size = .27. These results are similar to the parents' results (see Chapter 3, Table 3.9), but the immunising parents reported greater levels of severity of all diseases than the students, and both groups of parents reported measles as being more severe than the other diseases.

Table 4.7: Mann-Whitney U Tests for Severity

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2-tailed)
Severity:					
Measles	7	6	561.	-2.89	.004
Mumps	8	7	572.	-2.81	.005
Rubella	8	6	606.	-2.49	.013

Scores were out of a possible '10': '0' = not at all serious, '10' = very serious.

Vulnerability: Table 4.8 shows significant differences between immunisers and non-immunisers for mumps and rubella, and indicates near-significance for measles. The median values do not indicate the direction of differences, and therefore means were examined: measles: immuniser mean = 2.29 (SD=.62), non-immuniser mean = 2.03 (SD=.51); mumps: immuniser mean = 2.31 (SD=.71), non-immuniser mean = 2.06 (SD=.54); rubella: immuniser mean = 2.26, non-immuniser mean = 1.91 (SD=.56). The mean results indicate that immunisers perceived the risk of measles, mumps and rubella to be greater than non-immunisers. Mann-Whitney U tests illustrated significant differences between immunisers and non-immunisers for mumps and rubella, with the following effect sizes for mumps and rubella of .24 and .29, respectively. In comparison, the parents' results show significant differences

between immunising and non-immunising parents for all three of the diseases, with the immunising parents reported greater levels of risk (see Chapter 3, Table 3.10)

Table 4.8: Mann-Whitney U Tests for Vulnerability

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2- tailed)
Vulnerability (if not immunised):					
<i>Measles</i>	2	2	474.	-1.93	.054
<i>Mumps</i>	2	2	479.	-2.00	.045
<i>Rubella</i>	2	2	423.	-2.40	.016

Scores were out of a possible '3': '0' = no risk, '3' =high risk.

Response efficacy: Table 4.9 reports the results of the Mann-Whitney U tests for the two response efficacy subscales. The results highlight only one significant difference; immunisers were more likely to disagree with the statement that MMR immunisation was more dangerous for students than measles ($p=.015$). The effect size for this result was .26. The median results also suggest that immunisers perceived having rubella to be more dangerous than MMR immunisation, and were more likely to disagree that MMR weakened the immune system. However, the latter two results were non-significant. For the safety evidence subscale, both groups of students indicated no strong beliefs about the associations made between MMR immunisation and autism and bowel disease. These results differed vastly from those reported by parents (see Chapter 3, Table 3.11). Non-immuniser parents reported stronger beliefs in the association of the vaccine with autism and bowel disease. In comparison with the immunising groups, both non-immunising parents

and students perceived immunisation to be more dangerous than measles and were more likely to believe it weakened the immune system.

Table 4.9: Mann-Whitney U Tests for Response Efficacy

	Median Immunisers	Median Non-immunisers	Mann-Whitney U	Z	Asymp. Sig (2-tailed)
Response Efficacy: Attitudes and Efficacy					
<i>More dangerous to have MMR immunisation than to have measles</i>	-1	0	658.	-2.43	.015
<i>More dangerous to have MMR immunisation than to have mumps</i>	-1	-1	835.	-.83	.41
<i>More dangerous to have rubella than to have MMR immunisation</i>	1	0	755.	-1.37	.17
<i>MMR immunisation weakens the immune system</i>	-1	0	809.	-1.07	.28
Response Efficacy: Safety Evidence					
<i>Strong evidence of a link between MMR immunisation and autism</i>	0	0	748.	-1.48	.14
<i>No strong evidence that MMR causes IBD</i>	0	0	821.	-.94	.35

The items were scored using a -2 (strongly disagree) to +2 (strongly agree) scale.

Internal and external self-efficacy: The results indicate significant differences between the immunisers and non-immunisers, with immunisers perceiving fewer external barriers and anxiety regarding immunisation. According to the median results, both groups reported similar levels of distress relating to previous injections. However, mean results for this item indicate that non-immunisers perceived slightly greater distress than immunisers: immuniser mean = 1.17 (SD=.09), non-immuniser

mean = .75 (SD=1.06). The effect sizes ranged from .45 to .64 for external self-efficacy, and from .23 to .32 for internal self-efficacy, i.e. near-large/large effect sizes were reported for the external self-efficacy items, and near-medium/medium effect sizes were reported for internal self-efficacy. These results differed from the parents' results (see Chapter 3, Table 3.12), whereby immunising parents reported greater external barriers to immunisation than non-immunisers. Both non-immunising groups reported greater barriers in relation to their own anxiety than the immunising groups, although greater anxiety levels were reported for the non-immunising parents.

Table 4.10: Mann-Whitney U Tests for Self-Efficacy

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2- tailed)
External Self-Efficacy:					
<i>Time of appointment</i>	2	1	296.	-5.86	.000
<i>Taking time out</i>	2	1	418.	-4.72	.000
<i>University work</i>	1.5	0	450.	-4.11	.000
<i>Transport problems</i>	2	1	275.	-5.93	.000
<i>Own health</i>	2	0	353.	-5.19	.000
<i>Looking after yourself</i>	2	1	496.	-3.97	.000
Internal Self-Efficacy					
<i>Your distress</i>	1	1	670.	-2.15	.031
<i>Your anxiety</i>	1	0	594.	-2.94	.003

The items were scored using a -2 (very difficult) to +2 (very easy) scale.

Subjective Norm: Table 4.11 shows that in comparison with non-immunisers, immunisers reported that all referents had wanted them to immunise and were more likely follow their advice. They perceived health professionals and family members to wanting them to immunise more than other referent groups, and were more likely to follow the advice of health professionals and family. Non-immunisers perceived

health professionals as wanting them to immunise more than other significant referents, and were more likely to follow the advice of the GP and family. However, it needs to be taken into account that many of the participants reported they did not have a partner at the time of completing the questionnaire, therefore the results for this referent group only applies to 30 participants in total (12 immunisers and 18 non-immunisers). Nonetheless, these participants were still included in the analysis to examine the differences between the two groups who did have partners. All SN items were significant, except for following the advice of the practice nurse, although the median results indicate that immunisers were more likely to follow their advice than non-immunisers. Effect sizes for the first aspect of SN (want/didn't want you to immunise) ranged from .28 to .62, and for the second aspect of SN (did/did not follow their advice) ranged from .26 to .41. A similar pattern of results in relation to health professionals is illustrated by the parents in Chapter 3 (see Table 3.13). Both immunising and non-immunising parents and students perceived health professionals as wanting them to immunise, and the immunising groups were more likely to comply with these referents. Non-immunising parents reported they were likely to follow advice of their partner, whereas non-immunising students were more likely to follow the advice of their GP and family members.

Table 4.11: Mann-Whitney U Tests for Subjective Norm

	Median Immunisers	Median Non- immunisers	Mann- Whitney U	Z	Asymp. Sig (2- tailed)
Subjective norm (wanted you to immunise):					
<i>Partner</i>	8	5	30.	-3.42	.001
<i>Family</i>	10	5	180.	-4.14	.000
<i>Friend</i>	8.5	5	108.	-3.67	.000
<i>GP</i>	10	8	93.5	-1.69	.09
<i>Practice nurse</i>	10	7	82.	-2.48	.013
Subjective norm (followed their advice):					
<i>Partner</i>	10	7	51.	-2.20	.028
<i>Family</i>	9	8	326.	-2.49	.013
<i>Friend</i>	8	6	205.	-2.80	.005
<i>GP</i>	10	8.5	205.	-1.98	.048
<i>Practice nurse</i>	10	7	231.	-1.83	.07

Scores were out of a possible '10': section 1 – '0' = definitely didn't want them to immunise, 10 = definitely did want them to immunise. Section 2 – '0' = definitely didn't follow their advice, 10 = definitely did follow their advice.

Correlation between PMT components and SN

A Spearman Rho (SR) correlation was conducted to examine the relationships between PMT variables and SN (see Table 4.12). The results indicate that immunisation behaviour (including individuals who had recently immunised or those who refused immunisation/were still unsure) was most strongly correlated with external self-efficacy and SN. Immunisation behaviour correlated with all PMT variables except for the two response efficacy subscales. SN was significantly related to only two PMT variables – fear and vulnerability. The results suggest SN plays an important role in students' immunisation behaviour, which was also seen in the parents' results (see Chapter 3, Table 3.14).

Table 4.12: Spearman Rho Correlation between PMT Components, Subjective Norm and MMR Behaviour

	1.Behr	2.Fear	3.severity	4.Disease vulnerability	5.RE: imm efficacy and attitudes	6.RE: safety evidence	7.Internal SE	8.External SE	9.SN
1		.285**	.344**	.274*	.187	.080	.297**	.636**	.535*
2			.407**	.260**	.020	-.193**	-.130	.033	.325
3				.452**	.095	.018	.097	.205**	.491**
4					.109	-.072	.110	.186*	.436*
5						.170*	.112	.160*	.154
6							.252**	.216**	.028
7								.660**	.106
8									.295

*=p<.05 **=p<.01

1=MMR behaviour, 2=fear, 3=severity of diseases, 4=disease vulnerability if not immunised, 5=response efficacy: immunisation attitudes, 6=response efficacy: safety evidence, 7=internal self-efficacy, 8=external self-efficacy, 9=subjective norm.

Predicting Immunisation Behaviour

No parametric tests were conducted with this participant sample due to the violations of the assumption of normality. Furthermore, the missing data would have resulted in low numbers in the regression analysis – only 25.1% (n=23) of the participants would have been included in the regression focusing on PMT without SN, and with SN the number of participants included in the analysis would have been reduced to 4.8% (n=4).

4.6 Discussion

The results of the study highlight the importance of the PMT variables and SN when examining students' immunisation behaviour. The results for the immunising students indicate that, in comparison with the non-immunisers, this group were more worried about being diagnosed with the vaccine-preventable diseases, perceived the diseases to be more severe, perceived greater risks if they were not immunised and illustrated a pattern of stronger beliefs in the efficacy of the vaccine. Non-immunisers instead perceived greater external barriers to immunisation, and more anxiety as an internal barrier. Both groups perceived health professionals wanted them to immunise and were more likely to follow the advice from these referents than others. Both groups reported health professionals to be their most important source of information.

Differences were found between the results reported by parents and students. Parents reported high levels of worry if their child was diagnosed with any of the vaccine-preventable diseases and generally reported greater levels of severity, whereas similar results were not reported by students. Parents in previous studies

have perceived their children to be less susceptible to diseases if they were healthy (Evans et al, 2001; Casiday, 2007), and concerns about their child's immature immune system and wanting to postpone immunisation until the child was older or stronger have also been reported (Bond et al, 1998). This suggests age/maturity may play a prevalent role in the immunisation decision. Immunisation for younger individuals may be associated with fear and concerns about vulnerability to the diseases, whereas these concerns may reduce the older one becomes. Nonetheless, it needs to be taken into account that the parents were making the decision on behalf of their child, whereas students were making the decision for themselves. Responsibility for making a decision on behalf of another may increase levels of fear in relation to the diseases, increasing distress and guilt during the MMR decision (Bond et al, 1998; Flynn and Ogden, 2004).

Contrary to the parent sample, measles was regarded as the least serious disease by students. This may be due to the media coverage of mumps outbreaks across universities throughout the UK, and the mass poster and leaflet campaign undertaken by the University of Stirling to immunise students. This exposure may have raised levels of awareness of the mumps virus for this population group, and hence it was regarded as more serious than measles. Furthermore, mumps is serious and severe for adults (Gupta, Best and MacMahon, 2005). Whereas for the parent population, the media provided greater coverage of the measles outbreak amongst young children (English, 2006), and this presumably would be of greater concern for parents.

Both groups of students did not rate the media or internet as important sources of information, and instead reported health professionals as important sources. Students also reported that they were more likely to be motivated by the advice of these referents, suggesting that health professional subjective norms were important in the MMR decision for students. Also, much of the literature distributed on campus was provided by the university's medical centre, thus providing further support for the important role of health professionals in future campaigns for the uptake of the MMR vaccine with this population group. These results further provide support for the inclusion of subjective norm when examining PMT for risk assessment of MMR immunisation.

Previous research conducted by Hamilton-West (2006) suggests that students are likely to opt for immunisation if their friends had also been recently immunised. The present study also supports friend/peer norm; immunisers indicated that their friends had wanted them to immunise and they also showed a greater likelihood of complying with their friend's advice. However, the norm measured in the present study focuses on subjective norm, whereas the norm identified by Hamilton-West (2006) focuses on descriptive norm. Descriptive norms are determined by informational influences and the individual's perception about the prevalence of behaviour (Cialdini, Reno and Kallgren, 1990), whereas subjective norm refers to perceived social pressures imposed upon individuals concerning their participation in certain behaviours (Conner and Sparks, 1996). The relationship between the two differing norms is unclear, and further research, specifically qualitative research, needs to be undertaken to understand the role social norms play in MMR decision-making.

A pattern (although non-significant) was illustrated by immunising students who reported the media and internet as more important sources than the non-immunising students. This contradicts the results reported by the parents, whereby non-immunising parents were more likely to rate the two sources as important. However, the results can be explained by the information reported by the media and internet. In relation to MMR immunisation and children, negative accounts were reported about the association of the MMR vaccine with developmental disorders and Crohn's disease (Thompson, 2009), and therefore parents obtained information about these diseases from the media (Pareek and Pattison, 2000). However, the media coverage for students placed greater focus on the effects of the mumps virus and the need for immunisation amongst this population (Meikle, 2005). MMR immunisation for students was not portrayed as carrying the same risks as those for children. The only associated risk for students concerned the links between the MMR vaccine and thrombocytopenia (reduced platelet count), and this risk is considered smaller than the risk associated with natural infection (Schattner, 2005). Thus students who opted for immunisation may have been influenced by the information in the media, whereas the same may have not been true for non-immunisers.

Students reported ambivalent attitudes to the efficacy of the MMR vaccine in relation to its safety (i.e. the links with autism and bowel disease), but stronger beliefs in the efficacy of the vaccine in relation to measles, mumps and rubella. This result can be explained by the fact that autism and bowel disease are less likely to have a direct impact on the students than the vaccine-preventable diseases. The adverse side-effects of MMR immunisation were of greater concern for parents

(especially non-immunisers) than students. Students were asked about future intentions to immunise their children, and a large majority of students indicated that they would opt for immunisation. However, these results must be viewed tentatively. The saliency of the behaviour may affect attitudes and normative beliefs (DeCourville and Zanna, 1993). For example, parents may feel a greater moral obligation to protect their child whereas students feel a greater obligation to protect themselves. Both population groups are likely to experience different stresses in their lives which are likely to affect behaviour and attitudes. For parents, stresses may include weighing up the costs and benefits of immunisation in relation to the vaccine-preventable diseases and autism and Crohn's disease (refer to Chapter 1, Figure 1.2), whereas for students the main risk associated with immunisation would be related to the vaccine-preventable diseases, and in particular to mumps. Furthermore, students may be experiencing other stresses during the exam period (when the study was conducted), including the stress of living away from home and increase in work-load, which may be of greater importance than immunisation (Ross, Nieblin and Heckert, 1999; D'Zurilla and Sheedy, 1991; Towbes and Cohen, 1996). Thus, the population under study is important when understanding similar behaviours. However, beliefs in the efficacy of the vaccine in relation to developmental disorders and bowel disease must be cautiously interpreted for the student sample due to the low reliability of the subscale.

Immunising students reported greater external barriers to immunisation than immunising parents, and a similar pattern was illustrated for the non-immunising groups. Similar results were reported by Hamilton-West (2006) whereby barriers to immunisation were reported as important predictors of immunisation behaviour.

The period when the present study was conducted may have resulted in students perceiving greater barriers; students were approached to take part in the study during the exam period at the University of Stirling. This would have inevitably biased the results relating to external barriers and thus is a limitation to the study. Furthermore, the exam period may have resulted in a greater number of missing data than would have been expected. The study highlights the different stresses experienced by students, e.g. exams, which may affect their decision-making process and barriers to immunisation. Future campaigns with students need to take into account the academic period in order to effectively increase MMR uptake rates.

All students who had been immunised with MMR vaccine indicated they would not require the MMR vaccine again. However it is unclear whether they had received two doses of the vaccine or just the one dose. If only one dose was received then these students were susceptible to the vaccine-preventable diseases and held inaccurate beliefs about their need for further immunisation. The results suggest that students need to be provided with further information about the MMR vaccine. Health professionals can play a pivotal role as all participants reported health professionals as important referents and indicated they were likely to follow the advice from these referents.

Limitations of the study include the relatively low number of participants in each group. The study used opportunistic sampling and recruited 44 immunisers and 46 non-immunisers. Although 250 potential participants were approached and 231 students took part in the study, only the results from 90 students were analysed. The remaining students had already been immunised with the MMR vaccine at a

younger age or prior to the mumps outbreak and indicated they did not require the MMR vaccine again. The students included in the analysis indicated that they had not been immunised with the MMR vaccine prior to the mumps outbreak, and had either had been recently immunised, were still unsure about immunisation, or had refused immunisation (and had not been previously immunised but still perceived they may require the vaccine). Thus the final sample was relevant to the objective of the study, and clearly illustrated the decision-making processes for both student groups. The differences found between the student population and the parent population illustrate the importance of PMT and SN in understanding MMR immunisation behaviour for different population groups.

Chapter 5

The Role of Social Norms in Parents'

MMR Decision-Making

5.1 Abstract

Subjective norm is an important mechanism in the decision-making process and represents perceptions of significant others' beliefs about whether the individual should engage in a behaviour (Conner and Sparks, 1998). The utilisation of subjective norm as a measurement of normative beliefs in health-related research has been highlighted as problematic (Sheeran and Orbell, 1999). The narrow conceptualisation in some studies limits understanding of behavioural intentions and performance. This study addresses this limitation and investigates different dimensions of social norms which contribute to the MMR decision, including the 'self' (private/collective/relational) and personal/social identity, descriptive norms, injunctive norms, moral obligation, identification and relevant referent groups using a qualitative approach. Five focus groups with 16 MMR immunising parents were conducted in Central Scotland. Thematic analysis was used to identify themes relating to social norms during the MMR decision-making process. Different types of normative influences played an important role in the decision-making process for MMR immunising parents. The 'private self', i.e. own personal identity as 'parents', and feelings of moral obligation to their child, were perceived as important norms. Observing other parents' MMR vaccine behaviour raised their own awareness of the diseases and increased confidence in their own decision where congruent. The dual role of health professionals as a 'medical professional' and as a 'parent' enabled the parents to identify with them. This referent group was perceived to be influential, knowledgeable and trustworthy by the majority of the immunising parents.

5.2 Introduction

'No man is an island'

(John Donne, 1624)

Social norms reflect the importance of the social environment and its effect upon individuals' thoughts, beliefs and attitudes. Although the individual holds responsibility for their own decision-making and controlling behavioural responses, the influence of significant others and social pressures is acknowledged as a factor in this process.

The findings from Chapter 3 and 4 highlight the importance of assessing subjective norm (SN; a dimension of social norm) to understand its contribution to the MMR decision. Chapter 3 reports that immunising parents were motivated to comply with the advice given by their partners and medical professionals, whereas non-immunising parents were more motivated to follow the advice of their partner. Furthermore, immunisers perceived health professionals to be important sources for MMR information, whereas the media and internet were viewed as most important sources of information by non-immunisers. Also, the results from Chapter 4 indicated that in the context of being offered MMR immunisation during a mumps outbreak, both immunising and non-immunising students were motivated to follow advice from health professionals and family members, and information from health professionals was most valued. However, previous research has suggested that students were likely to opt for immunisation if a friend/colleague had also opted for immunisation (Hamilton-West, 2006). This indicates that different social norms may play a role in MMR immunisation behaviour in different contexts, and not just SN as previously measured in Chapters 3 and 4. The Chapter 3 and 4 studies solely

concentrated on quantitatively measuring subjective norm, alongside PMT variables, and therefore it cannot be assumed that other dimensions of social norms would not play a similar role in the MMR decision-making process. In light of the findings from Chapters 3 and 4, the present chapter will focus on the role of other social norms in the MMR decision-making process, using a qualitative methodology.

5.3 The Measurement of SN

The lack of distinction between SN and attitude constructs has already been highlighted as a problem when assessing the contribution of SN to behavioural performance (refer to Chapter 1, section 1.10, for a detailed description of SN). Sheeran and Orbell (1999) suggest that the measurement of social norms may be problematic and hence non-significant relationships between normative beliefs and intentions and/or behaviour are often observed. Areas highlighted as problematic include researchers solely concentrating on subjective norm to understand normative beliefs, and not accounting for individual differences (Sheeran and Orbell, 1999).

5.3.1 Narrow Conceptualisation

It has been suggested that by focusing solely on subjective norm the understanding of normative influences and the role played in behavioural performance is limited. According to Terry and Hogg (1996), social norms need to be reconceptualised to encompass a broader notion of perceived norms that goes beyond 'SN' employed in the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). Fekadu and Kraft (2002) have demonstrated the limited conceptualisation of SN

when looking at contraception intentions in Ethiopian females using TPB. In African cultures social influences play a more important role than other personal factors (e.g. attitudes and perceived behavioural control) when predicting contraception use. However, previous research using TPB in two African settings (Zimbabwe: Wilson, Zenda, McMaster and Lavelle, 1992; Tanzania: Lugoe and Rise, 1999) found SN was the weakest predictor of contraception use. This would suggest that personal factors, such as attitudes, need to be targeted in future health promotions rather than social norms. Nevertheless, by using a wider conceptualisation of social norms (including descriptive norms, group norms, group identification, collective self and private self), Fekadu and Kraft (2002) found that social norms significantly predicted intentions to use contraception over and above personal factors. For example, participants held generally positive attitudes towards contraception use but their friends/peers were perceived to hold more negative attitudes (measured as both ‘group norms’ and ‘descriptive norms’), which explains why the majority of participants did not intend to use contraception in the future. The results from this study suggest measurement of SN needs to be broadened so other normative beliefs are incorporated and thus providing a greater insight into understanding behavioural choices. Reconceptualisation may help to understand “the more complex role that norms may play in attitude-behaviour relations” (Terry and Hogg, 1996).

Perceived norms have been proposed to comprise two interrelated ideas – injunctive norms (SN) and descriptive social norms (Cialdini, Kallgren, and Reno, 1991; Rimal and Real, 2003). Descriptive norms are determined by informational influences and the individual’s perception about the prevalence of behaviour, i.e. *if*

others are doing it then it is probably a good thing to do (Cialdini, Reno and Kallgren, 1990). The greater the prevalence then the greater the likelihood the individual will also carry out the behaviour (Rimal and Real, 2003). Although it has been suggested that the two types of norms measure the same underlying concept of social pressures (Fishbein, 1993), it can be argued that they tap in to different aspects of social influences. Conner and McMillan (1999) illustrate this difference in their study of cannabis use amongst undergraduate students. They found that injunctive norm used alone was a significant predictor of intentions to use cannabis ($p < .05$); when descriptive norms and moral norms were included in the analysis, injunctive norms no longer rendered significant results whereas descriptive and moral norms did ($p < .001$ and $p < .01$, respectively).

With regard to the MMR decision, it is important to determine the roles of subjective norms and descriptive norms. Previous research is contradictory about the role of SN in the decision-making process. For example, Pareek and Pattison (2000) found vaccine outcomes was the only significant predictor of MMR immunisation intentions when using TPB, and Tickner et al (2010) report only attitudes and perceived behavioural control predicted immunisation intentions. However other studies provide evidence for the role of descriptive norms in the decisional process; learning about the proposed side-effects of the vaccine (e.g. autism) lead to an increase in negative parental attitudes and concerns towards the vaccine (Begg, Ramsay, White and Bozoky, 1998; Anderson, 1999; Pareek and Pattison, 2000; Elliman and Bedford, 2001; Smailbegovic, Laing and Bedford, 2003; Bedford and Elliman, 2003) and a refusal of the vaccine by some parents (Evans et al, 2001). Additionally, Hamilton-West (2006) report that knowing other

friends who opted for MMR immunisation predicted students' own immunisation behaviour.

The present study aimed to provide a greater insight into the contributory nature of these norms by broadening the concept of social norms to include both injunctive and descriptive norms and utilising qualitative methods to understand parents' experiences of these in MMR decision-making.

5.3.2 Individual Differences

Early research suggests that individuals are likely to differ in opinions, attitudes and behaviours in a group compared to when alone. For example, Allport (1924) found that when asked to form an opinion relating to weights and odours in a group, an individual's opinion was likely to be more conservative and less extreme than when alone, suggesting individuals are influenced by others when forming beliefs. Trafimow, Triandis and Goto (1991) purport a 'two location' theory to explain this phenomenon; individuals are proposed to store two concepts of their selves – private self (where private thoughts and traits are stored) and collective self (where thoughts about group membership are stored). The private self relates to personal identity and is defined by unique idiosyncratic traits and relationships, whereas the collective self involves sharing attributes with others in specific groups and differentiates 'them' from 'us' (Hogg and Abrams, 1988; Tajfel and Turner, 1979). According to Trafimow and Finlay (1996) the type of 'self' accessed by the individual will partially depend on whether the individual has 'an individualistic or collectivist cultural background' (p822). The concept of 'self' accessed by parents in the present study may influence the MMR decision process; parents belonging to

a close group may be more likely to take on board group norms, whereas parents with a greater sense of private self will be more likely to rely on their own beliefs.

When accessing the collective self, it is supposed that the individual will rely on group norms rather than personal characteristics when performing behaviours. Reliance on group norms tends to arise in the face of uncertainty and group pressure (Sherif, 1936; Asch, 1952). Sherif highlighted how individuals used frames of reference to establish their own beliefs when taking part in studies using autokinesis (an optical illusion whereby a pinpoint of light seems to move when in complete darkness). Unaware it was an illusion, solitary participants were uncertain how much the light moved but over a series of trials they began to adopt their own personal estimated norm. However, when in groups of 2 or 3, the participants relied on each other for the answer and converged on a group mean. This group norm of estimates continued when participants were asked to give estimations on their own again. Similar results were found by Asch (1952) who reported that participants tended to conform to group norms even though they did not believe the group to be correct. Reasons for this group conformity included uncertainty with their own belief and also group pressure and fear of disapproval. In an extension of Asch's experiments, Deutsch and Gerard (1955) found that even when uncertainty and group pressure were reduced a small proportion of people still used group norms (23%), thus suggesting these participants relied on the collective self. Group norms may be important to parents, particularly in the face of uncertainty during the MMR decision process. The conflicting evidence about the safety of the vaccine may cause confusion and uncertainty and further pressures from others (including health

professionals) may contribute to the decision outcome (Evans et al, 2001; McMurray, Cheater, Weighall, Nelson, Schweiger and Mukherjee, 2004).

Although there is confirmatory factorial evidence for the ‘two location’ theory (Singelis, 1994), Brewer and Gardner (1996) have further proposed the importance of the ‘relational self’. The relational self is defined by a dyadic relationship rather than group membership, and the integration of significant others’ attributes. Relational self may be particularly important for parents when making the MMR decision for their child. Previous research on infant feeding methods has illustrated that fathers tend to be a salient factor when making a decision on behalf of the child (Littman, Medendorp and Goldfarb, 1994). MMR decision-making is often made during the relational context (if both parents contribute to the decision-making) and therefore it was proposed that this will be an important ‘self’ in the MMR decision process.

5.4 Self-Categorisation Theory

Self-Categorisation Theory (SCT) further illustrates how individuals can be influenced by others. SCT (Turner, Hogg, Oakes, Reicher and Wetherall, 1987), an extension of Social Identity Theory (Tajfel and Turner, 1979; Turner, 1982; Hogg and Abrams, 1988), has been postulated as important for understanding social norms (Terry and Hogg, 1996; Fekadu and Kraft, 2002). SCT relates to individuals categorising themselves as belonging to a specific group and internalising the attributes that define the group, and thus producing specific inter-group behaviours (Turner et al, 1987; Terry, Hogg and White, 1999; Schofield, Pattison, Hill and Borland, 2001). The group *prototype* will affect the individuals’ beliefs, attitudes,

feelings and behaviours, and in doing so will signify the difference between in-groups and out-groups (Terry and Hogg, 1996). This association allows individuals to define themselves with a particular group, lose their identity (personal identity) and instead take on the identity of the group (social identity) as part of 'self-identity' (Turner et al, 1987). Thus the individual no longer acts in a certain manner purely on the basis of social approval or pressure, but because he/she perceives that other members endorse the behaviour, and thus group membership becomes a self-defining feature. Group norms are proposed to have an effect on behavioural intention when the individual strongly identifies with the group and perceives group membership as salient (Terry and Hogg, 1996; Terry et al, 1999; Åstrøm and Rise, 2001). Thus, one may assume that the behaviour of parents who belong to a tight-knit group will be more influenced by group norms than their own idiosyncratic attitudes and behaviours. However, in relation to MMR immunisation, beliefs about needs and characteristics of the child and the role of the parent will most likely be taken into account and will subsequently contribute to protection motivation and behavioural outcome.

5.5 Normative Control and Identification

Group membership and the views of others may only be important for a minority of individuals (Trafimow and Finlay, 1996). In their research looking at 30 different types of behaviour (including health behaviours), Trafimow and Finlay found that majority of participants (79%) were mainly under attitudinal control (behaviour controlled by personal attitudes) and a minority (21%) under normative control (behaviour controlled by others' beliefs and expectations). When normatively

controlled participants were excluded from the analysis, SN ceased to have any effect whilst attitudes had a greater effect. For participants under normative control, the results highlight SN as having a significant effect on over half (60%) of the behaviours. The highly correlated relationship between SN, intention and collective self suggests that individuals under normative control are more likely to access their collective self when forming intentions. Similar findings have been reported by Ybarra and Trafimow (1998). However, these results may be related to whether behaviourally relevant referent groups were used. The normatively controlled individuals may simply find a particular referent group more psychologically important than those who are attitudinally controlled.

Terry and Hogg (1996) explored the effect of behaviourally relevant referent groups with studies exploring exercise and sun-protective behaviours. Regression results indicate that identifying with reference groups was a significant predictor (alongside attitudes and perceived behavioural control) of intentions whereas non-referent group norms were non-significant. This suggests that behaviourally relevant groups are likely to shape intentions for individuals who identify with particular groups. Findings reported by Ajzen (1991) that personal factors (e.g. attitudes and perceived behavioural control) are more likely to predict behaviour may be of greater significance for high identifiers (individuals who identify strongly with the referent group). Terry and Hogg's (1996) research found that group norms significantly predicted behavioural intentions for the high identifiers, whereas personal factors significantly predicted intentions for the low identifiers (participants who identified weakly with the referent group).

Identification strength seems to be an important factor when looking at normative beliefs. For example, when Terry and Hogg (1996) used ‘motivation to comply’ (one part of the SN equation) to understand normative contributions, no significant results were achieved, in comparison with ‘identification’ which yielded fruitful results. Fazio (1990) suggests that such personal factors will play a greater role in behavioural choice and performance when the individual’s personal identity (as opposed to their group identity) is salient. A continuum between personal and social identity is proposed so that when personal identity is most salient then the role of personal factors will be strongest, but when social identity is prominent then the individual is likely to take on board group norms. Furthermore, when the groups used are not behaviourally relevant or are seen as psychologically unimportant then these individuals are likely to be guided by personal factors (attitudes and perceived behavioural control) when making their decision. Similar findings regarding the association of high group identification with social norms have been illustrated with research focusing on healthy eating (Åstrøm and Rise, 2001), exercise behaviour (Thompson and Rise, 2001) and recycling (Terry, Hogg and White, 1999). Focus was placed upon behaviourally relevant and important referent groups in the present study to understand the contribution of identity and behaviourally relevant groups during the MMR decision.

The ‘significant others’ employed in Fishbein and Ajzen’s (1975) conceptualisation of ‘subjective norm’ includes specific individuals and groups that are relevant to both the behaviour and the population under study. However, there is a tendency in current research to use general terms such as ‘significant others’ or ‘people close to you’, or groups that the researchers perceive may be relevant (e.g. parents, friends

etc). The use of such referent groups may be too general to be meaningful and may produce non-significant results. Identifying correct referent groups for the participants is essential for understanding normative influences in MMR decision-making.

Fishbein and Ajzen (1975) have stated that *both* the population and the behaviour may influence whether intentions are more under attitudinal or normative control. Trafimow and Finlay (1996) found that in their study with normatively controlled participants, only 11 of the 30 behaviours were under normative control and 19 behaviours under attitudinal control (evidence from beta weight data). This suggests that the type of behaviour under investigation may determine whether the behaviour will be principally under attitudinal or normative control. Most behaviour tends to be under attitudinal control (Ajzen and Fishbein, 1980), but behaviours such as contraceptive use (which occurs in a relational context) have been illustrated to be normatively controlled (Fishbein, Middlestadt, and Trafimow, 1993; Fekadu and Kraft, 2002). Furthermore, the conditions under which health behaviour is performed may also demonstrate a similar effect. For example, Stasson and Fishbein (1990) have demonstrated that seat belt use tends to be attitudinally controlled when under safe driving conditions but normatively controlled when under risky driving conditions. The findings from past research highlight the necessity to focus on both the individual and the behaviour to determine the relative importance of normative and attitudinal contributions. In light of the evidence, it was considered appropriate to explore the contributory nature of social norms in the current study, rather than relying on evidence provided from reports on other health behaviours.

5.6 Moral Norms

Many researchers have called for the inclusion of moral norms as well as social norms in understanding normative influences on behavioural choices (Ajzen, 1991; Sparks, 1994). Moral norm is defined as the “*conviction that some forms of behaviour are inherently right or wrong, regardless of their personal or social consequences*” (Manstead, 2000). Moral Socialisation Theory (MST; Hoffman, 1983) suggests that moral norm development involves the internalisation of external norms and consequently the development of feelings of empathy and guilt as a response to others’ distress and self-attribution (Gibbs, 1991). Although both cognitive behavioural theory (Kohlberg, 1984; Flavell, 1985) and sociocultural theory (Vygotsky, 1978, 1981; Buzzelli, 1991) have been postulated as means of moral development, Manstead (2000) contends that MST is most closely related to research focusing on moral norms and attitude-behaviour relationships. It has been argued that moral norm is an important component when operationalised as a measurement of moral obligation, and evidence suggests that the construct is a powerful predictor of behavioural intentions, often over and above the main TPB/TRA constructs with relatively high beta weights (Manstead, 2000).

As illustrated previously with other social norms, the significance of moral norms may depend on the behaviour as well as the individual. For example, Schwartz and Tessler (1972) found that when asking individuals to rate their moral obligation with regard to donating a kidney, moral obligation made a significant contribution (explaining 39-53% of the variance). However, when looking at non-life threatening behaviours this was not the case. Antisocial behaviour, such as flashing car headlights to force the driver in front to move faster or out of the way, was not

related to moral norms. Furthermore, saliency of the behaviour to the individual may also affect moral norms (DeCourville and Zanna, 1993). Norman and Conner (1996) suggest that moral norms may only be relevant for specific behaviours, i.e. those evoking important moral considerations. With reference to the current study, one can infer that the MMR immunisation decision induces a sense of moral obligation for parents, since it is in part an altruistic behaviour to preserve ‘herd immunity’, and perhaps more so since the 1998 Wakefield controversy. The MMR immunisation decision can be a confusing and complicated issue for parents who have to make this decision for their own child. According to Alderson (1990) getting the decision ‘right’, when making a decision in relation to a child’s health, symbolises being a ‘good parent’. It is not a simple matter of choosing good vs. bad behaviour, but requires complex decision-making (refer to Chapter 1, Figure 1.2). The present study aimed to investigate whether MMR immunisation evoked moral considerations for parents and whether these moral norms influenced the immunisation decision. It is proposed there are two facets relating to moral norms when making the MMR immunisation decision – moral norms towards the child (individual moral norms) and moral norms towards society (collective moral norms). Regarding individual moral norms, one can opt for the vaccine in order to protect the child from measles, mumps and rubella. However, it may be reasonable to assume that parents who strongly believe in the associated links of autism/IBD with the vaccine may decline the vaccine also to protect their child. Taking up the latter option would increase the risk of the child catching diseases and also reduce herd immunity, violating social moral norms. Alternatively, they may immunise their child with the intention of preventing the onset of diseases in the community. By violating either of these moral norms, parents may feel emotions of regret or

guilt (Manstead, 2000). This issue has not been explored in-depth using qualitative techniques when assessing MMR immunisation behaviour.

In summary, evidence suggests that social norms have not been operationalised to their fullest extent in previous research. Currently there are no studies focusing on the role of social norms for the MMR decision using qualitative methodologies. The MMR immunisation topic has become a social issue since the public interest concerning Wakefield's study (1998). Greater understanding of the contribution of norms to the MMR decision is required in order to develop interventions to enhance future MMR uptake. The present study therefore aimed to understand the perceived role of social norms in parents' MMR decision-making. Various aspects of social norms deemed central for parental decision-making were explored, including the 'self' (private/collective/relational), descriptive and injunctive norms, moral obligation, and group identification.

5.7 Method

This study used focus groups to investigate the contribution of various social norms during the MMR immunisation decision (refer to Chapter 2, section 2.5.2). Focus groups were regarded as appropriate due to the exploratory nature of the current study; focus groups allow for the generation of ideas and hypotheses, and the richness of the data emerges from the group dynamics (Kitzinger, 1995). Five focus groups (16 participants in total) were conducted with parents of young children from central Scotland.

5.7.1 Participants

Using criterion-based sampling (LeCompte and Preissle, 1997), participants were selected if they were native English speakers (in order to help the focus groups to flow more freely and facilitate a greater understanding of the issues under discussion), had lived in the UK since 1998 (when the MMR vaccine controversy began, allowing for a thorough discussion between participants), and had children born after 1998 and aged 24 months or over (parents are routinely offered/reminded about the MMR vaccine up until the child is 24 months, therefore all parents would have had the opportunity to accept or reject the first dose MMR vaccine).

Parents at two playgroups in central Scotland were approached and the study publicised by playgroup leaders and letters asking parents whether they would like to participate. One of the playgroups was run in a church hall with local mothers, and the second playgroup was run in a university setting. The university offered both a nursery service during the week and a playgroup offered twice a week to parents/students working or studying at the university. However, only parents at the playgroup were approached in order to ensure similarities between the parents from two different playgroups. Parents were also recruited from a university via posters, university magazine, internet (news and health websites), and local newspapers. Token gifts were also provided to encourage a greater participation rate.

The focus groups were set up when three or more parents consented to participate. Five focus groups were considered adequate as theoretical saturation was reached, i.e. when no more new information was attained (Minichiello, Aroni, Timewell, and Alexander, 1990; Patton, 1990; Pope, Ziebland and Mays, 2000). The focus groups

either took place in a university seminar room (in the day) or church hall (in the evening).

A total of 31 parents indicated they would be interested in participating but, due to time limitations or babysitting problems, 16 parents in total were finally included. All parents (including those who were initially interested) had immunised their child in question with the MMR vaccine. Four focus groups were held consisting of 3 parents and one group with 4 parents. The small group size was not considered problematic as the topic under discussion was both controversial and complex, and in such conditions small focus groups are recommended (Morgan, 1998b).

Parents: The vast majority of the discussion groups included mothers (n=15), with one father. Parents' ages ranged from 27 to 46 years (mean age=36.2 years). All of the parents had immunised their child/children with the MMR vaccine. Occupations of all participants was documented and the National Statistics Socio-Economic Classification (NS-SEC) Reduced Method (2004) was used to obtain NS-SEC codes (1 = high grouping, e.g. higher managerial/professional, 7 = low grouping, e.g. routine occupations, 8 = unemployed or missing). NS-SEC codes provide a combination of information relating to occupation, employment status and size of organisation (Standard Occupational Classification, 2000). Results indicate four parents were coded as '2' (lower managerial/professional occupations), one parent as code '3' (intermediate occupation), six as code '5' (worked in large organisation, lower supervisory/technical occupations), three as code '7' (routine occupation), and two as unemployed (full-time mothers). Two of the focus groups comprised university staff and students with students attending the university playgroups, and

three of the focus groups consisted of parents from a church playgroup. One of the parents from the latter playgroup also worked at the university in a secretarial role. No other socio-demographic data was obtained on request of the church playgroup leader.

Children: The MMR immunisation decision was discussed in relation to 18 children (two mothers had two children who fit the inclusion criteria). The children were aged between 13 months and 8 years (mean age = 2.93 years). All children had been immunised with the first-dose MMR vaccine, 11 had received the second dose MMR vaccine, 5 were approaching the second-dose MMR vaccine, and all were up-to-date with their other childhood vaccines, apart from one whose mother had refused one vaccine (meningitis C) for the child (no reason provided). Although both first and second dose vaccines were relevant for these children, only the first dose MMR vaccine was discussed.

5.7.2 Materials

A schedule was used to structure the discussion groups (refer to Appendix III for the interview schedule). A semi-structured approach was undertaken to examine the contributory aspects of social norms. The questions were based on the review presented in the introduction (refer to sections 5.2 to 5.6), to understand the contribution towards the MMR decision. Questions relating to norms, identity, subjective norms, descriptive norms, the 'self', and moral obligation were posed. General questions relating to attitudes towards the MMR vaccine and reasons for their MMR vaccine decision were also asked. All focus groups were audio recorded and also video recorded (to aid transcription).

5.7.3 Procedure

Ethical approval was obtained from the University of Stirling Ethics Committee (approval provided by an internal email from the committee Chair). Playgroup leaders were approached to publicise the study and to disseminate information about the study including the researchers contact details (refer to Appendix III for the letter). Posters were also placed on university advertising boards (located in public sections in university and departmental corridors). At the time of the research, the first study (refer to Chapter 3) was picked up in the media and therefore the opportunity was taken to advertise the study in the press release in newspapers and the internet. Either the playgroup leaders recruited the parents or parents directly contacted the interviewer. An initial study debrief was provided to all parents who contacted the researcher. All parents' availability was taken and interviews were scheduled. Prior to taking part in the focus groups, individual verbal and written consent for tape and video recording was obtained, and parents were assured that only the researcher would have access to the recoded material which would be consequently disposed of after the completion of research. Participants were told that all of the data collected would be anonymous and personal details mentioned in the interviews (for example, names of children or health professionals) would be changed during transcription. Parents were also asked to be as honest as possible and reassured there were no right or wrong answers. The groups lasted approximately one hour and parents were told they could stop the group at any time if they required a break. All parents were debriefed afterwards and also presented with a token gift (box of chocolates).

During the analysis process, two psychology post-graduate students also coded data from randomly selected samples of transcripts to ensure inter-rater reliability with the researcher (first coder). The second and third coders had undergraduate knowledge of qualitative research methods, including thematic analysis. They were given a full summary of the background and aims of the study. In order to aid the coders with the analysis, a coding frame was provided to help code the data (refer to Appendix III). The data was compared using the coding frame, disagreements were discussed and the data was reanalysed and recoded until agreement was reached.

5.7.4 Analysis

Thematic analysis was used to analyse the data set, and thus themes relating to aspects of social norms during the MMR decision-making period were identified (refer to Chapter 2, section 2.5, for details). All transcripts were transferred into NVivo and themes pertaining to normative beliefs were identified.

5.8 Results

Analysis of the focus groups revealed three overall themes relating to social norms (see Table 5.1): 1) group identification, norms and motivation, 2) experience and exposure to disease and immunisation behaviour, and 3) the self.

Table 5.1: Summary of Norms Identified in the Decision-Making Process

Themes	Details	Norm relationship
<i>Group identification, norms and motivation</i>	Identify with other parents (child's grandparents, friends, health professionals and partner)	High identifiers
	Referents were pro-immunisations	Group norms
	Listened to others but not necessarily motivated.	Subjective norm
	Information about health professionals' own behaviour	Descriptive norm
	Media motivated parents to gather information about the MMR vaccine	Referents
<i>Experience and exposure</i>	Own personal experience, observing health of other personally-known immunised/non-immunised children	Descriptive norm
<i>The self</i>	Responsibility as parent(s)	Private/relational self
	Obligation to child's health and not to population	Moral obligation

The quotes provided below indicate the focus group number (e.g. FG1 = focus group 1), and parents were also numbered for identification purposes (e.g. P1 = parent 1).

5.8.1 Group Identification, Norms and Motivation

5.8.1.1 Group Identification and Norms

Parents reported relevant referents (when making the MMR decision) to be their partners, own parents (particularly the child's grandmother), close family members, friends (especially friends with children), and health professionals (HPs: general practitioner, practice nurse and/or health visitor). The participating parents identified most highly with other parents, i.e. individuals who had had to make similar decisions for their child (though not necessarily under the same controversial circumstances). This highlights the saliency of other parents' experiences in the decision-making process. Parents generally believed the salient groups were pro-vaccination (single or triple) and tended to support their immunisation decision. However in some cases the child's grandmother was perceived to show some anxiety regarding the triple immunisation.

"My mum said she was worried about it but left it up to me." **P1/FG1**

"My mum worked with Autistic children, and she still does, and it was when X [child] was due his [MMR], there was a big...[scare]..... and she was quite concerned about it all. That's why she offered to send me to France!" [where single vaccines were offered]. **P1/FG 5**

5.8.1.2 Subjective Norm

Although the participating parents reported other parents as being relevant to their immunisation decision, in general parents perceived that personal factors (i.e. their own attitudes and beliefs) were more important than group norms. They reported

their own judgement as central in the decision-making, playing down the importance of others' opinions and group norms.

"It's your child, and people can try and influence you as much as you want but deep down you know what you want for your child." **P2/FG3**

Parents listened to the advice given by others and evaluated the credibility of the source and the information provided, thus suggesting this played a role in the decision-making process. However, parents believed group norms did not influence their final decision.

"I would listen to them [referents] and entertained what they said but it didn't...sway my decision." **P1/FG1**

"It kind of depends what their argument is based upon, you know if that was something credible." **P2/FG2**

Although not necessarily motivated by what others say, the parents highlight the contributory role of subjective norm in the decision process. Parents identified relevant others, and listened to these individuals but were not motivated to comply with their views where they conflicted with their own opinions. Furthermore, a 'them' (close others) vs. 'us' (parent and child dyad) situation was perceived by parents, highlighting in-group and out-group differences. Parents referred to their own 'family in-group' (i.e. both parents), with its own beliefs and behaviours, when making decisions for their child. There was agreement that this decision was best decided by parents of the child rather than listening to others.

“...I think for most parents when it comes to your child it doesn't matter what other people say.” P2/FG1

“I think....if they want to make that decision they can make that decision with their children, but your own child is your own....you are probably the best person to make that decision.” P1/FG1

5.8.1.3 The Dual-Role of Health Professionals

The influence of health professionals (HPs) is a good example of the role of descriptive norm in the MMR decision process. Although their own personal attitudes were considered by parents to play a greater role in the decision process, many actively sought information from HPs about whether they had immunised their own children.

“I asked mine if his [GP] children had been done.” P1/FG1

The parents appreciated the HPs' personal opinions, as well as professional opinions, and knowing that their HP had immunised their own children with the triple vaccine was considered reassuring. This illustrates the importance of descriptive norm in relation to 'professional' significant others during the decision-making process.

“..she [GP] said from a personal point of view, “I've got three kids and they've all had the MMR.” P3/FG5

HPs were understandably perceived as having greater knowledge about the vaccine than the parents themselves. However, the HPs' disclosure of personal parental

experiences enabled parents to identify with their health professionals as ‘parents’ as well as viewing them only in the professional ‘doctor-patient’ role. Some parents actively sought out information regarding whether their health provider had vaccinated their own children for reassurance about the safety of the vaccine. Furthermore, parents appreciated that they were not pressurised by HPs to vaccinate.

“She gave me all the facts and said “my kids have had it and professionally I would advise you to get it done but it’s entirely up to you. if you want to do the three separately then that’s entirely your decision.” P3/FG4

By refraining from a paternalistic didactic approach, the HPs gave parents reassurance and confidence to make the decision themselves. The dual role of ‘health professional’ and ‘parent’ provided greater weighting than that of other parents. This approach, helped to minimise the professional role played by HPs and highlighted the HPs’ identity as ‘parents’.

Asking HPs about their own experience allowed parents to categorise themselves as similar to HPs and thus create an in-group of ‘parents’. This differed from other parents in general as some of the participating parents reported that they trusted the advice of the HP more than parents in general, because of their dual professional/parent role. For example, the importance of trust was illustrated with the belief that HPs would have alerted the parent if there were any clinical risks associated with the vaccine.

“And I don’t think they [HP] would offer it if they felt.. it [MMR vaccine] would have been taken off [the shelf] completely if there was any [risk]..” P2/FG5

Parents trusted HPs in this dual role of professional and parent, indicating that HPs would not advocate health behaviour that they would not personally perform.

“I wouldn’t like to think they’re [HPs] promoting it and then not having it done.... that’s not good, that’s not moral.” P3/FG5

“.....I’ve given out hundreds of MMRs. I’m a nursery nurse. I mean you wouldn’t do that as a profession if you weren’t happy. You wouldn’t give a child an injection if you weren’t happy about giving it yourself.” P2/FG4

5.8.1.4 Media Influence³

Many of the parents believed they would not have questioned the MMR vaccine if the controversy had not been reported in the media.

“You just go and get them done [other vaccines], I didn’t think anything. And probably with the MMR again I wouldn’t have really given it much thought if it hadn’t come up in the press so much at that point in time.” P2/FG1

The media reinforced the MMR/autism risk message and influenced parents during their decision-making process.

“I think it [media reports] made me look into it more. Because some of the stories were quite scary.” P2/FG1

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³ It should be noted that the type of media was not specifically reported, although references were made to newspapers and television coverage about its safety.

As well as raising awareness of the MMR immunisation, the ‘scary’ media stories also increased fear of the possible side-effects and raised doubts in parents’ minds.

“It makes you worried I think. It puts that little bit of doubt in your mind but I think it doesn’t lead whether you’re going to [have the MMR vaccine].” M1/FG2

However, parents were also conscious that reports could be misrepresented or exaggerated by the media; the reports may have worried parents but this did not result in parents trusting the reports.

“ especially if you just sort of got a headline or you know that says 20% of children but then you think you did more you find out well it was only a study of 2 children or something. Then you thought well you know it’s not as bad as it said or it is not as bad as sounded when the big screaming headline comes.....it depends where the report was and who it was coming from as well. You know how much you thought it was true or not. But certainly it was always there in the back of your mind that you had to sort of weigh it up more and find out more about it.” P1/FG1

Many parents believed that the media had a tendency to exaggerate or “hype” stories and be “biased” and thus the credibility of the source was questioned or viewed more sceptically by parents. One parent (M2/2) labelled these reports as “dangerous” and “playing with people’s lives”. Such references were made in particular to tabloid papers and chat shows, thus implying the type and trustworthiness of informational sources were considered to be important for some parents - educational and medical sources were seen as more reliable/trustworthy than the media.

Overall, statements made by parents suggest that this group, the media, may have not been trusted but had been listened to, and thus indicating the influential role played by the media in the MMR decision-making process. This role was considered so influential for some parents that the feeling of information overload and the contradictory evidence presented consequently lead them to avoid actively consulting media sources when making the decision.

“When it [reports on MMR] came on in the news I just switched it over, I just stopped listening and reading anything about it....sat there and made the decision.

P2/FG2

5.8.2 Experience and Exposure

The important role played by descriptive norms is highlighted in parents’ own past experience and exposure to measles, mumps and rubella and vicarious experience of others. Many of the parents themselves had experienced these diseases in childhood, and therefore believed that non-immunisation would hold a greater risk of contracting the diseases for their own child and others.

“I know that measles is [inaudible] a fair standard routine childhood illness. When we were children people used to get measles all the time... when you’re older you learn that it’s actually quite a serious illness and children can go blind and suffer quite a lot of different complications...from what would seem to be a simple childhood illness.” **P1/FG3**

“I think one of the factors for me as well was my mum because my mum’s in her 70s and she remembers when she was young like measles, mumps and all those kinds of diseases being rampant, and like kids being really ill and or dying from them. And

her saying that it was not that long ago.....That she remembers all of those things. And she had a brother that died of whooping cough which is another disease that nowadays vaccinated against and you rarely hear of.” P2/FG1

Knowing someone personally who had not immunised their child and consequently had developed one of the diseases raised parental awareness of the risk of exposure and disease severity, and thus subsequently contributed to their own decision-making process.

“We have friends who had four children and lost the youngest one because they didn’t get the MMR and that hit home to me, because you always think it happens to other people you know and there it is.” P1/FG2

“I know of one person that didn’t give their son the MMR because at that point it’s when the outcry came out and whether it’s linked to autism or not. So she kept back from giving it to her son and when she finally decided to give it to her son...she gave it to him after he had an attack of the mumps and he’s now deaf in one ear and she feels so guilty about it now. ...because she thought well if she hadn’t reacted in that way and given it to him, you know, he wouldn’t have caught it and wouldn’t have had the deafness in one ear.” P2/FG2

Alongside observing consequences for children who had not been immunised, many parents purposefully observed children who had been immunised to assess the safety of the vaccine, and thus illustrating the role of descriptive norm during the MMR decision-making.

“..there has been some bad publicity and you pull as many cases to mind as you can and say “well, they were ok and they were ok. Oh no he was a bit sick. You bring to mind as many cases as you can to either justify what you are doing or to make you think about it.” P1/FG3

“..when you hear about people getting the immunisation, you know that their child has had it, it just sets your mind at ease a little bit. You think “well they’ve been through it” and whatever..... I was quite anxious about that side to it....I kept asking people I knew their children had had MMR: “were they OK after the MMR?” “Yeah fine, fine”.” P2/FG2

This information was seen as reassuring and acted as confirmation of the parents own decision.

“..it’s just a wee bit of confirmation that you’re making the right choice you know. Or the choice of somebody you respect and like has made as well....” P1/FG1

Parents admitted that positive personal experiences and exposure were important, and a lack of negative experience may have affected the outcome of their decision.

“I’ve never heard of a personal experience of a child being very ill with the jags so....” P1/FG3

“Maybe if I’d known somebody personally that had a problem with it then that would put me off.” P1/FG1

This evidence suggests that descriptive norms play an important role and help parents to assess the MMR immunisation by observing personal evidence of vaccine/disease outcome.

5.8.3 The Self

5.8.3.1 Private Self

The private ('parent') self was observed as a significant influence in the MMR decision. Parents perceived their private role as 'parent' as more important than in-group membership. Their identity as a 'parent' was valued highly and not shared with others in general.

“ I think when it comes to your children you don't actually give a stuff even if you're the type of person that pleasing the people who matter to you is very important, when it comes to your children they can all take a run and jump. You really don't care.....I would say it was one of the very few areas in your life where you're not influenced by peer pressure...You know your parents can make you double think a lot of things but when it comes to your baby I don't think peer pressure comes into it.” P1/FG3

As mentioned previously, relevant referents did play a role in the decision process whereby parents conceded to listening to their opinions, albeit not necessarily taking them on board. However many of the parents perceived they took a rational approach to the decision by weighing up the costs and benefits.

“So I thought if you weighed up the pros and cons she would be better to be vaccinated against them than not having them. But that was the way I just kind of tried to balance it.” P4/FG5

“But I did have to sit and weigh up well “how likely is it that she would get autism? How likely is it if no one gets this jag is she gonna go to nursery school or primary school and get measles, mumps, and potentially, and rubella”. And that was for me kind of like right..working probabilities....what’s more likely to happen to her?”

P1/FG3

The responsibility and obligation to their child was regarded by some parents as difficult and therefore expressed a desire for the Government to take away this personal responsibility by taking greater control of the MMR situation.

“Why did the Government not just say stand up, be counted, and say look “it’s a load of rubbish and this is what’s going to happen whenever the child is thirteen months, it’s just going to be the same as the infantile injections” rather than putting the onus on the parents and saying to the parents, “you need to decide and you’re the one that’s really going to go through hell if it goes wrong”I think that’s been the hardest part of the past few weeks.” **P2/FG3**

“There is a problem with measles at certain times of year, they seem to have outbreaks of it, and then it turns into a public health issue, where the Government really then... the onus is on them to step in and say “you can’t go around putting the rest... basically pregnant women, all these people are at risk if they come into contact with children with measles, old people are at risk if they come into contact with measles”. And it then becomes a public health issue and the onus really is on the Government to say “no ”.” **P3/FG3**

The responsibility of the private self as a parent, when making the MMR immunisation, was viewed as difficult for parents. Although parents felt strongly about the appropriateness of their own ‘private self’ decision-making, this did not prevent them from worrying about their decision.

“Cos even though like I’m saying that I weighed it all up, you still thought you were caught between the devil and the deep blue sea. Cos’ you were gambling you know. You just didn’t know. You’re still taking your child’s risk in your own hands you know.” P4/FG5

Parents expressed negative emotions such as guilt, anxiety and fear when making the decision, and these were not alleviated after the vaccine but instead intensified.

“I never any doubts I wasn’t going to get him [child] immunised. I’d done all the research..... Just decided that was the way to go and he [husband] was my shoulder to cry on when I came back, because I was suicidal when I come back from the health centre what a state! I suppose it was just anxiety and, you know, you sort of wonder how they are going to be....” P2/FG3

“I don’t think anybody likes putting something into their child’s body because you’ve got this baby that’s pure and it’s just perfect and you think “I’m giving permission for somebody to put these things into their body and you feel slightly guilty about that- I don’t know about anybody else but I felt really guilty.” P2/FG2

All parents felt responsible for any pain or harm caused by their immunisation decision. Many parents also still felt uncertainty about the vaccine side-effects even though they were confident they had made the right decision for their child.

“I think the MMR is perfectly safe...there still niggles there at the back of your mind when you go to give the child, you’re still a bit apprehensive.” P2/FG4

“There was a bit of you with your fingers crossed. No matter how much you had made your decision there was still that edge that worry.” P1/FG1

In light of the evidence it is implied that ‘private self’ played a major influence in the decision process. However, as parenting is a relational activity the decision was perceived as a shared rather than an independent decision, thus highlighting the relational self.

“It was just my decision or rather our [both parents] decision and that was what it was going to be, eh? If anyone wanted to put their tuppence in, then you’d listen to it but it was like...[sighs].” P2/FG3

Overall, the majority of parents perceived that both they and their partner shared similar attitudes with regard to the MMR vaccine decision, suggesting that in this dyadic relationship the parents had integrated their own and partners’ views (Brewer and Gardner, 1996).

“We thought we knew in our minds instinctively what each other were thinking too. It wasn’t just a separate thing, it was one will....” P2/FG2

5.8.3.2 Moral Norms and Responsibility

The child’s health took greatest precedence over everything else for parents; parents felt strongly about their role as a parent and the responsibility associated with this role to keep their child safe.

“They’re 100% dependent on you. Their life’s in your hands basically and the decision you make will affect their health and well-being for the rest of their life so it was a huge decision.” P3/FG5

This responsibility relates to a primary moral obligation to their child; an obligation to protect their child first, whereas collective responsibility relating to herd immunity was regarded as secondary.

“I suppose you’re kind of protecting against the spread of the disease, but I think the decision is on a selfish basis about you thinking about your own child, I guess because the nature of how these things work, you know in a strange sort of way, you’re making a decision for the rest of the population.” P1/FG2

“I think health issues for your children, you do have a very blinkered way of thinking about them, it’s a very narrow, “what’s good for you” view. I don’t even remember considering anyone else at all - it just didn’t enter the thought process.”

P1/FG3

Many of the parents admitted that their behaviour was ‘selfish’ and ‘narrow’ but also perceived as necessary to make the best decision for their own child. This perception was also present when talking about non-immunisers. Some parents felt that non-immunising parents may feel it is a moral obligation not to immunise their child.

“They think their moral obligation is to keep them safe so they have decided not to do it.” P1/FG1

“Even when you look at people who choose not to have the injection, they’re making the decision based on them and their child, they’re not thinking about anyone else. Everyone is just in their own little way a unit. Worried about themselves, in that kinda position.” P1/FG3

Thus moral obligation was reportedly associated with the child’s health regardless of immunisation status, although some parents did label non-immunisers as “silly” (M2/5) and “selfish” (M4/5) for their behaviour. Paradoxically, parents perceived both themselves and other non-immunising parents as ‘selfish’, which suggests that looking after your child and making decisions on their behalf is perceived as a necessarily selfish act.

5.8.3.3 Relational Self

The relational self (i.e. in relation to the parental dyad) was valued more highly by the parents than group relationships, whereby they were willing to address any disagreements regarding the MMR decision with their partner (previously not willing to address with relevant groups).

“If there were any strong issues [regarding MMR] we felt about, there would be a frank exchange of views and take it on from there”. P1/FG2

“I would say if X [husband] had said he had big reservations about it [MMR immunisation], then I would have thought “Wait a minute!” because I know X wouldn’t have had reservations unless he really had the need to have reservations you know. So in a way, I’m glad you know but I knew he would come up with the

right decision. But if he had said... if I had decided yeah and he had decided “oh no, wait a minute” they I would have been like “oh right. Wait a minute”. **P2/FG2**

Nonetheless, for many couples, the issue of MMR immunisation was not discussed in-depth (“*I don’t really remember it being a major night of head scratching or anything*”, **P2/FG1**). Instead, parents reported that they had independently arrived at the same conclusion.

“...came to a decision independently but you had a feeling what the other person [partner] wanted and then we discussed. It just confirmed that’s what you were going to do”. **P1/FG2**

The integration of attributes between the couples indicates that the relational self develops over time resulting in developing a shared understanding of the others’ feeling in relation to their children.

5.9 Discussion

Subjective norm has been widely operationalised in health research (using TPB/TRA), but it has been proposed that intentions are more likely to be predicted by personal factors due to the weak SN-intention relationship (Ajzen, 1991). The findings from this study suggest it would be helpful to reconceptualise SN to incorporate other notions of perceived social norms (Terry and Hogg, 1996). The present study explored the various aspects of social norms associated with the MMR immunisation decision process and found that other social norms play a central role in the decision-making process in addition to subjective norm. Social normative

factors which were found to contribute to the decision process included: group identification and norms, descriptive norms, private self, relational self, and moral norms.

In relation to subjective norm, the parents identified relevant referent groups during the MMR decision to include the child's grandparents, close family members, friends with children, and health professionals with children. However they did not believe they would act upon group norms (relating to MMR immunisations). Thus, the full construct of SN, as operationalized in the TPB (significant others' expectations multiplied by motivational compliance), was not perceived as important by the parents in this study. Additionally, Pareek and Pattison (2000) and Tickner et al (2010) also report non-significant findings for SN during the MMR decision process. Nevertheless, by examining the SN components individually the findings from the present study highlight its contribution to understanding the decision-making process. Attention was drawn to the importance of group identification and norms; others were consulted during the decision process, suggesting parents valued the views of others where they reinforced their own beliefs and attitudes, but would not defer to the views of others where they contradicted their own views.

Health professionals were regarded as particularly important and trustworthy social referents for parents since they occupied a 'dual' medical informational and parental role. The parents actively sought disclosure from HPs regarding their own children's MMR immunisation status. This 'dual' identity of professional and parent resulted in the HP being accepted by parents as relevant referents, and thus

enabling parents to identify with them. By categorising themselves as similar to HPs and creating an 'in-group', parents valued HPs' parental norms to a greater extent than other social referents apart from their partner.

Self-categorisation theory was evident from the findings, but rather than categorising themselves as part of a group, parents instead categorised their HPs as part of their own parental 'in-group', with 'parent' being a self-defining feature. This group inclusion was not seen with other closely identified referents, suggesting that HPs were held in greater esteem and were trusted more so than others due to their dual role identity. The Kings Fund report (Rosen and Dewar, 2004) postulate that an effective interpersonal relationship with individual HPs creates trust, and a good relationship with HPs often helps to alleviate fear and uncertainty (Cassell, 1995). In the present study, norms were internalised and acted as reassurance and helped parents to gain confidence with their own decision. The significance of both SN (influenced by HP norms with increase in confidence) and descriptive norm (learning about HPs personal immunisation status) in the decision process were illustrated. The results also indicate an important area for future health promotion, highlighting the important role HPs can play during the MMR immunisation decision.

Previous research has suggested parents can experience distrust and suspicion of HPs during the MMR decision (McMurray et al, 2004), but the present study did not find similar results and instead found most parents placed a degree of trust in HPs. Nevertheless, the present study only consisted of immunising parents as participants and thus the results need to be viewed tentatively, these parents may hold HPs in

greater esteem than non-immunising parents. Non-immunisers may view HPs as pressurising, biased, dismissive, and having their own agenda (i.e. financial incentives) to increase uptake rates (Evans et al, 2001; McMurray et al, 2004; Cassidy, Cresswell, Wilson and Panter-Brick, 2006). Further investigations need to be carried out to understand the complex role of HPs in MMR decision formation for both immunising and non-immunising parents. Additionally, the study was conducted from 2004 to 2005, during which period 10 of the original authors/researchers from Wakefield's research group placed a retraction regarding the interpretation of the findings and the media coverage was less intense (from 1531 articles in 2002 to 394 articles in 2005) (Thompson, 2009). Parents may have felt under less normative pressure regarding their immunisation decision. They may also currently hold more positive views of health professionals than they may have done during the decision-making process, given that they had all successfully immunised their own child without adverse effects.

Media reports were portrayed as a source of reference and motivated parents to assess the risks involved with the MMR vaccine. Media coverage alerted parents to the possible dangers of the vaccine and evoked emotions of worry, doubt and fear in parents both before and after the child was immunised. These findings suggest that the influence of media in the decision-making is important; without the MMR media reports, parents would not have initially questioned the vaccine. According to Thompson (2009), there was an over-representation of negative reports in the media about the MMR vaccine, with an under-representation of scientific evidence. Parents were influenced by the media to assess the possible risks (elements of SN), and reports of other parents'/children's experiences evoked emotions of uncertainty

(descriptive norms). The media is a potentially important tool in parents' decision-making. In the present study, the media reports resulted in negative emotions, however, the media can also have a positive effect - a positive mass media campaign (television, radio and newspapers) in Finland increased MMR immunisation rates from 89.3% to 96.5% (Paunio, Virtanen, Peitola et al, 1991). In summary, the media is a powerful social tool, which can act as a motivational cue to both non-immunisation and immunisation.

As highlighted above, descriptive norm played a prominent role in the MMR decision and helped parents feel confident with their own decision-making. Additionally, parents' own personal negative experience of the diseases, together with current observations of immunised/non-immunised children helped them to positively evaluate the costs and benefits associate with MMR immunisation and further acted as a motivation to immunise. Focusing on positive aspects of MMR immunisation is likely to result in positive immunisation behaviour (Rimal and Real, 2003). The findings support the inclusion of descriptive norms in future research attempting to understand parents' MMR decision making process.

Parents' private self as 'parent' was important, and parental attitudes were the most important influence regarding the MMR decision. These parents believed that as parents they knew best for their child and were not influenced by others' views. Parents perceived they acted responsibly considering their obligation to their own child and that they made the decision rationally, weighing up the pros and cons, rather than doing what others do, or what they think. The 'collective self' was not perceived as an influential factor by parents but this may reflect social desirability

with the responses provided, parents' may have perceived that others may view them as weak or that it showed bad parenting to rely on others' views about important health decisions for your child. According to Alderson (1990), parental choices symbolises what it means to be a good parent. However, group norms may have played a role in the decision process. Past research has suggested that when facing uncertainty individuals are likely to rely on group norms (Asch, 1952; Sherif, 1936), and certainly in this case uncertainty lead many parents to approach HPs for information. The parents may not think they relied on group norms to make their decision but they may indeed have influenced their belief formation.

Morality played a significant role in all of the parents' decision formation. Parental responsibility was highlighted as a major factor for the parents; they felt it was their moral responsibility to protect their child and make the best decision for them and this was more important than collective responsibility. Although collective moral norms were violated (i.e. moral norms to society were seen as secondary, parents did not feel emotions of regret or guilt (Manstead, 2000) but some did feel their decision was 'selfish' as it was based on the child's health and less weighting was placed on herd immunity. Hence some of the parents did not criticise non-immunising parents but understood that they too were protecting their own child. The outcomes of a negative MMR decision were perceived as a potentially health-threatening, and consequently parents felt a sense of moral obligation to protect their child. Parents felt the moral responsibility for their child's health and wellbeing to be vast, and reported emotions of anxiety, guilt and worry even when the behaviour had been performed, because of uncertainty about outcomes. Some parents would have preferred the Government to play a bigger role by accepting

responsibility and taking pressure off parents. However it is important to note that these results only apply to immunising parents, and would probably not apply to non-immunising parents.

According to Gross and Howard (2001), mothers tend to make basic decisions about health care and behaviours for their children. However, in the present study the MMR decision occurred in a relational context for the parents. Results indicate that the relational self was valued more highly by the parents than any other group relationship. These parents were willing to address any disagreements regarding the MMR decision with their partner, whereas not willing to do the same with other referent groups. Shared decision making may also fulfil a function of reducing stress related to decision making for a potentially risky decision, for example the MMR decision. In this study partners were perceived as being in agreement with the decision. This would suggest that both the private self as '*parent*' and relational self as '*parents*' were evident in the MMR decision-making process; these two selves were seen as part of the same integral 'self'. Nevertheless, one of the limitations involves the majority of the parents being represented by mothers, with only one father taking part in the study. It is not clear whether the partners of the mothers would have agreed with the 'relational self' and the mothers' reports of the decision-making process. It would have been more methodologically sound to investigate partners' decisions directly rather than relying on participants' own reports.

These findings relate to the MMR decision and are based on parents making the decision on behalf of their child - the dilemma induced feelings of responsibility in

the face of risk assessment which consequently evoked a strong parental identity. However, this may not be true for other behaviours whereby parents have to make non-health related or non-controversial health-related decisions for their child, or where individuals are required to make the decision for themselves. Both the population and behaviour have been reported to influence behavioural intentions (Fishbein and Ajzen, 1975; Trafimow and Finlay, 1996). It would be of interest to investigate whether norms change under these different circumstances in order to understand the precise workings of normative beliefs and their contributions to different behaviours.

The study focused on normative beliefs relating to immunising parents and therefore represented the views of this population group only. However, there are many benefits of obtaining the views of this group as they illustrate areas which can be targeted for future interventions to promote the vaccine. For example, the health professional relationship was demonstrated as an important factor for immunising parents and therefore can be used in future promotion campaigns. Unfortunately no non-immunising parent was willing to take part in the focus groups, possibly due to the stigma attached to non-immunisation and also because they were a minority group and therefore more difficult to recruit, regardless of our attempts to widely advertise the study. It may be that non-immunisers will view the role of HPs very differently, and may perceive the media to be a relevant informational source (Pareek and Pattison, 2000). It is important to understand both immunising and non-immunising parents' decision making in order for a full comprehension of normative influences in MMR decision-making, and consequently for effective health promotion campaigns.

Sampling bias may also add to the limitations of the study. Two focus groups included university staff/students who may have had greater access to MMR immunisation information via journal articles and the internet. However similar attitudes were illustrated by parents represented by university staff/students and parents from the church playgroup. It may have been assumed that parents recruited from the playgroups may have been influenced by the playgroup norms. However, this was not the case in the present study as parents stated that the MMR topic was not discussed during the playgroup sessions (or indeed outside these sessions) with each other. The playgroup parents did not perceive each other as relevant referents when making the MMR decision.

The socio-economic status of eight of the parents (NS-SEC codes 1 to 5) report an average or above socio-economic classification. Statistics from ISD Scotland suggests that affluent parents are more likely to be pro-MMR immunisation and immunise their children at the recommended age (15 months), whereas less affluent parents tend to delay their decision-making (Friederichs, Cameron and Robertson, 2006). Both affluent and non-affluent parents were represented in the present study. However, it is not clear whether their partner's NS-SEC code would have been similar (especially for the full-time mothers) and therefore the family socio-economic status may be very different from those presented by the NS-SEC codes. This research was the first study to focus on the varying roles of social norms during the MMR immunisation decision. The findings from the current study support the need for the broader reconceptualisation of social norms in health research, and in particular for MMR immunisation related research. The results clearly indicate that the sole use of SN does not allow for in-depth understanding of the different

perceived normative influences attached to the MMR immunisation decision. Neglecting other norms would have limited the findings and not allow for a full comprehension of parents' decision-making. This study highlights the need for future health-related research to encompass various social norms rather than relying solely on SN.

Chapter 6

The Role of Interpersonal and Generalised Trust in Parents' MMR Immunisation Decision-making

6.1 Abstract

Trust is considered crucial in the health-care setting, and in particular in the face of health risk. Two types of trust, generalised and interpersonal, have been acknowledged as playing a role in health care but it is not clear what role they play in parents' MMR decision. A modified grounded theory approach was utilised to explore the role of trust with both immunising and non-immunising parents. Seventeen interviews were conducted with 6 MMR immunisers, 3 non-immunisers and 8 immunisers with single vaccines. Findings suggest different levels of interpersonal and generalised trust in these groups. All groups of parents reported generalised mistrust in the Government based on the provision of biased information and past experiences of Government behaviour. Parents who opted for the MMR vaccines demonstrated interpersonal trust with their own HPs, whereas parents opting for the single vaccines or refusing all vaccines tended to report mixed experiences with their HPs. However, greater trust was illustrated by all parents, regardless of immunisation status, for their own health professionals and the NHS than for private clinics offering the single vaccines.

6.2 Introduction

The findings from Chapters 3, 4 and 5 illustrate the importance of health professionals' views during MMR decision-making. In quantitative research using PMT and SN, (Chapter 3), both parents perceived health professionals to be important sources of information (although non-immunisers reported them as being less important than the media and internet), and immunising parents were motivated to comply with the advice given by their partners and medical professionals, whereas non-immunising parents were more motivated to only follow the advice of their partner. In the students' study (Chapter 4), both immunising and non-immunising students were more likely to follow advice from health professionals than other groups. These findings from Chapters 3 and 4 led to further investigations, seeking more detailed qualitative information about the contribution of different types of social norms on MMR immunisation, as reported in Chapter 5. The results from Chapter 5 suggest health professionals play a more complex role in the decision-making process than simply providing information to parents; immunisers tended to identify with health professionals who occupied a dual role as 'health professional' and as a 'parent', and as a result these referents were regarded as important, trustworthy, and influential in MMR decision making. Therefore, in line with the 'nested' mixed method approach taken throughout this thesis (refer to Chapter 2, section 2.3), the current chapter examined the role of trust in more depth to gain greater understanding of the decision-making process in the MMR decision.

“Trust is understood as a judgement in a situation of risk that the trustee will act in the best interests of the truster, or at least in ways that will not be harmful to the truster.”

(Goudge and Gilson, 2005, pp1440)

In a health care setting ‘trust’ is regarded as an essential element in the patient-provider relationship (Parson, 1951). Trust is necessary in the face of uncertainty and risk and when one individual is reliant on another (Mayer, Davis and Schoorman, 1995; Mishra, 1996; Calnan and Rowe, 2006). This is especially true in the health-care setting where the patient is reliant on competency and intentions of the health-care provider (Titmuss, 1968; Alaszweski, 2003). There has been debate about the amount of trust needed to ensure a positive health professional (HP) and patient relationship. Gatter (2004) postulates that in order to avoid paternalistic medicine, i.e. emotional over-dependence on the HP, patients should be encouraged to trust their HP less. However, the majority of researchers disagree with this viewpoint and instead report that greater trust in the health-care setting relates to higher levels of satisfaction and adherence to treatment and in turn improves health outcomes (Safran, Kosinski, Tarlov, Rogers, Taira, Liberman, and Ware, 1998; Trachtenberg, Dugan and Hall, 2005). It is important for trust in the health context to be explored separately from trust in any other context due the high emotional context associated with illness vulnerabilities (Hall, Dugan, Zheng and Mishra, 2001).

In the MMR context, trust in health professionals has been identified as an important factor in the MMR decision. For example, Ogden and Flynn (2004) report

that having faith in the medical profession predicted MMR vaccine attendance by the age of 2 years. Nevertheless, many parents have reported HPs as dismissive, condescending, and providing incomplete or biased information, which resulted in them either being unable to make an informed decision or rejecting the triple vaccine altogether (Bond et al, 1998; Evans et al, 2001; Sporton and Francis, 2001; McMurray et al, 2004). Evans et al (2001) report that some immunising parents found health professionals pressurising and as a consequence were unhappy with the way they were treated or with their decision. Instead, parents preferred HPs who were supportive of the parents' concerns and open to discussions about the safety concerns associated with the MMR vaccine, which acted as cues to immunisation (Bond et al, 1998; Evans et al, 2001; Gust et al, 2003; Smailbegovic, Laing and Bedford, 2003). However, these studies illustrate aspects of trust related to personal HPs (i.e. GPs or nurses in the patient's own general practice), but it is unclear whether similar attitudes would be presented for health professionals in general.

Previous literature in this area has identified two different types of trust: 'generalised trust' and 'inter-personal trust'. Generalised trust refers to beliefs about people in the aggregate, whereas interpersonal-trust relates to beliefs in a specific individual (Larzelere and Huston, 1980). In the healthcare context, we can relate these definitions to the medical profession as a whole (generalised) and to patient's own healthcare provider (inter-personal). Interpersonal trust refers to the transference of control from the patient to the HP with the understanding that they will now act in the person's best interest (Straten, Friele, Groenewegen, 2002; Lee, Ng, Ghazalie, Ngiam, and Tai, 2007). In relation to inter-personal trust, patients are likely to focus on the following: experience of the provider's behaviour, impartial

concern for patients' well-being, technical competence, communication and listening skills, and honesty (Thorne and Robinson, 1989; Mechanic and Meyer, 2000; Straten, Friele and Groenewegen, 2002). No transference of trust is involved in generalised trust and instead relies on a verbal expression of confidence relating to personal and others' experiences of the health care system and on mass media communication (Lee et al, 2007).

Both general and inter-personal trust have been demonstrated to be independent from one another (Hall et al, 2002; Balkrishnan, Dugan, Comacho and Hall, 2003; Trachtenberg et al, 2005). For example, Trachtenberg et al (2005) found that trust in HPs (in general) predicted issues relating to health professional recommendation, reliance, control, and the patients' desire to seek help, whereas inter-personal trust in their own HP was only associated with greater reported adherence. These distinctions have been illustrated in the MMR literature (although focus was not placed on these different dimensions of trust). For example, Casiday, Cresswell, Wilson and Panter-Brick (2006) found that parents made a distinction between 'doctors' and 'my doctor'. The majority of the immunising parents (85.3%) believed that concerns regarding the MMR were taken seriously by their own doctor, whereas 48.2% agreed that doctors in general were dismissive about parental claims concerning vaccine side-effects. Paradoxically, a majority of non-immunising parents (including single immunisers) believed that doctors in general were dismissive about the side-effect claims (88.7%), but showed split agreement when asked whether they believed that their own GP would take their MMR concerns seriously (49.8% agreed and 48.5% disagreed). It is interesting that immunising parents place greater trust on their own GP but were split with regards to doctors in

general, whereas a majority of non-immunisers did not trust doctors in general but were split with regards to their own GP. Similar findings of attitudinal discrepancies between 'own doctor' and 'doctors in general' have been reported by Rosen and Dewar in the King's Fund Report which focused on improving patients' care (2004).

Another study by Lee et al (2007) identified three objects of trust in the health-care setting: i) personal primary care doctor, ii) the medical profession, iii) the (Government) health-care system. The issue of public trust between parents and the Government has been highlighted in previous research (New and Senior, 1991). In the UK, health policies and reforms are passed through Government ministers to the NHS and then passed down to health professionals to carry out. Thus, issues relating to health professionals and the Government are inter-related.

In Diego Gambetta's (1988) article, 'Can we trust trust?', it is postulated that in order for cooperation with health care messages to occur there is a need for mutual trust, but if this trust is unilateral then cooperation is likely to fail and result in deception, especially if the trust is blind (i.e. unconditional). This has been illustrated in recent years with regard to public health messages and the Government. For example, when the Bovine Spongiform Encephalopathy (BSE) public health crisis came to light there was public distrust in the British Government's advice. In 1996 the Government initially denied any links between BSE-infected cattle and the fatal human neurodegenerative condition – the new 'variant Creutzfeldt-Jakob Disease' (vCJD). The Government reassured the public of the safety of British beef, and to illustrate this point the Minister of Agriculture,

John Gummer, fed his daughter a beef burger to gain publicity and the Government's Chief Medical Officer Sir Donald Acheson reassured the public about its safety. Unilateral trust was expected of the public, i.e. 'blind' trust in the Government. However, over a year later the Government admitted the possibility of links between vCJD and BSE, resulting in heavy criticism of officials, scientists and Government ministers. The Government were accused of creating a false impression of the risk to human health, and the scare led to reduced levels of trust in Government information sources (Smith, Young and Gibson, 1999).

According to Berry (2004) risk communication relies heavily on trust. Differences in risk perceptions between different groups or stakeholders with different risk perceptions may result in mistrust (Slovic, Flynn and Laynan, 1991; Frewer, 1999). This lack of trust is associated with perceptions of deliberate biased information or distortion of information and previously been proven wrong (Frewer, 2003). Evidence suggests that poor risk communication between the Government and the public was illustrated with in the vCJD and BSE context. In light of this it would be interesting to examine whether previous experiences with the Government affected parents' present MMR decision.

In relation to the MMR vaccine, previous studies have indicated that HPs tended to follow the 'official' Government line (Evans et al, 2001; McMurray et al, 2004; Brownlie and Howson, 2005). Parents perceived the information provided to them by HPs was passed down by the Government and HPs were further incentivised by the Government to increase MMR uptake rates via financial gain (Evans et al, 2001; McMurray et al, 2004; Brownlie and Howson, 2005; Casiday, 2007). Thus it is

suggested that parents perceived the Government as inhibiting the open parent-health professional relationship. The role of the Government was explored in the present study to determine immuniser and non-immuniser differences, and to understand whether Government attitudes affected HP interpersonal or generalised trust.

The distinction between interpersonal and generalised trust is particularly important when focusing on MMR immunisation behaviour. No study to-date has closely investigated these two specific dimensions of trust in relation to personal health professionals, general health professionals and the Government in the MMR context. The present study aimed to explore the relationship between social norms and trust in relation to the MMR vaccine decision.

6.3 Method

6.3.1 Participants

17 parents from NHS Forth Valley in Scotland were recruited using the SIRS (Standard Immunisation Recall System) database. Parents with children born between 01/01/2001 and 31/12/2003 were identified from the database. These years were specifically selected for two reasons: i) the study was supported by the Head of Public Health, NHS Forth Valley, and on his request the interviews were conducted retrospectively so they could not influence parents in making their MMR decision. Participants with children over the age of two were contacted, as this time period would have provided them with sufficient opportunity to either opt for or refuse the vaccine. ii) The selected years would represent more recent attitudes of parents towards MMR immunisation, facilitating better retrospective recall of their

MMR decision. Exclusion criteria included non-English speakers, and also non-UK residents at the time of the MMR controversy (from 1998 to present day) were also excluded from the study. Amongst the participants, 6 had immunised their child with the MMR vaccine, 8 had their children immunised with single vaccines, and 3 had not immunised their child. For the purpose of this study, parents who have immunised their child with the MMR vaccine will be referred to as ‘immunisers’, parents who opted for the single vaccines as ‘single immunisers’ and those who refused immunisation as ‘non-immunisers’. The label ‘non-MMR-immunisers’ was used to describe both single and non-immunisers when similar views were expressed.

Among the 17 interviews, three of the interviews included both the father and mother as participants, and the remaining 14 interviews included the mothers only. Parents’ ages ranged from 24 to 41 years, whilst index children’s ages ranged from 2 to 4 years. Socio-economic status was calculated using deprivation scores (DepCats), a measure of socio-economic status based on material affluence/deprivation of the residing area (values ranging from 1 = most affluent, 7 = most deprived). Seven of the parents fell into the ‘affluent’ grouping, 7 into the ‘intermediate’ grouping, and 3 were borderline between ‘affluent’ and ‘intermediate’. Apart from the MMR vaccine, all parents reported that their child was up-to-date with all other childhood vaccines.

6.3.2 Procedure

Ethical approval was obtained from Forth Valley and Fife NHS Research Ethics Committee (ref: Gd/ab) and Stirling University Department of Psychology Ethics

Committee (approval sent via email from the committee Chair). NHS support was also obtained from the Head of Public Health, NHS Forth Valley for this study, and all letters and information sent to parents were headed on NHS paper with his signature. Parents with children born between 01/01/2001 and 31/12/2003 in the Forth Valley were identified via the SIRS database by a NHS worker (in charge of the SIRS database). Two hundred non-immunising parents and 200 immunising parents were randomly selected in order to obtain 20 participants (in Chapter 3, 178 non-immunising parents were invited to take part in a questionnaire study but only 24 completed the questionnaires and therefore a large sample size was selected as a low participation rate was anticipated). The researcher remained blind to the immunisation status of the children (until the interview) and received two separate lists, A and B, each containing names of 200 children. In the first instance only 100 parents from each list (200 in total) were contacted to take part in the study. The remaining 100 participants were to be contacted if a sufficient number of participants had not been recruited. The parents were all sent a letter (with attached consent form) requesting them to take part in the study (refer to Appendix IV). The parents were also sent an information sheet detailing the study (refer to Appendix IV), and a pre-paid envelope was included for parents to return the consent slips. Parents were requested to return the consent slip within a two-week period and also encouraged to contact the researcher for further information or clarification on any issues raised. Ten parents in total consented to take part in the study, in the first instance. As sufficient numbers were not reached, 20 participants would have been considered ideal (10 immunising and 10 non-immunising), the remaining 200 parents identified on the SIRS database were also invited to take part, and the same procedure as above was followed. In total, 17 parents (with 7 respondents from the

second mailing) consented to the study, and suitable interview times and venues were arranged. Travel costs incurred by parents were reimbursed. Interviews lasted between 35 and 90 minutes and were held at local and convenient venues, nominated by participants, including the parents' home, researcher's office, parents' place of work, and library seminar room. Letters were also sent to all GPs in the Forth Valley describing the study (refer to Appendix IV). The letters were sent with the purpose of assuring GPs that the interviews were confidential and anonymous, and any names of parents, children or GPs mentioned were to be deleted or changed during transcription and presentation.

Prior to the interview, all parents were reassured of confidentiality and all names or identifiers were deleted/changed during transcription. Demographic characteristics were also recorded, e.g. age of parent, gender, post codes, age of child, as well as immunisation status for all childhood vaccines. The interviews used a modified grounded theory approach (Glaser and Strauss, 1967; Strauss and Corbin, 1990) and therefore questions were non-directive and open (refer to Appendix IV for the interview guide, and Chapter 2, section 2.5.3, for details of this theory). All interviews were audio-recorded, and conducted, transcribed and analysed by the researcher.

A second-coder was also used during the analysis process. The coder had undergraduate and post-graduate experience in interview methodology, and had basic training in Grounded Theory. The coder also sat in on 4 of the interviews (permission was obtained from the parents prior to the interview): interviews 1, 5, 8 and 16. The coder was provided with an initial brief of the study and topic area, and

asked to write memos during the interviews of the topic areas. A coding frame/grid was used to aid the process (refer to Appendix IV). In order to ensure that the second coder did not distract the participants, the coder sat away from the researcher and participants but within hearing distance to take notes. After completion of the interviews, the interviewer and coder compared notes and identified important categories to guide the next interview.

6.3.3 Analysis

A modified Grounded Theory (GT) approach was used to explore parents' feelings of trust in relation to their personal health professional(s), health professionals in general, the Government, and single vaccines (refer to Chapter 2 for full details regarding this approach). All transcripts were transferred into NVivo and categories were identified.

6.4 Results

Interestingly, the NHS database classified 8 parents as 'non-immunisers' although they had immunised their child with the single vaccines. Amongst the 3 parents who had rejected the triple and single vaccines, one parent had refused due to her child suffering from egg allergies and was therefore unable to have the measles vaccine. However, the inclusion of this interview in the analysis was justified because prior to finding out about the allergies, this parent had gone through the same process as other parents in weighing the risks and benefits of MMR immunisation. Therefore, the study was included in the analysis to contribute to the understanding of parents' MMR decision. The main themes identified in the study are presented in Table 6.1.

Table 6.1: Themes and Sub-Themes Relating to Trust during the MMR Decision

Themes Identified	Sub-themes	Details
<i>Generalised mistrust in the Government</i>	Biased information	All parents: Lack of information, all pro-MMR, limited immunisation options
	Unilateral trust	Non-MMR-Immunisers: frustration, unwilling to unilaterally trust Immunisers: trust but with concerns
	Conflict of interest/ulterior motives	Non-MMR-immunisers: public good vs. private self, financial motives
	Past and present experience	All parents: negative past experiences relating to BSE All parents: frustration with present Government behaviour regarding the Prime Minister's immunisation behaviour
<i>Generalised trust in health professionals</i>	Government influence	All parents: Government influence over HPs
<i>Interpersonal trust in HPs</i>	Supportive relationship	Non-MMR-immunisers: mixed reviews reported - unhelpful and not willing to discuss vs. helpful and willing to discuss and help Immunisers: helpful, willing to discuss, non-pressurising
	HP relationship	Single immunisers: no relationship, viewed as a medical procedure only
<i>Trust in single vaccines</i>	Low confidence	All parents: credibility of vaccines questioned, greater trust in the own HP/NHS

6.4.1 Non-MMR-Immunisation Attitudes

The non-MMR-immunisers were more likely to report the triple vaccine was linked to autism and also believed three-in-one vaccine was 'too much' for a child's system and would 'overload the system'. However, these parents were generally

pro-immunisation, including the parents who had not immunised their child with either the triple or single vaccines. It became apparent throughout the interviews that non-immunisers held similar attitudes and trust issues to the single-immunisers, and would have preferred to opt for the single vaccines but were prevented by external barriers (e.g. allergies, cost, and having to obtain vaccines from private ‘non-NHS’ clinics). It was the ‘combination’ aspect of the vaccines rather than immunisation per se that was seen as important by the parents.

6.4.2 Generalised ‘Mistrust’ in the Government

Issues relating to mistrust in the Government were described by all groups of parents (immunisers, non-immunisers, and single-immunisers).

6.4.2.1 Biased Information

Government information regarding the vaccine’s safety and links with autism was questioned by all parents, including immunisers. Confusion relating to the credibility of the sources and lack of confidence in the information was frequently reported.

“It was very much in your face, it was on the telly, there were (sic) all sorts of information. You kind of think “well, what’s the best thing? What do you do?”... you’re not very sure.”.

(Interviewee 6/immuniser/mother)

Non-MMR-immunisers reported the Government as being unhelpful and providing biased information. These parents did not trust the imparted information and instead indicated a preference for the Government to disclose full information and present

both sides of the MMR debate rather than giving only pro-immunisation information. Parents perceived that such information would have allowed them to make a fully informed decision. Additionally, parents viewed the Health Board and Government synonymously.

“..if you go to the health board website: “MMR is great!” and “MMR is safe” and they don’t show any of the flip side of it at all. It’s very kind of one-sidedI would have liked if the actual health board side and the NHS would have actually put some of the bad points there so you could actually make a proper decision”

(Interviewee 1/single-immuniser/mother)

The non-immunisers reported that information received from the Government about MMR immunisation only offered two choices to parents: to either opt for the triple vaccine or receive no alternative immunisation. This lack of choice caused parents to feel frustrated and ‘*disgusted*’ (interviewee 10/non-immuniser/father), and they believed the MMR decision and choice was taken away from them. Parents did not appreciate being ‘*put in a corner*’ (Interviewee 15, single-immuniser, mother) with the lack of choice.

“Well the Government at the time decided that they weren’t going to give anyone the choice, so the choice was taken away from me.”

(Interviewee 15/single-immuniser/mother)

All three groups of parents, including immunisers, questioned the credibility of the information provided by the Government about the causal link between the vaccine and autism. Parents did not believe they were fully informed and perceived there

may have been some element of truth in the autism link. This perception caused some immunisers to feel less confident in their own decision.

“And you think well you know there’s no... there’s usually not any smoke without fire, I won’t be surprised if years down the line they find a link to be honest with you....I wouldn’t be surprised to find that years down the line that there’s something in the MMR that triggers it in some kids. And you’ve just got to hope that your kids aren’t one of them, to be honest that’s the way I looked at it.”

(Interviewee 7/immuniser/mother)

The perceived lack of information or bias in information provided by the Government was a cue to non-immunisation for many of the none-MMR immunisers. It created lack of confidence in the Government as parents were unwilling to accept any level of risk for their child.

“But it was the official report which the Government issued And I read it in detail ...and there’s actually a small sentence they couldn’t be absolutely certain that... there wasn’t a risk for a small minority of children. They might be susceptible...So there was .. a kind of warning bell.”

(Interviewee 5/non-immuniser/mother)

6.4.2.2 Unilateral Trust

Non-MMR immunising parent’s expressed frustration with regard to the unilateral trust expected of them by the Government. These parents were not willing to accept what they were told but instead wanted to be provided with more detailed information. As a consequence, many parents felt confused and questioned the Government’s motives.

“Now X [daughter]...had her MMR at fifteen months, had never needed a booster, suddenly they were saying right they need boosters pre-school. That freaked me, I thought well why, I just didn't trust them..... Because they got it wrong the first time.”

(Interviewee 12/ single-immuniser/mother)

The Government were reproached for expecting unilateral trust from parents. Parents felt they the government behaved in a condescending to parents by treating them as though they were ‘*stupid*’ for questioning the safety of the MMR vaccine (interviewee 3/single-immuniser/mother). Parents were not willing to accept information at face value, preferring to be treated with respect and provided with balanced information to enable them to fully understand the debate regarding the MMR vaccine.

“whilst I understood the criticism of his [Andrew Wakefield] report, of his study...it's only come out now that his methods were suspect at best. ... they [Government] just said it wasn't competent enough. I'm sorry I need more than your opinion on that, I need to understand why... just because you say it it doesn't make it not true. I think they have a God complex. They are not God. I want to see a detailed report.”

(Interviewee 10/ non-immuniser/father)

However, immunisers reported greater overall trust in the Government on public health matters. The Government were perceived as acting in the best interests of the public. It was accepted that government pro-MMR behaviour may also be motivated

by other factors, such as financial gains, but there were perceived limits to the level of risk the Government would take. .

“..well I do tend to trust the Government you know, and certainly in things like public health you know I don't think they'd take on those particular risks with people's health for the sake of, well I don't know, who would it benefit to stop ...triple vaccine and start single vaccines. I suppose there must be some money involved, but at the end of the day I believe that if they truly thought there was an issue with the triple vaccine they would stop it, I do.”

(Interviewee 7/immuniser/mother)

However, despite having a degree of trust in Government policies there was still doubt and anxiety about the autism link for the immunisers both before and after immunising the child with the MMR vaccine.

“But it was difficult, it was really difficult and even up until the point I took her for the vaccination I sat and cried my eyes out before getting vaccination done. Just the thought of it you could be putting your child in danger. it was really hard and you just think ‘am I doing the right thing or not’. ... Could I be putting her at risk?’, you know, ‘is she gonna show signs of behavioural problems and things after she's had the jag?”

(Interviewee 8/immuniser/mother)

6.4.2.3 Conflict of Interest/Ulterior Motives

Non-MMR-immunising parents were more sceptical about the Government's motives for promoting MMR immunisation. Concerns were relayed about the

Government protecting the majority rather than accepting the risks posed to some children.

“I don’t think they’re [Government] going to tell you what’s best for the individual, they’re more interested in the masses.”

(Interviewee 15/non-immuniser/father)

The Government’s public health concern was considered understandable and their difficult position was acknowledged by parents, but they were unable to accept risks to their own child. The Government’s broader public health concern conflicted with parents’ ‘private self’ responsibilities as ‘parent’. Parents believed that they were responsible for their child and it was their priority to protect their child, whereas the Government’s priority was to increase herd immunity and decrease risks of epidemics in the country.

“It’s really hard to know the Governments and the health boards... have a public health priority, and obviously if you have a public health priority for the greater good it’s better to get as many children as possible immunised, so there’s not an epidemic of measles or something like that. But when it comes down to your individual child you have concerns about that. You think for the greater good yes but what if my child was one of the few that may not react well to this medicine [MMR].”

(Interviewee 5/non-immunising parent/mother)

Some non-MMR-immunising parents believed the Government’s main priority and motivation was influenced by finance. They could not understand why the Government were not offering single vaccines if they were concerned about

immunising all children. They perceived the Government were more concerned about finance rather than assessing the risk of the vaccines.

“You know like the very fact that it was made difficult to get them separate... and think a lot of that is to do with money actually and not really to do with risk.”

(Interviewee 17/single-immuniser/mother)

“I was disgusted with the National Health Service that you did not have free choice.. they will not give you single vaccine... it doesn't cost them that much more and they are taking the mickey as far as I am concerned, they could have single vaccines.”

(Interviewee 10/non-immuniser/father)

6.4.2.4 Government Experience: Past and Present

Parents' experience of past Government behaviour was not viewed favourably, and confidence in the Government was questioned by all the three groups of parents.

“But the Government has its own problems because they tell a pack of lies as well. You don't know.. they put a spin on everything and it's a case of them saying “no it's safe, it's safe”. But they've done things like that before and it hasn't been quite as safe as what they would have liked to have believed.”

(Interviewee 6/immuniser/mother)

Non-triple-immunising parents highlighted their experience of the Government's past behaviour with their handling of the BSE/vCJD health issue. The Governments' behaviour was remembered negatively and resulted in a loss of confidence.

“The other thing that was a big factor for me was, it was the CJD thing, it was that that guy in Aberdeen, the researcher who said humans can get this, this mad cow disease thing, humans can get it, and he was shot down in flames by the Government .. And what happens, two or three years later he was right, that for me was a huge turning point with the Government and you know the Health Board, I didn't trust them.. I didn't believe them saying it was okay.”

(Interviewee 12/single immuniser/mother)

All parental groups reported frustration with the Government, and in particular with the then- Prime Minister's lack of communication regarding his own child's immunisation status. Parents reported disappointment with the Government for not disclosing this information, resulting in loss of confidence. Parents preferred openness and transparency about the MMR vaccine, including the Prime Minister's own MMR behaviour decision.

“Tony Blair refusing to say whether that child of his had had it [MMR vaccine]. If the kid had had it why didn't he say, I bet he hadn't... I just can't even begin to tell you the hypocrisy and how furious it makes me to be told to do something by him, that he clearly doesn't play by the rules... he didn't get his son vaccinated against the MMR, I absolutely would lay my life down on it that he didn't, and that really made me just so distrustful.”

(Interviewee 12/single-immuniser/mother)

6.4.3 Generalised Trust in Health Professionals

Generalised trust with HPs was difficult to distinguish from generalised trust with the Government. Parents were aware that the Government and the health board

controlled the health care system, including health professionals, and therefore parents viewed both HPs and the Government together when talking about generalised trust.

6.4.3.1 Government Influence

All groups of parents reported they were conscious that, in the consultation context, health professionals were not able to provide their own opinions about the MMR vaccine and instead their actions and discussions were influenced by Government policy.

“... some GPs and.. my GP was sympathetic because [she] could understand. But her hands were tied and couldn't do anything about it.they said “the line we must give you is it's better for your child to be vaccinated”. Which makes you think that's all they're allowed to tell you, because it's a very .. a statement, isn't it? It's not a view, ..it's not an opinion is it?”

(Interviewee 4/single-immuniser/mother)

These parents believed not enough information was passed on to HPs by the Government. However, the blame was not aimed at health professionals but instead at the Government who were seen as providing biased information, whereas health professionals were seen to be ‘doing their job’.

“Well no it's not the health professionals I don't trust...there was limited information from the top down during that time. So it's not actually about the health professionals themselves...it's about the information they have at their fingertips...I don't think enough information was cascaded down to the people who were on the ground doing the job advocating the MMR.....they can only do their job....I'm really

talking more about the Government, sort of Department of Health making it difficult and information to be passed down.”

(Interviewee 17/single-immuniser/mother)

One method of Government influence was highlighted by the non-MMR-immunisers: offering HPs financial incentives to increase the MMR vaccine uptake.

“Government was giving clear advice on this, they were giving clear “get your child vaccinated”. What they were also not telling you were that doctors were ... rewarded for that, they get money for making their targets.”

(Interviewee 10/non-immuniser/mother)

6.4.4 Interpersonal Trust in HPs

6.4.4.1 Supportive Relationship

Non-MMR-immunisers parents reported mixed reviews about their own HP. Not all parents found their HPs helpful or willing to discuss the MMR vaccine, and one parent reported that her health visitor had stated that single vaccines were not offered in Scotland.

“.... It would have been nice to have had some discussion about were there any other possibilities... And it was a bit disappointing to be told there was definitely nobody who would consider helping us go down any other route.”

(Interviewee 16/single-immuniser/mother)

Parents reported annoyance with HPs who were not prepared to discuss the vaccine or guide them with their decision-making, and viewed this as contradictory in terms of how HPs normally behaved.

“Just the fact that they’re normally telling you what to do and you’re responding to that, it’s a trust aspect, but now they’re saying .. make your own minds up.”

(Interviewee 15/single-immuniser/father)

The main source of support for immunisers and some single-immunisers came from health visitors who were reported as ‘*supportive*’ (interviewee 5/non-immuniser/mother) and ‘*helpful*’ (interviewee 2/single-immuniser/ mother). Immunisers reported that their health visitor was extremely sympathetic, and, although they promoted the MMR vaccine, they also helped parents to find information about the single vaccines and located clinics offering the single vaccine. This level of understanding and support from the health visitor helped to promote a supportive and trusting relationship.

“Great, really good, very informative and she [health visitor] was very supportive of if I want to do single vaccines, she helped me investigate it, she also showed me the kind of drawbacks and said you know he will be at risk for longer because there’s this four months in-between vaccines that he needs....”

(Interviewee 7/immuniser/mother)

Immunisers described that their own HPs were happy to discuss concerns about the vaccine with the parents. Immunisers reported that their own HPs did not behave in a condescending manner, and discussed the MMR vaccine rather than directly tell parents to opt for the vaccine. This type of relationship was appreciated by the immunisers and contributed to the HP-parent relationship and promoted trust.

“I felt there was more of a discussion rather than a lecture. So I felt quite happy ... It was nice. You get some doctors that are very patronizing and I tend not to..don’t like to go back to them.”

(Interviewee 6/immuniser/mother)

Furthermore, the MMR immunising parents did not feel pressurised into having the MMR vaccine, and instead reported the health professionals made recommendations and were open to discussion.

“..yeah very open to questions and just not dismissing me – “oh it’s just MMR you know carry on”, answered my questions, listened to my concerns if I had any.. but you know they were very good.”

(Interviewee 9/immuniser/mother)

6.4.5 Trust in the Single Vaccines

Throughout the interviews with single and non-immunisers, the issue of trust relating to the single vaccines emerged frequently. Therefore, additional questions were included in the discussion guide to understand parental trust in the single vaccine context.

6.4.5.1 HP Relationship

Single immunisers reported no relationship or interpersonal trust issues with the HPs based at the clinics offering the single vaccines (i.e.in the private healthcare sector). Parents reported no discussions about concerns regarding the single vaccines with the private clinic HPs. These HPs were simply seen as carrying out a medical procedure which did not require the parents to build any relationship.

“It was medical, you know it's a medical procedure. I didn't need to ask because I knew that that's what I was there for, any questions they asked were purely medical”

(Interviewee 12/single-immuniser/mother)

6.4.5.2 Low Confidence

Parents associated generalised trust with the NHS more than with the private health clinics offering the single vaccines. All groups of parents recognised the quality and high standard provided by the NHS and, therefore, questioned their faith in the single vaccines issued by the private clinics. The unfamiliarity of the private clinics and lack of confidence in the vaccines, illustrated by all parents, were reported as major concerns. All parents wanted more information about the background to the single vaccines and medical certificates indicating the authenticity of the vaccines to increase their confidence in the vaccines.

“..you don't know what you're buying and you go to these places where you've never come across them before. They were pretty professional but you didn't know what was in the syringes, it could have been anything, they still... could have given her nothing... and there was.. nothing on the website or they never us anything to back that up... they didn't give us a certificate from the Medical Board...saying that X's [daughter] had an injection of bona fide ingredients with her medicine...I mean she could have been given water for all we know.”

(Interviewee 15/single-immuniser/father)

The single immunisers reported frustration about the lack of information and guidance with the single vaccines. They reported that opting for the single vaccines

was made harder for parents as they were required to do their own research. Lack of information from HPs about the safety of single vaccines resulted in lack of confidence and mistrust in these vaccines (although they perceived the single vaccines to be safer than the MMR vaccine regarding the links with autism).

“...they weren’t generally available and therefore information about them was less, and you weren’t obviously being given any sort of reassurance by any health individual about their safety. Whereas the MMR you’re getting all the Government literature pushed at you about how safe it was...you knew it was coming from a ...reliable source.”

(Interviewee 16/single-immuniser/mother)

Non-MMR-immunisers generally would have preferred their own HP to provide the single vaccines rather than having to trust HPs at the private clinic. This suggests a greater value being placed on inter-personal trust than generalised trust in the MMR decision

“I would have liked to have seen my own doctor offering to get the single ones there instead of having to go away and find somewhere else.. that actually offers all 3 singles.”

(Interviewee 1/single-immuniser/mother)

Two of the non-immunisers indicated that although they were frustrated with the Government and the medical profession, they would still opt for the single vaccines if they were offered on the NHS. Although finance prevented one of these parents opting for the single vaccines, both parents also indicated that they perceived the NHS to be safer than the private healthcare system

“..if they said on the National Health are you going to have it, I would definitely definitely do that because I think it’s safer”

(Interviewee 13/non-immuniser/mother)

6.5 Discussion

The themes identified in this analysis illustrate the role of interpersonal and generalised trust during parents’ MMR decision. Overall, all groups of parents reported generalised mistrust in the Government due to the Government not fully disclosing information about the MMR vaccine or about the then- Prime Minister’s own immunisation status regarding his youngest child. They also referred to past negative experience of the Government’s handling of safety concerns around beef and BSE. Non-MMR-immunisers were unwilling to show unilateral trust for the Government, whereas immunisers were more trusting even though they still had concerns about the MMR vaccine. Non-MMR-immunisers perceived the Government had ulterior motives for promoting the vaccine which conflicted with the parents’ sense of ‘self’ and responsibility for their child. All of the parents believed that the issues of generalised trust in HPs were closely linked with Government trust, as the Government was perceived as controlling HPs since Wakefield’s MMR link. However, interpersonal trust with HPs was distinguished from generalised trust in HPs; immunisers reported helpful and supportive relationships with their own HPs during the MMR decision-making process, whereas non-MMR-immunisers reported mixed experiences with their HPs. The issue of trust in the single vaccines also emerged from the interviews. All parents, including single-immunisers, viewed the single vaccines cautiously and questioned their credibility, and reported greater trust in the NHS than the private clinics.

Furthermore, no inter-personal trust was indicated with HPs in the single vaccine clinics by the single-immunisers, and instead the relationship was viewed medically with no emotional attachment.

Experiences with HPs were seen to effect interpersonal trust. Non-MMR-immunisers reported mixed experiences, which have also been highlighted in previous literature. For example, Casiday (2006) reports that parents who refused the MMR vaccine tend to report diverse experience with their health professionals. Dissatisfaction is often experienced by parents who thought their HPs to be dismissive and not allowing sufficient time to discuss concerns and ask questions (Yarwood, 2006). However, HPs who allow patients to express concerns in the consultation are likely to have more satisfied patients, who are also likely to adhere to treatment offered (Stiles, Putman, Wolf and James, 1979; Heaton, 1981; Roter and Hall, 1987; Stewart, Brown, Weston, McWhinney, McWilliam and Freeman, 1995). In the immunisation context, parents were more likely to be confident in the safety of the vaccine when a positive and satisfactory relationship between the HP and patient was reported (Safran et al, 1998; Gust et al, 2003; Trachtenberg et al, 2005). Thus, a supportive HP-patient relationship is essential for the generation of interpersonal trust, and is more likely to increase satisfaction with the HP and increase the level of confidence in the vaccine and treatment adherence. This theory is supported by the immunisers in the present study; immunisers held concerns about the vaccine but also reported their HPs were supportive and open to discussion, and so motivated them to proceed with the immunisation behaviour. However, a causal link cannot be suggested. A satisfactory relationship does not necessarily translate to changes in parents' attitudes or concerns regarding the MMR

vaccine (Carlsen and Aakvik, 2006), but the evidence from the interviews does suggest a relationship between interpersonal trust with HPs and MMR immunisation. However, positive experiences between some of the non-MMR-immunisers and HPs suggest that other factors may play a greater role over and above generalised trust, such as the role of ‘private self’ as parent.

The existence of a private self and collective self has been postulated by Trafimow et al (1991), suggesting individuals store two separate concepts of their selves: private self (where private thoughts and traits are stored) and collective self (where thoughts about group membership are stored) (refer to Chapter 5, section 5.3.2, for further details). The findings from Chapter 5 illustrated that being a parent led to consideration of responsibilities of the ‘private self’ as the prime factor in the MMR decision making process. Health professionals who occupied the dual role of a parents and medical advisor were also important sources of reference. However, the findings from Chapter 5 could only be generalised to immunisers. The present study suggests that the ‘private self’ as parent played a potentially more important role for non-MMR-immunisers, since there was a general lack of trust of the views of other referents such as health professionals, health boards and the Government.

The present study findings highlight the conflict between public health and individual child health, which has also been illustrated in previous studies (Davidson, Smith, and Frankel, 1991; Rogers and Pilgrim, 1995). Non-MMR-immunising parents believed the Government to be concerned about public health and promoting immunisation amongst the majority of children rather than understanding the risk the MMR vaccine may pose for some children. As a

consequence, these parents relied on their private self as a parent when making the MMR decision rather than on generalised trust.

Brownlie and Howson (2005) illustrate similar conflicts experienced in the MMR context from the HPs perspective; HPs reported concerns about the health policies and Governance which limited their ability to make judgements on vaccine risks for individual children. This conflict was experienced by HPs who perceived a duty to protect their individual patients' health interests and simultaneously follow Government health policies (Fry, 2002; Wood-Harper, 2005). In light of evidence from the current study, it is suggested that HPs and parents would benefit from HPs having greater control during the consultations with concerned parents and to have the ability to assess each individual child and offer their own personal judgements. HPs who show caring, supportive and understanding attitudes and are open to discussions are more likely to be valued, respected and trusted by parents, alleviating concerns about vaccine safety, and leading to better overall immunisation uptake (Bond et al, 1998; Evans et al, 2001; Gust et al, 2003). Allowing HPs greater control will help to promote generalised trust with HPs in general and also interpersonal trust with own HPs.

Non-MMR-immunisers, and to some extent immunisers, perceived the Government and some HPs provided biased and inadequate MMR information. The decision-making process can be negatively influenced by poor or inadequate information (Evans et al, 2001), whereas sufficient information has been suggested as a cue to action (Tickner et al, 2010). Previous research has suggested that HPs admit that the information they were given and were asked to impart to parents tended to be pro-

immunisation, insufficient, and questionable in terms of accuracy and quality (Martin and Samson, 2002; Brownlie and Howson, 2005). As a consequence, this created barriers for parents and prevented them from making an informed decision, and additionally made the HPs' role in advocating the MMR vaccine more difficult (Martin and Samson, 2002; Brownlie and Howson, 2005). Brownlie and Howson (2005) report that HPs felt unable to step away from the 'party line' when providing information, and were inadequately equipped with dealing with parents' concerns about information found on the internet and through the mass-media. Poor information may inhibit interpersonal and generalised trust. Thom (2001) and Keating, Green, Kao, Mararian, Wu and Claery (2002) suggest that health-care providers can promote trust by communicating more effectively, listening to parental concerns, providing sufficient information for the parent requirement, and involving the patients in the decision-making process. Again, the results suggest a greater autonomy for HPs to deal with parents independently as a more effective way of promoting trust.

The findings highlight the importance of the HP-parent relationship for improving both generalised and inter-personal trust. However, it is unclear whether trust is affected by continuity of care which is considered to be a core feature of good primary health care (Hjortdahl and Laerum, 1992; Starfield, 1994; Donaldson and Vanselow, 1996), and associated with patient satisfaction and greater trust in HPs (Hjortdahl and Laerum, 1992; Mainous, Barker, Love, Gray and Gill, 2001). A preference for HP continuity of care has been demonstrated by patients when discussing issues relating to family concerns; HPs were perceived as possessing better medical knowledge of the patient, a greater understanding of the patients'

personal background, and were likely to show greater responsibility for the patient (Kearley, Freeman, and Heath, 2001; Schers, Webster, van den Hoogen, Avery, Grol, and van den Bosch, 2002). In light of the evidence presented, there is a strong argument for continuity of care for parents making the MMR decision where patients have the opportunity to develop a relationship with the HP. In the present study, it was unclear whether parents, when talking about interpersonal trust and own HPs, were referring to one or several HPs. A lack of continuity of care may explain the negative experiences reported by non-MMR-immunisers. In the past decade there has been a reduction in the continuity of care in the UK due to organisational changes in the primary health care system, whereby practices have increased in size, walk-in centres have been introduced, and workloads are now shared within primary health care teams (Baker, 1997; Guthrie and Wyke, 2000). Future research needs to be undertaken to understand the contribution of continuity of care on parents' trust in HPs and its impact on immunisation behaviour.

In order for effective risk communication and for trust to be developed, both 'competence' and 'honesty' are essential, and a deviation from this, i.e. biased or distorted information, can result in distrust (Frewer, 2003). The findings from the present study show that the Government, as a provider of MMR information, was generally perceived negatively and mistrust was illustrated by all groups of parents. Previous experiences of mistakes made by the Government in their dealings the BSE links with vCJD resulted in poor generalised trust and undermined confidence in the Government's role in promoting health and safety of the MMR vaccine. Interestingly, parents used the terms 'health professionals', 'NHS', and Government interchangeably when referring to higher authorities. Previous studies have

indicated that parents tended to differentiate between the Department of Health and Government when discussing the MMR vaccine (Petts and Niemeyer, 2004), but the present study illustrates that parents' generalised trust related to the Government, NHS and HPs in general. Non-MMR-immunisers, and to some extent immunisers, were unwilling to show unilateral trust and were more likely to question Government motives, and feel frustrated with Government influence over HPs.

Mistrust was further heightened when the then- Prime Minister refused to disclose his child's own immunisation status. Previous studies have also reported similar findings concerning Government handling of health issues as well as non-health-related issues, including mishandling of the BSE and the Iraq war (Caplan, 2000; Murphy-Lawless, 2003; Raithatha, Holland, Gerrard and Harvey, 2003; Rowell, 2003; Casiday, 2007). Governments can promote greater trust by providing balanced information to parents and equipping HPs better to deal with parental concerns.

The issue of interpersonal trust was not relevant for single-immunisers in relation to the HPs providing the single vaccines, and greater interpersonal trust was related to their own HPs. All parents tended to mistrust the single vaccines and would have preferred the option to receive the vaccines via the NHS who were seen as a trusted source. These findings suggest different levels of interpersonal and generalised trust. For example, all parents displayed mistrust in the Government regarding MMR information and advice (generalised mistrust) but did trust them to ensure quality and standards in the NHS. Similarly, many non-MMR-immunisers did not perceive their health professional (inter-personal) as supportive or a reliable source

of information but still showed a preference for their own HP to administer the single vaccines than other private healthcare HPs. 'Trust' is not a straightforward 'yes' or 'no' issue, but instead is complex as illustrated in the present study. Future research is needed to fully understand the different levels of interpersonal and generalised trust in HPs and the Government and their impact on MMR immunisation decision-making and behaviour.

It has been reported that parents who refuse the MMR vaccine are more likely to refuse other childhood vaccinations, e.g. diphtheria, tetanus, polio, pertussis and *Haemophilus influenzae* (Alfredsson, Svensson, Trollfors and Borres, 2004). However, the results from the present interviews do not confirm this finding. Regardless of their child's MMR immunisation status, all parents were pro-immunisation and were aware of the risks of vaccine-preventable disease and issues of herd immunity. This may be partly explained by the extensive media coverage of the MMR vaccine since 1998 to present day, which has not been illustrated with other vaccines (Evans et al, 2001). Nonetheless, these findings must be tentatively viewed as there may be a sampling bias in parents participating in the study; all parents came from affluent/intermediate backgrounds and these groups tend to report higher immunisation rates than those from deprived backgrounds (Marsh and Channing, 1987; Jarman, Bosenquet, Rice, Dollimore, and Teese, 1988). They may also be more likely to have sufficient self-confidence to challenge received advice regarding issues such as immunisation.

The NHS database (SIRS) classified eight of the parents who had immunised their child with the single vaccines as 'non-immunising parents'. Although these parents

did not opt for the 3-in-1 vaccine, they had immunised their children with the separate measles, mumps and rubella vaccines. It is suggested that that uptake rates of the MMR vaccine may not be accurate since parents opting for single vaccines were categorised as 'non-immunisers'. It is important for the Health Board to work closely with clinics offering single vaccines to ensure accurate MMR uptake statistics.

The participant sample was relatively small with only 17 parents, comprising of 6 immunisers, 3 non-immunisers and 8 single-immunisers. The sample was below the intended 20 initially deemed appropriate for the study, but this became less of a concern during the interviewing process as theoretical saturation was reached by the 15th interview, i.e. similar information was being repeated in the interviews. The number of interviews was sufficient for the emergence of theory on generalised and interpersonal trust in the MMR decision-making context to be developed from the data. The goal of qualitative research is not to provide generalizable data (Willig, 2008) but to obtain rich data and to gain an insight into individuals' attitudes, beliefs, motivations, relationships, culture and behaviours (Myers, 2001; Jones, 2005). This was achieved in this study in relation to understanding the role of different types of trust in the MMR immunisation decision.

Chapter 7

Conclusions and Recommendations

7.1 Introduction

The MMR vaccine was introduced in the UK in 1988 to protect children against the vaccine-preventable diseases - measles, mumps and rubella. According to the WHO (1999), a 95% uptake rate would help to eradicate the diseases in the UK and prevent national epidemics. However, a set-back to achieving these uptake rates was introduced by Wakefield et al (1998) who proposed a causal link between the vaccine and autism and Crohn's disease (a form of irritable bowel disease: IBD). Although his research was discredited by the General Medical Council in 2010, during the time period from 1998 onwards the MMR vaccine uptake rates steadily declined, falling below 50% at the lowest point (Deer, 2006). The decision of whether to opt for the vaccine became increasingly difficult for parents; the decision-making process went beyond the rational risk/benefit analysis, as proposed by heuristic decision-making models (Kurz-Milcke and Gigerenzer, 2007). Instead the process involved risk perceptions which concerned the individual's beliefs, attitudes, judgements and feelings (Pidgeon et al, 1992; Meszaros et al, 1996), including the beliefs and norms of social referents, which reflected the social milieu and culture of the UK at that time. The decision was further made difficult by the media coverage which embellished perceived risks of the MMR vaccine and played down scientific evidence refuting the links between MMR, autism and Crohns disease (Begg et al, 1998; Clements and Ratzan, 2003; Colgrove and Bayer, 2005; Thompson, 2009). In this context, the present thesis aimed to gain a greater understanding of parents' MMR immunisation decision-making process.

A cognitive science approach (Berry, 2004) was undertaken to understanding risk, and the psychometric risk model Protection Motivation Theory (PMT), alongside subjective norm (SN), was used as a framework for the first two studies. Study 1 investigated parents' decision-making process for the first and second dose MMR vaccine and used a cross-sectional quantitative design. Study 2 was similar to the first study but was conducted with students who were offered the MMR vaccine during a mumps outbreak on the university campus. This study allowed a comparison with the first study to determine whether similar cognitions were involved in the decision-making process for the same behaviour in a different population. One of the findings from both of the first two studies was the importance of social referents and subjective norm during the immunisation decision process. This led to the development of the third study; focus groups were conducted to understand the contribution of different social norms in the decision process. The findings from all three studies indicated the importance of the role of HPs during the MMR decision, and study 3 highlighted the role as complex and involved issues of trust. Therefore, the fourth study investigated the role of trust in health authorities, including health professionals, to understand its contribution to the MMR decision.

7.2 Conclusions

7.2.1 Protection Motivation Theory (PMT)

- PMT successfully predicted first dose immunisation behaviour ($\chi=52.9$, $df=8$, $p<.001$; with 79.1% of the participants predicted correctly) and second dose immunisation intentions ($\chi=91.8$, $df=7$, $p<.001$, with 85.3% of participants

predicted correctly) with parents, and thus was found to be a useful and important model to use for understanding parents' MMR decision.

- Differences between immunising and non-immunising parents were illustrated with the PMT components:
 - Both groups of parents indicated high levels of fear if their child was diagnosed with measles and mumps, but immunisers reported greater worry with the diagnosis of rubella ($p < .001$).
 - Immunisers perceived all vaccine-preventable diseases to be more serious than non-immunising parents, although significant differences were only reported for rubella ($p < .001$).
 - In comparison with non-immunisers, immunisers perceived non-immunised children to be at a greater risk of measles ($p \leq .01$), mumps ($p \leq .01$) and rubella ($p < .05$).
 - In comparison with immunisers, non-immunisers perceived the risk of autism ($p < .001$) and IBD ($p < .001$) to be greater for immunised children.
 - Non-immunisers were significantly less likely to believe in the safety efficacy of the vaccine in relation to autism ($p \leq .01$) and IBD ($p \leq .01$) than immunisers.
 - Immunisers were more likely to disagree that the immunisation was more dangerous than measles ($p \leq .01$) and weakened a child's immune system ($p \leq .01$) in comparison with non-immunisers.

- Non-immunisers reported greater anxiety as an internal barrier to immunisation than immunisers ($p < .05$). No other internal or external barriers were perceived as significantly different for the two groups.
- The students' results indicate both similarities and differences between immunisers and non-immunisers with the PMT components.
 - In comparison with non-immunisers, student immunisers reported greater fear of being diagnosed with measles ($p \leq .05$), mumps ($p \leq .001$) and rubella ($p < .05$).
 - Immunisers perceived all three diseases to be more severe than non-immunisers: measles ($p < .01$), mumps ($p < .01$), rubella ($p < .05$).
 - Immunisers believed that students were significantly more likely to be vulnerable to mumps ($p < .05$) and rubella ($p < .05$) than non-immunisers, and a near-significant difference was reported for measles ($p = .054$).
 - Immunisers held more positive efficacy beliefs about the vaccine than non-immunisers, although the only significant difference was reported for the belief that immunisation was more dangerous than measles ($p < .05$).
 - Similar beliefs were reported by immunisers and non-immunisers when asked about the vaccine's safety in relation to autism and IBD.
 - Non-immunisers reported significantly greater external barriers to immunisation than immunisers (all $p < .001$).
 - In contrast with immunisers, non-immunisers reported greater levels of anxiety ($p < .01$) and distress ($p < .05$) as internal barriers to immunisation.

- The results from studies 1 and 2 highlight differences between the parents' and students' MMR decision-making process.
 - Both immunising and non-immunising parents reported similar levels of worry for measles and mumps, whereas immunising students reported greater worry of all three vaccine-preventable diseases than non-immuniser students.
 - A similar pattern of results were indicated by both parents and students on perceived severity of the diseases, but immunising parents perceived all three diseases to be more serious than did immunising students.
 - Similar perceptions of vulnerability were reported by both the student and parent groups, but immunising parents perceived greater vulnerability to non-immunisation than immunising students.
 - The only similarity indicated on the response efficacy scale between parents and students was whether immunisation was more dangerous than measles, with both immunising groups disagreeing with the statement. No other differences were reported. Students did not report any strong beliefs about the safety links with the vaccine, whereas strong beliefs were reported by non-immunising parents who were more likely to perceive the vaccine was linked to autism and IBD.
 - Differences were illustrated on the self-efficacy scales, whereby greater difficulties with external barriers were reported by immunising parents and non-immunising students. Both non-immunising groups reported anxiety as an internal barrier to immunisation.

The findings indicate PMT is a useful model when examining the MMR decision-making process for immunisers and non-immunisers in different population groups. The psychometric risk model identified immunising parents as having greater concerns about measles, mumps and rubella, and non-immunising parents reporting greater distress with the associations between the vaccine and autism and IBD. Many similar patterns between students and parents were illustrated, but parents reported stronger beliefs. This was expected as parents' immunisation decision was on behalf of their young child, who could be perceived as more vulnerable to the effects of immunisation. The results indicate that MMR decision-making differs depending on the population under study. Parents and students presented similar threat appraisals in relation to the vaccine-preventable diseases, but were different in their coping responses (response efficacy and self-efficacy).

7.2.2 Subjective Norm (SN)

- SN was firstly examined in study one to understand its contribution to parental risk assessment using PMT.
 - For the first dose MMR vaccine, the inclusion of SN with the PMT model increased the robustness of the regression with a greater number of participants predicted correctly: from 79.1% to 81.3% accurately predicted. Similar results were identified when examining the second dose vaccine intention; when using PMT alone 85.3 of the participants were correctly predicted, but with the addition of SN this percentage increased to 89.1%.

- Immunisers perceived that health professionals and partners wanted them to immunise their child and they showed greater motivation to follow the advice from these referents than any other referents.
- Non-immunisers indicated that their partner did not want them to immunise their child and were more likely to follow their advice. Non-immunising parents also indicated that they were least likely to follow the advice of health professionals.
- SN correlated more strongly with first dose immunisation intentions and behaviour than any other variable, and also correlated strongly with second dose intentions and behaviour.
- SN was also examined with the student population to understand its contribution. Although regressions could not be conducted with this group, the results still highlighted similarities and differences between immunisers and non-immunisers.
 - All students reported health professionals as wanting them to immunise, and a strong motivation to follow the advice of these referents was reported for both groups of students. However, non-immunisers were less likely to follow the advice of GPs than immunisers.
 - In comparison with non-immunisers, immunisers indicated partner, family and friends wanting them to opt for the MMR vaccine, reflecting the salience of the views of these social referents. Immunising students also reported a greater likelihood of following the advice of these referents than non-immunisers.

- A significant relationship was identified between SN and student immunisation behaviour.
- Differences and similarities between students and parents for SN were also illustrated.
 - All groups of students and parents indicated HPs as wanting them to immunise, and both immunising parents and students indicated being more motivated to follow the advice from these referents than non-immunisers. However, non-immunising students indicated a greater motivation to follow the advice of GPs than any other referent group, whilst non-immunising parents were more likely to follow the advice of partners than any other referent.

Subjective norm is an important construct when examining immunisation behaviour. The results from Chapter 3 and 4 highlight the key referents for immunisers and non-immunisers during the decision-making process. Discussing the issue with HPs and being motivated to follow their advice was an important factor for both parent and student immunisers, and also non-immunising students. The SN results also indicate that for non-immunising parents, the partner was the most important referent with whom non-immunisers shared similar intentions of non-immunisation and were more likely to follow their advice. The findings provide support for the inclusion of SN when using psychometric risk models to examine parents' MMR immunisation decision-making process.

7.2.3 Important Sources of Information

- Important sources of information were investigated for both immunisers and non-immunisers in the parent population and student population.
 - All groups of parents and students reported health professionals, especially GPs, as important sources of information.
 - Family was also reported as an important source of information for all groups, but in particular for immunising students (reported by mean scores).
 - Immunising parents and students and non-immunising students reported health professionals as the most important source of information. Significant differences were indicated between immunising and non-immunising parents.
 - Non-immunising parents reported the media and internet as the most important sources of information, with significant differences being reported between immunising and non-immunising parents.

Health professionals were viewed as important sources of information about MMR immunisation for parents and students, regardless of immunisation status. However, non-immunising parents identified the media and internet as most important sources, suggesting that these parents placed greater importance on media coverage, which tended to be negative (Begg et al, 1998; Clements and Ratzan, 2003; Colgrove and Bayer, 2005; Thompson, 2009), rather than the official information provided by health authorities.

7.2.4 Social Norms

- Chapter 5 focused on the contribution of social norms using focus groups. Different types of norms were identified as relevant for immunisers during their decision-making process.
 - Partners, child's grandparents, close family members, friends with children and health professionals were identified as relevant referents when making the MMR decision. Parents identified mainly with individuals who also had children. All referents were perceived as pro-MMR immunisation.
 - Subjective norm played a contributory role where parents listened to the advice of significant others and assessed the credibility of the advice but did not perceive this to be a motivational factor to comply. They perceived their own beliefs and attitudes played a greater role.
 - The media was an important source of information for immunisers, without which they would not have queried the vaccine safety. However, parents also questioned the credibility of media reports.
 - Descriptive norm played an important role during the decision-process.
 - Parents actively sought information about their HPs regarding their own children's immunisation status. This dual-role of HPs, as medical advisor and parent, provided greater weighting than that of other parents, and illustrated trust in HPs.
 - Previous experience of and exposure to vaccine-preventable diseases raised awareness of the associated risks and dangers.

- Observing other children who had or had not been immunised allowed parents to assess the safety of the MMR vaccine.
- The private self was highlighted as an important factor during the MMR decision. Parents perceived their own role as ‘parent’ to be more important than other group norms or advice. However, parents described the responsibility as a parent making the MMR decision to be difficult and associated with emotions of guilt, fear, and anxiety.
- The relational self was valued more highly than other group memberships, with willingness to discuss the MMR decision if disagreements arose.
- Parents perceived a primary moral obligation to protect their child, and herd immunity was a secondary obligation. This primary obligation was viewed as a necessary selfish act which all parents, regardless of immunisation status, conducted to protect their child. Onus was placed on the Government to take greater control of the information presented during the controversy surrounding the MMR vaccine.

It can be concluded that social norms play a significant role in the MMR decision. Subjective norm was not considered by parents as having a major contribution to their decision. Instead the ‘private’ and ‘relational self’ as parents, their responsibility to protect their child were considered greater determinants of behavioural decision-making. Descriptive norm was particularly important for risk assessment during the MMR decision, and particular trust was placed in HPs who occupied a dual role of parent and medical advisor.

7.2.5 Trust

- Chapter 6 explored the role of interpersonal and generalised trust during the MMR decision for immunisers, non-immunisers and single-immunisers.
 - All parents reported generalised mistrust in the Government for providing biased information.
 - Immunisers reported some trust in the Government but also indicated concerns. However, non-MMR-immunisers (non-immunisers and single-immunisers) reported frustration with the Government for expecting unilateral trust whilst simultaneously not fully disclosing information about the vaccine. Parents also showed frustration with the Government who were perceived as having ulterior financial motives.
 - The Government's past dealing in health issues, i.e. their handling of the BSE and vCJD controversy, was discussed by all parents and viewed negatively.
 - The Government's public health concern conflicted with non-MMR-immunisers sense of 'private self' as parent.
 - Parents found it difficult to differentiate the views of HPs in general from Government views, as they perceived the Government as controlling HP behaviour in the MMR context.
 - Immunisers reported inter-personal trust in their own HPs. Their HPs were generally considered helpful, non-pressuring and open to

discussion. However, non-MMR-immunisers reported mixed views about their HPs.

- All parents queried the credibility of the single vaccines and reported low confidence with single vaccines administered in private clinics. Preference was reported for the NHS/own HPs to administer the single vaccines, suggesting generalised trust in the health care system and interpersonal trust in their own HPs.
- No interpersonal trust with HPs at the single vaccine clinics was reported by single-immunisers.

It would appear that trust is not a straightforward and dichotomous issue, but played an important role in parents' MMR decision. The Government was perceived negatively with their handling of the MMR vaccine safety concerns and this was linked to their handling of other health issues in the past. Although parents reported frustration with the Government and some indicated poor relationships with their own HPs, they still trusted them in ensuring quality and standard over the single vaccine clinics. Thus it is suggested that parents hold different levels of trust in relation to health authorities/the Government when making the MMR decision.

7.3 Summary of Present Research

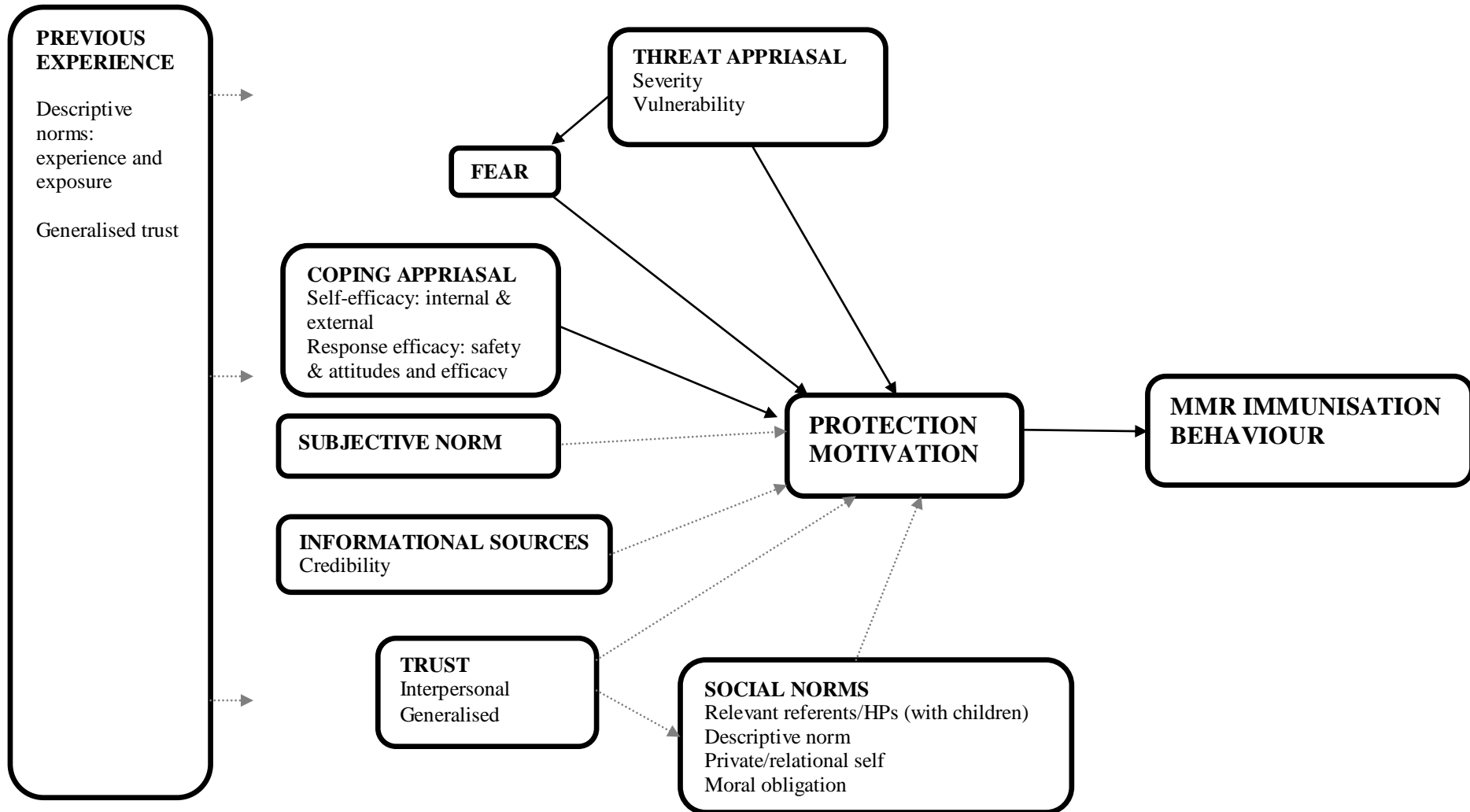
The studies conducted in Chapters 3 to 6 illustrate the importance of PMT in understanding MMR behaviour, and the significance of social norms, important sources of information, and trust in gaining a greater insight into understanding

MMR decision-making and risk assessment. Parents were required to assess the risk of the MMR vaccine and immunisation when faced with unknown probabilities and uncertainties (Lopes, 1987; Yates and Stone, 1992) relating to the causal links with autism and IBD, and PMT helped to identify the key cognitions involved in the process. However, important sources of information motivated parents to examine the risks associated with the vaccine, with non-immunising parents viewing the media and internet as important sources. This may explain negative attitudes in relation to the safety of the vaccine as most media coverage at the time of the study, in 2003, were negative with very little coverage of scientific evidence which refuted the claims (Thompson, 2009). Health decisions were made in a social context and social norms were also considered important contributory factors in the decision-making process; relevant referents and HPs who were parents, descriptive norm (experience and exposure), private and relational self, moral obligation, and subjective norm contributed to the risk assessment process. The relationship with HPs was found to be related to interpersonal trust, with the ability to discuss the concerns about the vaccine positively contributing to the decision-making process. However, poor generalised trust and risk communication between the Government and parents was reported, thus suggesting that the parents did not perceive the Government conveyed competence and honesty, which are two values necessary for effective risk communication (Berry, 2004). Previous experiences also play a role in the MMR decision. Previous experiences of vaccine-preventable diseases (a dimension of descriptive norm) and the Government's handling of the BSE and vCJD link were taken into account by parents during the MMR risk assessment process. Parents described negative experiences of the Government in Chapter 6, suggesting a loss of trust in the government which had not been recovered when

making the MMR decision (Slovic, 2000). Figure 7.1 illustrates the theory postulated by the findings in this research thesis. Items which were quantitatively measured have solid arrows, whereas themes which were qualitatively identified have perforated arrows, since these results are not considered generalisable.

On the whole, parents and students evaluated the threat of vaccine-preventable diseases in a similar manner, but differences were illustrated in their coping appraisals. Previous research suggests perceived and actual risk differs depending on the population group (Slovic et al, 1980), but the present research suggests that risk also differs depending on the saliency of the risk. Although similar patterns of risk were illustrated by parents and students, differences were reported in their risk assessment of the causal association between the vaccine and autism/IBD, and therefore suggesting that this risk was of greater saliency to parents than students.

Figure 7.1: Representation of Key Factors Involved in MMR Immunisation Decision-Making



7.4 Methodological Limitations

The present research used a critical realist framework and a mixed method approach to understand risk perception during the MMR context. Four studies were conducted to gain an insight into the mechanisms involved during the decision-making process. Two of the studies employed quantitative cross-sectional designs using questionnaires, the third study used focus groups and applied thematic analysis, and the last study employed a modified grounded theory approach during semi-structured interviews with parents. The mixed method approach allowed for a greater understanding of the MMR decision-making process (Bazeley, 2004). The methodological strengths and limitation of each study have been discussed in the relevant research chapters and in Chapter 2, and therefore the main points for each study will be summarised here.

7.4.1 Study 1: The Role of Protection Motivation Theory and Subjective Norm in Parents' Decision-Making

A review of the past literature provided sufficient information for the development of a questionnaire to understand the contribution of PMT and SN. The research design was generally constrained by NHS operational and ethical issues. Ideally a longitudinal approach, which investigated the social cognition prior to the MMR decision, would have been more methodologically robust and would have determined whether intentions transferred to behaviour (as proposed by PMT; Rogers, 1975). Additionally, parents were required to recall their intentions made three years previously, which may have resulted in memory bias. However, the retrospective approach was cost effective and time efficient, and allowed for the

examination of both first dose and second dose MMR decision process. A limitation to examining both first and second dose MMR behaviour was the use of the same variables to predict the intentions and behaviours and therefore the results from both behaviours cannot be compared. However, the main focus of the research was to understand parents' first dose MMR behaviour, but as a retrospective approach, and the opportunity to focus on second dose intentions and behaviours was also taken up. Additionally the cross-sectional design permitted the examination of relationships between the factors and the prevalence of their occurrence (Mann, 2003). Furthermore, such a design allowed for the access to a wide range of participants.

For ethical reasons, an opt-in design was used, whereby letters and consent forms were initially sent to all potential participants requesting them to participate in the research, and only the participants who returned the signed consent form was sent a questionnaire, which they were required to complete and send back. It was proposed that the opt-in design would reduce participation rates, and therefore to minimise this effect a large sample size of 2000 was used, of which 423 returned completed questionnaires. There was an uneven representation of immunisers and non-immunisers, 399 (94.3%) immunisers vs. 24 (5.7%) non-immunisers, but this reflected the population at the time of the study in 2003 in Dundee (94.5% immunisers vs. 5.4% non-immunisers). Since the study was conducted in one Scottish health board area it should be replicated in other regions of the UK to generalise the results.

7.4.2 Study 2: The Role of Protection Motivation Theory and Subjective Norm in Students' Decision-Making

An opportunity was provided to study students' MMR immunisation behaviour during a mumps outbreak on the university campus. A similar questionnaire to the one detailed in Chapter 3 was modified and adapted to be used with a student population. However, the study was conducted during the examination period which may explain why non-immunisers perceived greater external barriers to immunisation than the immunisers. Exam and workload demands may have been a more salient stress for the students than immunisation (D'Zurilla and Sheedy, 1991; Towbes and Cohen, 1996; Nieblin and Heckery, 1999). The academic period for this population group needs to be taken into account when interpreting results.

The sample included in analysis was relatively small (n=90) since many students had been immunised in childhood. The sample was relevant to the objective of the study and was equally represented by immunisers (n=44) and non-immunisers (n=46).

7.4.3 Study 3: The Role of Normative Beliefs

Focus groups were used to explore the contribution of social norms in the MMR decision. The main aim of focus groups is not to generalise the results but to produce rich data to understand the full dimensional picture involved in the MMR decision (Myers, 2002; Mack et al, 2005). In order for generalisation of the results,

quantitative research needs to be conducted using questionnaires to determine the causal relationships between the norms and the MMR decision.

Five focus groups comprising of 16 parents (15 mothers and 1 father) from two different playgroups in Central Scotland were conducted. Although the groups were small in size, with 3 to 4 participants per group, this was considered appropriate due to the controversial and complex nature of the MMR decision, which would have been difficult to discuss in larger groups (Morgan, 1998).

Only MMR immunisers participated in the study and therefore results cannot be generalised to non-immunisers. Focus groups with non-immunisers would have provided a more complete understanding of normative influences. The lack of non-immuniser participation may have resulted from unwillingness to take part in focus groups due to the stigma attached to non-immunisation and as a minority group they were difficult to access. However, the results obtained from immunisers identify key social norms and influences which contribute to immunisation, and these can be targeted to improve immunisation uptake in the future.

Sampling bias may have been a limitation to the study. Two focus groups consisted of university staff and students, and the remaining three groups were obtained from a playgroup held in a church. However, all groups reported that the topic of MMR immunisation was not discussed with any of the parents in the playgroup and thus it can be suggested that these parents were not influenced by group norms.

Additionally, parents were evenly represented in terms of socio-economic status (based on NS-SEC codes), although it is not clear whether their partners also possessed similar NS-SEC codes. Affluent groups tend to be more pro-MMR immunisation and immunise their children at the recommended age of 15 months (Houston, 2002; Friederichs et al, 2006). It is essential that in future research, socio-economic status data should be obtained for the partner.

In order to achieve a deeper insight (Howitt and Cramer, 2007), the researcher carried out and facilitated the focus groups, transcribed the group interviews and analysed the data. However, two additional coders were employed to ensure inter-rater reliability. These coders analysed samples of transcripts using coding frames, and coding was compared and data reanalysed in the presence of disagreements until agreement was reached.

7.4.4 Study 4: The Role of Interpersonal and Generalised Trust

One-to-one interviews were conducted to understand individual perspectives of the contribution of trust during the MMR decision (Mack et al, 2005). This study was conducted retrospectively so as not to influence parents during the MMR decision. Therefore, only parents with children aged over two were contacted to take part in the research, and the MMR decision had been made 1 to 3 years prior to the interview taking place. Although it would have been ideal to focus on attitudes during the decision-making process and prior to behaviour, the results still highlight differences between immunisers, non-immunisers and single-immunisers in relation

to trust. Parents were able to clearly recall their trust attitudes in the MMR context, but there may be recall and social desirability biases in the data. In order to generalise the results it may be appropriate to develop a questionnaire to assess the different levels of interpersonal and generalised trust present for all parent groups.

The researcher conducted the interviews, transcribed the interviews carried out the analysis and interpreted the results to ensure the data was fully understood (Howitt and Cramer, 2007). Inter-rater reliability was ensured with the use of a second coder who sat in on four of the interviews and used a coding grid to record memos. The memos were compared and discussed until agreement was reached, and also provided guidance for the next interview discussion guide.

7.4.5 Shared Limitations

All three parent studies had one shared limitation that they were mainly completed by mothers. The recruitment process for all studies was directed at parents in general, but mothers tended to respond: in study 1 (Chapter 3) 92.2% of mothers and 6.8% of fathers took part, in study 3 (Chapter 5) only 1 father but 15 mothers participated in the focus groups, and study four included 14 interview with mothers and only 3 interviews with both parents. However, mothers tend to make basic decisions about health care and health behaviours regarding their children (Gross and Howard, 2001), and in the case of MMR it is likely that the mother will be the primary person responsible for taking their child to a health professional for vaccination. Additionally, mothers reported the role of the relational self during the

decision-making process (Brewer and Garner, 1996), whereby the MMR decision was discussed with partners. Nevertheless, in order to generalise the results from all studies it would be ideal to replicate them with fathers. This would provide an even greater insight into the decision-making process, and in particular to the dyadic relationship and its role in the MMR decision.

Personal reflexivity also needs to be taken into account when interpreting the results of this thesis. Reflexivity refers to the contribution to the construction of meanings throughout the research process based on the researcher's preconceptions and provisional knowledge (Nightingale and Cromby, 1999). Thus, the researchers own positive attitudes towards MMR immunisation and trusting relationship with HPs may have guided the studies in relation to the areas researched and the interpretation of the results. However, the critical realist approach taken in this research accepts that human values and reflectivity play a role during knowledge acquisition (Dobson, 2002; Krauss, 2005).

7.5 Implications of the Present Research

Since the proposed autism and Crohn's disease link in 1998 and the start of this research in 2003, Andrew Wakefield's research has been discredited by the General Medical Council in 2010, negative media coverage of the vaccine sharply decreased by 2007 (Thompson, 2009), and the MMR vaccine uptake rates gradually increased in Scotland and the UK. By 24 months of age, 92.7% of children in Scotland and 89.4% of children in the UK have been immunised with the first dose vaccine in

2010 (ISD Scotland, 2010; Health Protection Agency, 2010). Uptakes of the second dose vaccine by 5 years of age has also increased, with 90.6% of children in Scotland and 84.8% of children in the UK immunised in 2010 (ISD Scotland, 2010; Health Protection Agency, 2010). Although the vaccine rates have increased since the proposed link, they are still below the recommended 95% (WHO, 1999). It is unclear whether the 95% uptake rate will be achieved, but the present study highlights key factors which either need to be investigated further or can be used in future interventions to promote MMR immunisation. Additionally, study 4 (Chapter 6) highlights that negative experiences, such as BSE and vCJD, may remain in public memory and therefore effective risk communication and interventions need to be in place to ensure similar incidences and experiences are not repeated in the future in relation to MMR and childhood immunisation.

7.5.1 Future Research and Interventions

7.5.1.1 Social Normative Influences

The main theoretical findings from the present research suggests the importance of including social norms when investigating MMR decision-making using PMT (refer to Figure 7.1 for a schematic representation). Future interventions need to take into account social normative influences involved in the MMR decision, as well as the coping and threat appraisals proposed by PMT. The role of group norms, relevant referents, descriptive norm, subjective norm, private self, relation self and moral norm was relevant in the decision-making process. Thus, the normative influences identified here went beyond Fishbein and Ajzen's (1975) 'subjective norm'. It is proposed that social norms need to be reconceptualised to encompass a broader

notion of norms involved in MMR decision-making. During the risk assessment, parents relied on behaviourally relevant groups, for example, other parents, which acted as a coping mechanism during the decision-making process (Terry and Hogg, 1996). However, the role of social norms was largely explored using focus group methodologies with immunising parents. Further research needs to be conducted to quantify the level of social norm contribution for immunising and non-immunising parent groups which would allow the results to be generalised.

7.5.1.2 Significant Others

Significant others' views contributed to the MMR decision, especially the views of partners. Although not necessarily motivated by others, parents reported that they listened to others and assessed the credibility of the source. However, the role of the relational self was apparent with both immunising and non-immunising parents indicating that they were likely to follow the advice of this referent group, and were open to discussion during disagreements. This suggests that significant others can be targeted during MMR vaccine uptake promotions. In other health-related areas concerning children, such as breastfeeding, it has been reported that interventions with fathers which involved providing them with information on the health-related behavior (i.e. breastfeeding) helped to increase uptake rates of the behavior (i.e. breastfeeding rates) (Wolfberg, Michels, Shields, O'Campo et al, 2004; Piscane, Continisio, Aldinucci, D'Amora et al, 2005). Similarly, Winterburn, Moyez and Thompson (2003) report that support from the child's grandmother or close female confidante highlighted a pattern of increased initiation of breastfeeding. In the present research, immunising parents reported other parents as salient groups during

the MMR decision. Thus primary targets in MMR intervention may include partners and secondary targets may include close family and friends who also have children. No published intervention to date has focused specifically on partners, close family members or friends, but the present studies suggest that these referents play a key role during the MMR decision. Prior to intervention work it is important to examine significant referents' attitudes and risk perception to determine key components to target in future immunisation interventions.

7.5.1.3 Health Professional Interventions

Health professionals (HPs) have been identified as important referents in parents' decision-making process. Both immunising and non-immunising parents reported HPs as wanting them to immunise, and both parental groups perceived HPs as relatively important sources of information. Interpersonal trust was indicated as an issue for non-immunisers due to poor relationships with their health-care provider, and all parents reported difficulties in accepting generalised trust in HPs as their behaviour was associated with Government/NHS control and as a result provided inadequate information for parents. The results suggest future interventions could encourage HPs to develop trustful relationships with patients.

Greater autonomy for HPs during consultations with parents would allow them greater control and reduce conflicts experienced within their professional role (Fry, 2002; Wood-Harper, 2005). In the present research, non-immunising parents reported concerns regarding vulnerability of their own child and public health issues

were a secondary concern. HPs need to be better equipped to deal with parental concerns by providing detailed and balanced information about all aspects of health risks. This may improve parents' confidence, and generalised and interpersonal trust in health professionals (Lee et al, 2001). However, it is important for HPs to judge the type of information required on an individual basis. For example, information about possible side-effects of the MMR vaccine may only be of value to parents actively seeking the information, whereas the same information can be detrimental to those who prefer to avoid threatening information (Miller and Mangnan, 1983; Ludwick-Rosenthal and Neufeld, 1988; Steptoe, Sutcliffe, Allen and Coombes, 1991; Gattuso, Litt and Fitzgerald, 1992).

Past research has suggested that parents often perceive GP consultations to be rushed and providing insufficient time to discuss their concerns (McMurray et al, 2004; Yarwood, 2006). Since this research was undertaken interventions have been carried out to assist health professionals. For example, the use of immunisation co-ordinators and champions has been proposed by local PCTs (London Assembly, 2007; Department of Health, 2009). The role of the co-ordinator and champion was created to establish links with staff in general practices, monitor standards and targets within immunisation programmes, organise and facilitate training for HPs on immunisations, provide updates on immunisation information and knowledge to HPs, commission and facilitate catch up campaigns during disease outbreaks, and offer on-going advice and support to parents (London Assembly, 2007; Gardiner, Davies, McAteer and Michie, 2008; Department of Health, 2009; NHS Central Lancashire, 2009). The results of this intervention are still being evaluated so cannot be reported. However, in a focus group study about MMR champions, Gardiner et al

(2008) report that although parents thought the idea was good they still had misgivings about the credibility of those fulfilling the role of champion, and linking them to the Government and a 'big brother agenda'. Furthermore, the 'personality' of the champion was also queried with some parents preferring the role to be occupied with someone they were familiar with. The results of the present study indicate that health visitors should also be involved in the co-ordinating/champion role. Health visitors have been described as supportive, sympathetic, less pressurising and more accessible than doctors (Evans et al, 2001; McMurray et al, 2004; Petts and Niemeyer, 2004; Petrovic et al, 2005). The present research indicated health visitors were rated as important sources of information whose advice was more likely to be accepted than GPs in some cases. Health visitors may report greater confidence in disseminating information about the vaccine in comparison with other HPs, including GPs (Petrovic et al, 2005). They should be a key contact for parents during the MMR decision. A positive, supportive and satisfying relationship is likely to increase parents' immunisation confidence and generate trust (Safran et al, 1998; Gust et al, 2003; Trachtenberg et al, 2005).

7.5.1.4 Government Interventions

There was significant distrust in the role of the UK Government due to the lack of full disclosure of information relating to the safety of the vaccine. The present research suggests that the Government's handling of the MMR controversy may still be negatively remembered in the future, as illustrated by memories of the BSE and vCJD link. According to Slovic (2000), when distrust is initiated then it tends to reinforce and perpetuate itself. Parents may be more likely to place greater emphasis

on negative events ('trust destroying') handled by the Government than on positive events ('trust building'). Trusting sources of information are required in risk communication (Slovic, 2000; Berry, 2004), and during this research generalised trust in the Government was perceived as low. As a result parents were turning to the media for further information (Jewell, 2001; present research findings). The Government should be proactive, timely and as accurate as possible in providing information to parents and to HPs to supply to parents. This would help to increase generalised trust. Furthermore, it may prevent parents from sourcing biased and inaccurate information from other media (Begg et al, 1998; Clements and Ratzan, 2003; Colgrove and Bayer, 2005, Thompson, 2009).

7.5.1.5 Media Interventions

The UK media was blamed for the fall in MMR uptake rates and for presenting inaccurate and embellished information which was emotionally-loaded rather than scientifically supported (Begg et al, 1998; Clements and Ratzan, 2003; Colgrove and Bayer, 2005, Thompson, 2009). In the present study, non-immunising parents reported the media and internet as the most important sources of information and the media coverage of the MMR vaccine motivated all parents to question the safety of the vaccine. According to Paling (2003) all risk information will be filtered through various media and will impact on the interpretation of the risk. However, the media can have both a positive and negative influence (Berry, 2004). For example, with the use of a mass media campaign (including TV, radio and newspapers), Paunio et al (1991) successfully increased MMR vaccine uptake from 89.3% to 96.5%. As the media tend to amplify existing public interest (Bennett, 1998) and current trends

have suggested a slow but gradual increase in MMR uptake rates, a mass media intervention could be employed to promote vaccine uptake by reporting scientific evidence more clearly and objectively to promote the safety, efficacy and future uptake of the MMR vaccine.

Chapter 8

References

Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl & J. Beckmann (Eds), *Action-Control: From Cognition to Behaviour*, pp11-39. Heidelberg: Springer.

Ajzen, I. (1988). *Attitudes, Personality and Behavior*. Chicago: The Dorsey Press.

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, 50, 170-211.

Ajzen, I. & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice Hall.

Ajzen, I. & Madden, T.J. (1986). Prediction of goal-directed behavior: attitudes, intentions and perceived behavior control. *Journal of Experimental Social Psychology*, 22, 453-474.

Alaszweski, A.M. (2003). How can doctors communicate information about risk more effectively? *British Medical Journal*, 327, 728-731.

Alderson, P. (1990). *Choosing For Children: Parents' Consent to Surgery*. Oxford: Oxford University Press.

Alfredsson, R., Svensson, E., Trollfors, B., & Borres, M.P. (2004). Why do parents hesitate to vaccinate their children against measles, mumps and rubella? *Acta Paediatrica*, 93, 1232-1237.

Allport, F. H. (1924). *Social Psychology*. New York: Houghton, Mifflin.

Alvesson, M. & Sköldberg, K. (2000). *Reflexive Methodology – New Vistas for Qualitative Research*. London: Sage.

Anderson, P. (1998). Another media scare about MMR vaccine hits Britain. *British Medical Journal*, 318 (7198), 1578.

Andre, F.E., Booy, R., Bock, H.L., Clemens, J., Datta, S.K., John, T.J., Lee, B.W., Lolokha, S., Peltola, H., Ruff, T.A., Santosham, M., & Schmitt, H.J. (2008). Vaccination greatly reduces disease, disability and death inequity worldwide. *Bulletin of the World Health Organization*, 86 (2), 81-160.

Aronson, J. (1994). A Pragmatic View of Thematic Analysis. *The Qualitative Report*, 2 (1), 2-4.

Asch, S.E. (1952). *Social Psychology*. Englewood Cliffs, NJ: Prentice Hall.

Åstrøm, A.N. & Rise, J. (2001). Young adults' intention to eat healthy food: Extending the theory of planned behavior. *Psychology and Health*, 16, 223-237.

Autism Society of America (2010). <http://www.autism-society.org/>

Autistica: science in the service of autism (2010). http://www.autismspeaks.org.uk/about_autism/impact.php

Bachrack, S. & Scoble, H. (1967). Mail questionnaires efficiency: Controlled reduction of non-response. *Public Opinion Quarterly*, 31, 265-271.

Baird, G., Brown, D., Simonoff, E., Pickles, A. & Charman, T. (2008). No evidence for MMR-ASD link. *Practitioner*, 252 (1704), 6.

Baird, G., Pickles, A., Simonoff, E., Charman, T., Sullivan, P., Chandler, S., Loucas, T., Meldrum, D., Afzal, M., Thomas, B., Jin, L. & Brown, D. (2008). Measles vaccination and antibody response in autism spectrum disorders. *Archives of Diseases in Childhood*, 93(12), 1079.

Baker, R. (1997). Will the future GP remain a personal doctor? *British Journal of General Practice*, 47, 831-834.

Balkrishnan, R., Dugan, E., Comacho, F.T. & Hall, M.A. (2003). Trust and satisfaction with physicians, insurers, and the medical profession. *Medical Care*, 41(9), 1058-1064.

Baronowski, T., Bee, D.E., Rassin, D.K., Richardson, C.J., Brown, J.P., Guenther, N., & Nader, P.R. (2002). Social support, social influence, ethnicity and the breastfeeding decision. *Social Science and Medicine*, 17 (21), 1599-1611.

Basch, C.E. (1987). Focus group interview: An underutilized research technique for improving theory and practice in health education. *Health Education Quarterly*, 14, 411-448.

Bazeley, P. (2004). Issues in mixing and quantitative approaches to research. In: R. Buber, J. Gadner & L. Richards (Eds), *Applying Qualitative Methods to Marketing Management Research*. New York: Palgrave Macmillan, pp141-156.

BBC News (2001). <http://news.bbc.co.uk/1/hi/health/1100489.stm>

Beck, U. (1992). *Risk Society: Towards a New Modernity*. London: Sage.

Becker, M.H. (Ed) (1974). The health belief model and personal health behaviour. *Health Education Monographs*, 2, 324-508.

Becker, M.H., Kabach, M., Rosenstock, I., & Ruth, M. (1975). Some influences on public participation in a genetic screening program. *Journal of Community Health*, 1, 3-14.

Becker, M.H. & Maiman, L.A. (1975). Sociobehavioral determinants of compliance with health and medical care recommendations. *Medical Care*, 13, 10-24.

Becker, M.H., Maiman, L.A., Kirscht, J.P., Haefner, D.P., & Drachman, R.H. (1977). The health belief model, and prediction of dietary compliance: a field experiment. *Journal of Health and Social Behaviour*, 18, 348-366.

Becker, M.H. & Rosenstock, I.M. (1984). Compliance with medical advice. In: A. Steptoe & A. Mathews (Eds), *Health Care and Human Behaviour*. London: Academic Press.

Bedford, H. & Elliman, D. (2003). MMR: The onslaught continues. *British Medical Journal*, 326, 718.

Begg, N., Ramsay, M., White, J. & Bozoky, Z. (1999). Media dents confidence in MMR vaccine. *British Medical Journal*, 316, 561.

Benner, P. (1999). Quality of life: a phenomenological perspective on explanation, prediction, and understanding in nursing science. In: E.C. Polifroni & M. Welch (Eds), *Perspectives on Philosophy of Science in Nursing: An Historical and Contemporary Anthology*. Philadelphia PA: Lippincott Williams & Wilkins.

Bennett, P. & Smith, C. (1992) Parents attitudinal and social influences on childhood vaccination. *Health Education Research*, 7(3), 341-348.

Benson, L. (1946). Mail surveys can be valuable. *Public Opinion Quarterly*, 10, 234-241.

Berelson, B. (1952). *Content Analysis in Communication Research*. New York: Free Press.

Berry, D. (2004). *Risk, Communication and Health Psychology*. Maidenhead: Open University Press.

Binder, V., Hendriksen, C., & Kreiner, S. (1985). Prognosis in Crohn's disease-based on results from a regional patient group from the county of Copenhagen. *Gut*, 26, 146-50.

Bisman, J. E. (2002, July). The Critical Realist Paradigm as an Approach to Research in Accounting. Poster presentation at the Accounting Association of Australian and New Zealand Annual Conference, Perth, Australia. Cited in: Krauss,

S.E. (2005). Research paradigms and meaning making: A primer. *The Qualitative Report*, 10 (4), 758-770.

BMA (2002). BMA Scotland response to MMR figures. <http://web.bma.org.uk/pressrel.nsf/wlu/BKEY-5GKG8G?OpenDocument&vw=wfmisc>

Bond, L., Nolan, T., Pattison, P. & Carlin, J. (1998). Vaccine preventable diseases and immunisations: A qualitative study of mothers' perceptions of severity, susceptibility, benefits and barriers. *Australian and New Zealand Journal of Public Health*, 22 (4), 441-446.

Bowman, C.H. & Fishbein, M. (1978). Understanding public reaction to energy proposals: An application of the Fishbein model. *Journal of Applied Social Psychology*, 9, 319-340.

Boyatzis, R.E. (1998). *Transforming Qualitative Information: Thematic Analysis and Code Development*. Thousand Oaks, CA: Sage.

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.

Brewer, M.B. & Gardner, W.L. (1996). Who is this "we"? Levels of collective identity and self representations. *Journal of Personality and Social Psychology*, 71, 83-93.

Brownlie, J. & Howson, A. (2006). 'Between the demands of truth and government': Health practitioners, trust and immunisation work. *Social Science and Medicine*, 62 (2), 433-443.

Burnard, P. (1994). The telephone interview as a data collection method. *Nursing Education Today*, 14 (1), 67-72.

Buzzelli, C.A. (1991). Morality in context: A socio-cultural approach to enhancing young children's moral development. *Child and Youth Care Forum*, 20, 375-386.

Cahalan, D. (1951). Effectiveness of a mail questionnaire technique in the army. *Public Opinion Quarterly*, 15, 575-580.

Calnan, M. & Rowe, R. (2006). Researching trust relations in health care: Conceptual and methodological challenges - an introduction. *Journal of Health, Organisation and Management*, 20 (5), 349-358.

Caplan, P. (2000). 'Eating British beef with confident': A consideration of consumers' responses to BSE in Britain. In P. Caplan (Ed), *Risk Revisited*. London: Pluto Press.

Caracelli, V. J., & Greene, J. C. (1997). Crafting mixed-method evaluation designs. In J. C. Greene, & V. J. Caracelli (Eds), *Advances in Mixed-Method Evaluation: The Challenges and Benefits of Integrating Diverse Paradigms*, (pp. 19-32. San Francisco: Jossey-Bass.

Carey, M.A. (1994). The group effects in focus groups: planning, implementing and interpreting focus group research. In J.M. Morse (Ed), *Critical Issues in Qualitative Research Method*, pp 225-241. Thousand Oaks, CA: Sage.

Carlsen, B. & Aakvik, A. (2006). Patient involvement in clinical decision making: the effect of GP attitude on patient satisfaction. *Health Expectations*, 9 (2), 148-157.

Carlsen, B. & Glenton, C. (2011). What about N? A methodological study of sample-size reporting in focus group studies. *BMC Medical Research Methodology*, 11, 26.

Casellas, F., López-Viviancos, J., Vergara, M., & Malagelada, J. (1999). Impact of inflammatory bowel disease on health-related quality of life. *Digestive Diseases*, 17 (4), 208-218.

Casiday, R.E. (2007). Children's health and the social theory of risk: Insights from the British measles, mumps and rubella (MMR) controversy. *Social Science and Medicine*, 65, 1059-1070.

Casiday, R., Cresswell, T., Wilson, D. & Panter-Brick, C. (2006). A survey of UK parental attitudes to the MMR vaccine and trust in medical authority. *Vaccine*, 24 (2), 177-184.

Cassell, E. (1995). Teaching the fundamentals of primary care. *The Milbank Quarterly*, 73, 373-405.

Centers for Disease Control and Prevention (2008). Vaccines and preventable diseases: Measles – Q & A about disease and vaccine. <http://www.cdc.gov/vaccines/vpd-vac/measles/faqs-dis-vac-risks.htm>

Champion, V.L. (1984). Instrument development for health belief model construct. *Advances in Nursing Science*, 6, 73-85.

Charmaz, K. (1995). Grounded theory. In J.A. Smith, R. Harré, & L. van Langenhove (Eds), *Rethinking Methods in Psychology*. London: Sage Publications.

Chen, H. (1997). Applying mixed methods under the framework of theory-driven evaluations. In J. C. Greene, & V. J. Caracelli (Eds), *Advances in Mixed-Method Evaluation: The Challenges and Benefits of Integrating Diverse Paradigms*, pp. 61-72. San Francisco: Jossey-Bass.

Chinn P.L. & Kramer M.K. (1995). *Theory and Nursing: A Systematic Approach* (4th Edn). St Louis: Mosby.

Cialdini, R.B., Kallgren, C.A. & Reno, R.R. (1991). A focus theory of normative conduct: A theoretical refinement and reevaluation of the role of norms in human behavior. *Advances in Experimental Social Psychology*, 24, 201-234.

Cialdini, R.B., Reno, R.R. & Kallgren, C.A. (1990). A focus theory of normative conduct: Recycling the concepts of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58, 1015-1026.

Clemments, C.J. & Ratzan, S. (2003). Misled and confused? Telling the public about MMR vaccine safety. *Journal of Medical Ethics*, 29, 22-26.

Colgrove, J. & Bayer, R. (2005). Could it happen here? Vaccine risk controversies and the spectre of derailment. *Health Affairs*, 24 (3), 729-739.

Conner, M. & Armitage, C.J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology*, 28 (15), 1429-1464.

Conner, M. & Mcmillan, B. (1999). Interaction effects in the theory of planned behaviour: Studying cannabis use. *British Journal of Social Psychology*, 38 (2), 195-222.

Conner, M. & Norman, P (1998). The role of social cognitions in health behaviours. In M. Conner & P. Norman (Eds), *Predicting Health Behaviour*. Buckingham: Open University Press

Conner, M., Povey, R., Bell, R., & Norman, P. (1994). GP intervention to produce dietary change. In: M. Conner & P. Norman (Eds), *Predicting Health Behaviour*. Buckingham: Open University Press.

Conner, M. & Sparks, P. (1999). The theory of planned behaviour and health behaviours. In M. Conner and P. Norman (Eds), *Predicting Health Behaviour*, pp122-162. Buckingham: Open University Press.

Cook, T.D. & Campbell, D.T. (1979). *Quasi-Experimentation: Design and Analysis Issues for Field Settings*. Oxford: Houghton Mifflin.

Cutcliffe, J.R. (2000). Methodological issues in grounded theory. *Journal of Advanced Nursing*, 31, 1476-1484.

Cutcliffe, J. (2005). Adapt or adopt: developing and transgressing the methodological boundaries of grounded theory. *Journal of Advanced Nursing*, 51 (4), 421-428.

Dales, L., Hammer, S.J., & Smith, N.J. (2001). Time trends in autism and in MMR immunization coverage in California. *The Journal of American Medical Association*, 285 (9), 1183-1185.

Davis, R.L., Karamarz, P., Bohlke, K., Benson, P., Thompson, R.S., Mullooly, J., Black, S., Shinefield, H., Lewis, E., Ward, J., Marcy, M., Eriksen, E., Destefano, F., & Chen, R. (2001). Measles-mumps-rubella and other measles-containing vaccines do not increase the risk for inflammatory bowel disease. *Archives of Pediatrics and Adolescent Medicine*, 155, 354-359.

Davidson, C., Smith, G.D. & Frankel, S. (1991). Lay epidemiology and the prevention paradox: the implications of coronary candidacy for health education. *Sociology of Health and Illness*, 13 (1), 1-19

DeCourville, N.H. & Zanna, M.P. (1993). The role of affective beliefs and perceived immorality in predicting frequency of intoxicification. In D.J. Terry & M.A. Hogg (Eds), *Attitudes, Behaviour and Social Context: The Role of Norms and Group Membership*. London: Lawrence Erlbaum Associates.

Deer, B. (2006). Schoolboy, 13, dies as measles makes a comeback. *The Sunday Times*: www.timesonline.co.uk/tol/news/uk/article701151.ece.

Demicheli, V., Jefferson, T., Rivetti, A., & Price, D. (2005). Vaccines for measles, mumps and rubella in children. *Cochrane Database of Systematic Reviews*, 19 (4), CD004407.

Denzin, N.K. (1989). *The Research Act: A Theoretical Introduction to Sociological Methods* (3rd Edn). Englewood Cliffs NJ: Prentice Hall

Denzin, N. & Lincoln, Y. (1995). Transforming Qualitative Research Methods. Is it a Revolution?. *Journal of Contemporary Ethnography*, 24, 349–58.

Department of Health (2003). MMR: The Facts. http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_105189.pdf

Department of Health (2009). <http://www.dh.gov.uk/en/Publichealth/Immunisation/Localcoordinatorstoolkit/DH110259>

Department of Health and Ageing, Australian Government (2010). Immunise Australia Programme.

<http://www.health.gov.au/internet/immunise/publishing.nsf/Content/faq>

DePoy, E. & Gitlin, L.N. (1993). *Introduction to Research: Multiple Strategies for Health and Human Services*. St. Louis: Mosby.

DeStefano, F. (2007). Vaccines and autism: evidence does not support a causal association. *Clinical Pharmacology Therapeutics*, 82 (6), 756–9.

Deutsch, M. & Gerard, H.B. (1955). A study of normative and influences upon individual judgment. *Journal of Abnormal and Social Psychology*, 51, 629-636.

Dey, I. (1993). *Qualitative Data Analysis: A User-Friendly Guide for Social Scientists*. London: Routledge.

Dobson, P. J. (2002). Critical realism and information systems research: Why bother with philosophy? *Information Research – An International Electronic Journal*, 7(2), <http://informationr.net/ir/7-2/paper124.html>

Donaldson, N.S. & Vanselow, N.A. (1996). The nature of primary care. *Journal of Family Practice*, 42, 155-160.

Donne, J. (1624). No man is an island. Meditation XVII: Devotions upon Emergent Occasions. <http://www.online-literature.com/donne>

Douglas, M. (1992). *Risk and Blame: Essays in Cultural Theory*. London: Routledge.

Dowell, J., Huby, G., & Smith, C. (1995). TayRen research methodology collection: qualitative research. *Scottish Consensus Statement of Qualitative Research in Primary Health Care*. Dundee: Tayside Centre for General Practice.

Duke, S.S., Gordon-Sosby, K., Reynolds, K.D., & Gram, I.T. (1994). A study of breast cancer detection practices and beliefs in black women attending public health clinics. *Health Education Research*, 9, 331–42.

Dumas, J.E., Wolf, L.C., Fisman, S.N. & Culligan, A. (1991). Parenting stress, child behavior problems, and dysphoria in parents of children with autism, Down syndrome, behavior disorders, and normal development. *Exceptionality*, 2, 97-110.

D’Zurilla, T.J. & Sheedy, C.F. (1991). Relation between social problem-solving ability and subsequent level of psychological stress in college students. *Journal of Personality and Social Psychology*, 61, 841-846.

Eatough, V. & Smoth, J.A. (2008). Interpretive phenomenological analysis. In: C. Willig and W.S. Rogers (Eds), *The Sage Handbook of Qualitative Research in Psychology*. London: Sage.

Elliman, D. & Bedford, H. (2001). MMR vaccine: The continuing saga. *British Medical Journal*, 322, 183-184.

Engel, G.L. (1977). The need for a new medical model: a challenge for biomedicine. *Science*, 196, 129-135.

English, B (2006). <http://news.bbc.co.uk/1/hi/england/5081286.stm>

Evans, M., Stoddart, H., Condon, L., Freeman, E., Grizzell, M. & Mullen, R. (2001). Parents' perspectives on the MMR immunisation: A focus group study. *British Journal of General Practice*, 51, 904-910.

Farley, J.U., Lehmann, D.R., & Ryan, M.J. (1981). Generalizing from "imperfect" replication. *Journal of Business*, 54, 597-610.

Fazio, R.H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. *Advances in Experimental Psychology*, 23, 75-109.

Fekadu, Z. & Kraft, P. (2002). Expanding the theory of planned behaviour: The role of social norms and group identification. *Journal of Health Psychology*, 7 (1), 33-43.

Fishbein, M. (1993). Introduction. In D.J. Terry, C. Gallois & M. McCamish (Eds), *The Theory of Reasoned Action: Its Application to AIDS-preventive Behaviour*. Oxford: Pergamon.

Fishbein, M. & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Fishbein, M. & Ajzen, I. (1981). On construct validity: A critique of Miniard and Cohen's paper. *Journal of Experimental Social Psychology*, 17, 340-350.

Fishbein, M., Middlestadt, S.E. & Trafimow, D. (1993). Social norms for condom use: Implications for HIV prevention interventions of a KAPB survey with heterosexuals in the eastern Caribbean. *Advances in Consumer Research*, 20, 292-296.

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S., & Coombes, B. (1978). How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy Sciences*, 9, 127-152.

Flavell, J.H. (1985). *Cognitive Development* (2nd Edn). Englewood Cliffs, NJ: Prentice Hall.

Flynn, M. & Ogden, J. (2004). Predicting uptake of MMR: A prospective questionnaire study. *British Journal of General Practice*, 54, 526-530.

Flynn, M. F., Lyman, R. D. & Prentice-Dunn, S. (1995). Protection motivation theory and adherence to medical treatment regimens for muscular dystrophy. *Journal of Social and Clinical Psychology*, 14, 61-75.

Fombonne, E. & Chakrabarti, S. (2001). No evidence for a new variant of measles-mumps- rubella-induced autism. *Pediatrics*, 108(4), e58.

Foucault, M. (1991). Governmentality. In G. Burchall, C. Gordon, & P. Miller (Eds), *The Foucault Effect: Studies in Governmentality*. Hemel Hempstead: Harvester Wheatsheaf.

Freed, G., Fraley, J., & Schanler, R. (1992). Attitudes of expectant fathers regarding breast-feeding. *Pediatrics*, 90, 224-227.

Freeman, N.L., Perry, A., & Factor, D.C. (1991). Child behaviours as stressors: replicating and extending the use of the CARS as a measure of stress: a research note. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 32, 1025-1030.

Frewe, L.J. (1999). Public risk perception and risk communication. In P. Bennet & K. Calman (Eds), *Risk Communication and Public Health*, pp20-32. Oxford: Oxford University Press.

Friederichs, V., Cameron, J.C. & Robertson, C. (2006). Impact of adverse publicity on MMR vaccine uptake: a population based analysis of vaccine uptake records for one million children, born 1987–2004. *Archives of Diseases in Childhood*, 91, 465 - 468.

Frith, H. & Gleeson, K. (2004). Clothing and embodiment: Men managing body image and appearance. *Psychology of Men and Masculinity*, 5 (1), 40-48.

Fry, R. (2002). MMR vaccine debate. *British Medical Journal*, 324, 733-735.

Gambetta, D. (1988). Can we trust trust? In D. Gambetta (Ed), *Trust: Making and Breaking Cooperative Relations*, pp213-237. New York: Blackwell Publishers.

Gardiner, B., Davies, A., McAteer, J., & Michie, S. (2008). How can MMR uptake be increases? A literature review and intervention feasibility study. <http://www.londonhp.nhs.uk/wp-content/uploads/2011/03/UCHL-How-can-MMR-uptake-be-increased-report.pdf>

Gatter, R. (2004). Faith, confidence and health care: fostering trust in medicine through law. *Wake Forest Law Review*, 39, 395-445.

Gattuso, S.M., Litt, M.D. & Fitzgerald, T.E. (1992). Coping with gastrointestinal endoscopy: Self-efficacy enhancement and coping style. *Journal of Consulting and Clinical Psychology*, 60, 133–139.

Gibbs, J.C. (1991). Toward an integration of Kohlberg's and Hoffman's moral development theories. *Human Development*, 34, 88-104.

Giddens, A. (1990). *The Consequences of Modernity*. Cambridge: Polity Press.

Giddens, A. (1991). *Modernity and Self Identity*. Cambridge: Polity Press.

Giugliani, E.R., Caiaffa, W.T., Vogelhut, J., Witter, F.R. & Perman, J.A. (1994). Effects of breastfeeding support from different sources on mothers' decisions to breastfeed. *Journal of Human Lactation*, 10 (3), 177-161.

Glaser, B.G. & Strauss, A.L. (1967). *The Discovery of Grounded Theory*. Chicago: Aldine.

Goudge, J. & Gilson, L. (2005). How can trust be investigated? Drawing lessons from past experience. *Social Science and Medicine*, 61, 1439-1451.

Gross, G.J. & Howard, M. (2001). Mothers' decision-making processes regarding health care for their children. *Public Health Nursing*, 18 (3), 157-168.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 105-117). Thousand Oaks, CA: Sage.

Gupta, R.K., Best, J. & MacMahon, E. (2005). Mumps and the UK epidemic. *British Medical Journal*, 330 (7500), 1132-5.

Gust, D.A., Woodruff, R., Kennedy, A., Brown, C., Sheedy, K. & Hibbs, B. (2003). Parental perceptions surrounding risks and benefits of immunization. *Seminar in Pediatric Infectious Diseases*, 14, 207-212.

Guthrie, B. & Wyke, S. (2000). Does continuity in general practice really matter? *British Medical Journal*, 321, 734-736.

Hall, M., Camacho, F., Dugan, E. & Balkrishnan, R. (2002). Trust in the medical profession: Conceptual and measurement issues. *Health Services Research*, 37 (5), 1419-1439.

Hall, M., Dugan, E., Zheng, B. & Mishra, A. (2001). Trust in physicians and medical institutions: What is it, can it be measured, and does it matter? *Milbank Quarterly*, 79 (4), 613-639.

Hamilton-West, K. (2006). Factors influencing MMR vaccination decisions following a mumps outbreak on a university campus. *Vaccine*, 24, 5183-5191.

Harrison, J.A., Mullen, P.D., & Green, L.W. (1992). A meta-analysis of studies of the health belief model with adults. *Health Education Research*, 7, 107-116.

Hastings, R.P. & Johnson, E. (2001). Stress in UK families conducting intensive home-based behavioral intervention for their young child with autism. *Journal of Autism and Developmental Disorders*, 31, 327-336.

Health Protection Agency (2004). <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Mumps/>

Health Protection Agency (2004). <http://www.hpa.org.uk/>

Health Protection Agency (2009a). <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/VaccinationImmunitation/>

Health Protection Agency (2009b). http://www.liv.ac.uk/studentssupport/Mumps-student_information-Dec_09.pdf

Health Protection Agency (2010). <http://www.hpa.org.uk/NewsCentre/NationalPressReleases/2011PressReleases/130511hparemindsparentsofimportanceofmmr/>

Healy, M., & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative Market Research: An International Journal*, 3(3), 118-126.

Heaton, P.B. (1981). Negotiation as an integral part of the physician's clinical reasoning. *Journal of Family Practice*, 13, 845-848.

Hilton, S., Petticrew, M. & Hunt, K. (2007). Parents' champions vs. vested interests: who do parents believe about MMR? A qualitative study. *BMC Public Health*, 7, 42.

Hirschheim, R. A. (1985). Information systems epistemology: An historical perspective. In E. Mumford, R. Hirschheim, G. Fitzgerald, & T. Wood Harper (Eds.), *Research Methods in Information Systems*. Amsterdam: Elsevier Science

Hirtz, D.G. (2000). The challenges of autism, why the increased rates? National Institute of Neurological Disorders and Stroke. Department of Health and Human Services. <http://www.hhs.gov/asl/testify/t000406b.html>

Hjortdahl, P. & Laerum, E. (1992). Continuity of care in general practice: Effect on patient satisfaction. *British Medical Journal*, 304, 1287-1290.

Hochstim, J. & Athanasopoulos, D. (1970). Personal follow-up in a mail survey: Its contribution and its cost. *Public Opinion Quarterly*, 34, 69-81.

Hoffman, M.L. (1983). Affective and cognitive processes in moral internalization. In E.T. Higgins, D. Ruble & W.W. Hartup (Eds), *Social Cognition and Social Development: A Sociocultural Perspective*. New York: Cambridge University Press.

Hogg, M.A. & Abrams, D. (1988). *Social identifications: A Social Psychology of Intergroup Relations and Group Processes*. London: Routledge.

Holloway, I. & Wheeler, S. (2002). *Qualitative Research in Nursing* (2nd Edn). Oxford: Blackwell Science.

Holmes, C.A. (1990). Alternatives to natural science foundations for nursing. *International Journal of Nursing Studies*, 27, 187-198.

Holstein, J.A. & Gubrium, J.F. (1997). Active interviewing. In D. Silverman (Ed), *Qualitative Research: Theory, Method and Practice*, pp113-119. London: Sage.

Honda, H., Shimizu, Y. & Rutter, M. (2005). No effect of MMR withdrawal on the incidence of autism: A total population study. *Journal of Child Psychology and Psychiatry*, 46 (6), 572-579.

Houston, M. (2002). The MMR Vaccine Controversy. *The Irish Times*, March 4, 7.

Howitt, D. & Cramer, D. (2007). *Introduction to Research Methods in Psychology* (2nd Edn). Englewood Cliffs, NJ: Prentice Hall.

Hutchinson, S.A. (1993). Grounded theory: the method. In P.L. Munhall & C. Oiler Boyd (Eds), *Nursing Research: A Qualitative Perspective*, pp180-212. New York: National League for Nursing Press.

Immunization Action Coalition (2009).
<http://www.vaccineinformation.org/measles/qandavax.asp>

Information Services Division Scotland (2002). http://www.isdscotland.org/isd/ch-immunisation.jsp?pContentID=1742&p_applic=CCC&p_service=Content.show&

Information Services Division Scotland (2008).
<http://www.isdscotlandarchive.scot.nhs.uk/isd/1652.html>

Information Services Division Scotland (2010). <http://isd.scot.nhs.uk/isd/6545.html>

Jaccard, J. J. & Davidson, A. R. (1972). Toward an understanding of family planning behaviors: An initial investigation. *Journal of Applied Social Psychology*, 2, 228-235.

Jahoda, M., M. Deutsch, & Cook, S. (1962). *Research Methods in Social Relations*. New York: Holt, Rinehart and Winston.

Janis, I.L. (1967). Effects of fear arousal on attitude change: Recent developments in theory and experimental research. In L. Berkowitz (Ed), *Advances in Experimental Social Psychology* (Vol. 3), pp. 166-225. New York: Academic Press.

Jansen, V.A.A., Stollenwerk, N., Jensen, H.J., Ramsay, M.E., Edmunds, W.J. & Rhodes, C.J. (2003). Measles outbreaks in a population with declining vaccine uptake. *Science*, 301, 804.

Janz, N.K. & Becker, M.H. (1984). The health belief model: a decade later. *Health Education Quarterly*, 11, 1-47.

Jarman, B., Bosenquet, N., Rice, P., Dollimore, N. & Teese, B. (1988). Uptake of immunisation in district health authorities in England. *British Medical Journal*, 296, 1775-1778.

Jewell, D. (2001). MMR and the age of unreason. *British Journal of General Practice*, 51, 1.

Joffe, H. & Yardley, L. (2004). Content and thematic analysis. In D.F. Marks & L. Yardley (Eds), *Research Methods for Clinical and Health Psychology*, pp56-68. London: Sage.

Jones, R. (1995). Why do qualitative research? *British Medical Journal*, 311 (6992): 2.

Kasari C. & Sigman M. (1997). Linking parental perceptions to interactions in young children with autism. *Journal of Autism and Developmental Disorders*, 27, 39-57.

Kasl, S.V, & Amick III, B.C. (1995). The impact of work stress on health and well-being. In J. C. McDonald (Ed.), *The epidemiology of work related diseases*, pp239-266. London: BMJ Press.

Kaur, B., Swanson, V. & Power, K. (2008). MMR immunisation: The role of protection motivation theory and subjective norm in understanding parents' decision-making. Under peer review.

Kaye, J., del Mor Melerio-Montes M., & Jick, H. (2001). Mumps, measles, and rubella vaccine and the incidence of autism recorded by general practitioners: a time trend analysis. *British Medical Journal*, 322, 460-463.

Kearley, K.E., Freeman, G.K., & Heath, A. (2001). An exploration of the value of the personal doctor-patient relationship in general practice. *British Journal of General Practice*, 51 (470), 712-718.

Keane, V., Stanton, B., Horton, L., Aronson, R., Galbraith, J. & Hughart, N. (1993). Perceptions of vaccine efficacy, illness, and health among inner-city parents. *Clinical Pediatrics*, 32(1): 2-7.

Kearley, K.E., Freeman, G.K. & Heath, A. (2001) An exploration of the value of the personal doctor-patient relationship in general practice. *British Journal of General Practice*, 51, 712-718.

Keating, N.L., Green, O.C., Kao, A.C., Gazmararian, J.A., Wu, V.Y. & Cleary, P.D. (2002). How are patients' specific ambulatory care experiences related to trust, satisfaction, and considering changing physicians? *Journal of General Internal Medicine*, 17 (1), 29-40.

Khan, M. & Manderson, L. (1992). Focus groups in tropical diseases research. *Health Policy and Planning*, 7, 56-66.

King, N. (2004). Using templates in the thematic analysis of text. In C.Cassell & G.Symon (Eds), *Essential Guide to Qualitative Methods in Organizational Research*. London: Sage.

Kitzinger, J. (1995). Introducing focus groups. *British Medical Journal*, 311, 299-302.

Kohlberg, L. (1984). *The Psychology of Moral Development: Essays on Moral Development (vol. 2)*. San Francisco, CA: Harper & Row.

Kraus, S.J. (1995). Attitudes and the prediction of behaviour: A meta-analysis of the empirical literature. *Personality and Social Psychology Bulletin*, 21, 58-75.

Krauss, S.E. (2005). Research paradigms and meaning making: A primer. *The Qualitative Report*, 10 (4), 758-770.

Krippendorff, K. (2004). *Content Analysis: An Introduction to its Methodology*. Thousand Oaks, CA: Sage.

Kurz-Milcke, E. & Gigerenzer, G. (2007). Heuristic Decision Making. *Marketing*, 1, 48-60.

Kvale, S. (1996). *Interviews: An Introduction to Qualitative Research Interviewing*. Thousand Oaks, CA: Sage.

Langlie, J.K. (1977). Social networks, health beliefs, and preventative health behaviour. *Journal of Health and Social Behaviour*, 18, 244-260.

Larzelere, R. E. & Huston T. L. (1980). The dyadic trust scale: toward understanding interpersonal trust in close relationships. *Journal of Marriage and the Family*, 595-604.

Lecavalier, L., Leon, S., & Witz, J. (2006). The impact of behaviour problems on caregiver stress in young people with autism spectrum disorders. *Journal of Intellectual Disability Research*, 50 (3), 177-183.

LeCompte, M. and Preissle, J. (1993): *Ethnography and Qualitative Design in Educational Research*. London: Academic Press Inc.

Lee, Y., Ng, C., Ghazalie, S.A.M., Ngiam, J. & Tai, B. (2007). Public trust in primary care doctors, the medical profession and the healthcare system among Redhill residents in Singapore. *Annals Academy of Medicine Singapore*, 36 (8), 655-661.

Leininger, M. (1992). Current issues, problems, and trends to advance qualitative paradigmatic research methods for the future. *Qualitative Health Research*, 2, 392-415.

Leventhal, H. (1970). Findings and theory in the study of fear communications. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 5), pp 119-186. New York: Academic Press.

Leventhal, H. & Cameron, L. (1994). Persuasion and health attitudes. In S. Shavitt & T.C. Brock (Eds), *Persuasion: Psychological Insights and Perspectives*, pp 219-249. Boston, MA: Allyn & Bacon.

Levin, D. M. (1988). *The Opening of Vision: Nihilism and the Postmodern Situation*. London: Routledge.

Levitt, S. & Dubner, S.J. (2005). *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*. Harper Collins: London.

Lieberman, E.S. (2005). Nested analysis as a mixed-method strategy for comparative research. *American Political Science Review*, 99 (3), 435-452

Littman, H., Medendorp, S. & Goldfarb, J. (1994). The decision to breastfeed: the importance of fathers' approval. *Clinical Pediatrics*, 33, 214-217.

Lloyd, H.M., Paisley, C.M. & Mela, D.J. (1993). Changing to a low fat diet: attitudes and beliefs of UK consumer. *European Journal of Clinical Nutrition*, 47, 361-373.

Lopes, L.L. (1987). Between hope and fear: The psychology of risk. *Advances in Experimental Social Psychology*, 20, 255-295.

London Assembly (2007). Still Missing the Point? Infant Immunisation in London. Health and Public Services Committee. Cited in: Gardiner, B., Davies, A., McAteer, J., & Michie, S. (2008). How can MMR uptake be increased? A literature review and intervention feasibility study. <http://www.londonhp.nhs.uk/wp-content/uploads/2011/03/UCHL-How-can-MMR-uptake-be-increased-report.pdf>

Ludwick-Rosenthal, R. & Neufeld, R.W.J. (1988). Stress management during noxious medical procedures: An evaluative review of outcome studies. *Psychological Bulletin*, 104, 326–342.

Lugoe, W. & Rise, J. (1999). Predicting intended condom use among Tanzanian students using the theory of planned behaviour. *Journal of Health Psychology*, 4 (4), 497-506.

Lupton, D. (1999). *Risk*. London: Routledge.

Mack, N., Woodsong, C., MacQueen, K.M., Guest, G., & Namey, E. (2005). *Qualitative Research Methods: A Data Collector's Field Guide*. North Carolina: Family Health International.

Maddux, J.E. & Rogers, R.W. (1983). Protection Motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology*, 19, 469-479.

Madsen, K.M., Hviid, A., Vestergaard, M., Schendel, D., Wohlfahrt, J., Thorsen, P., Olsen, J. & Melbye, M. (2002). A population-based study of measles, mumps, and rubella vaccination and autism. *New England Journal of Medicine*, 347 (19), 1477-1482.

Mainous, A.G., Barker, R., Love, M.M., Gray, D.P. & Gill, J.M. (2001). Continuity of care and trust in one's physician: Evidence from primary care in the United States and the United Kingdom. *Family Medicine Journal*, 33 (1), 22-27.

Mann, C.J. (2003). Observational research methods. Research design II: cohort, cross sectional, and case-control studies. *Emergency Medical Journal*, 20:54-60.

Mann, C. & Stewart, F. (2000). *Internet Communication and Qualitative Research: A Handbook of Searching Online*. London: Sage.

Manstead, A.S.R. (2000). The role of moral norm in the attitude-behaviour relation. In D.J. Terry & M.A. Hogg (Eds), *Attitudes, Behaviour and Social Context: The Role of Norms and Group Membership*. Lawrence Erlbaum Associates: London.

Marsh, G.M. & Channing, D.M. (1987). Comparison in use of health services between a deprived and an endowed community. *Archives of Disease in Childhood*, 62, 392-396.

Martin, C. & Samson, A. (2002). *Evaluation of the MMR Discussion Pack and Preparation of MMR Communication Strategy*. Edinburgh, Scottish Health Feedback.

Mayberry, M.K., Probert, C., Srivastava, E., Rhodes, J., & Mayberry, J.F. (1992). Perceived discrimination in education and employment by people with Crohn's disease: A case-control study of educational achievement and employment. *Gut*, 33, 312-314.

Mayer, R.C., Davis, J.H. & Schoorman, F.D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20, 709-734.

McClain, J., Bernhardt, J.M. & Beach, M.J. (2005). Assessing parents' perception of children's risk for recreational water illness. *Emerging Infectious Diseases*, 11 (5), 670-676.

McMurray, R., Cheater, F.M., Weighall, A., Nelson, C., Schweiger M. & Mukherjee, S. (2004). Managing controversy through consultation: A qualitative study of communication and trust around MMR vaccination decisions. *British Journal of General Practice*, 54, 520-525.

Mechanic, D. & Meyer, S. (2000). Concepts of trust among patients with serious illness. *Social Science and Medicine*, 51 (5), 657-668.

Medicines Control Agency/Committee on Safety of Medicines (1999). The safety of MMR vaccine. *Current Problems in Pharmacovigilance*, 25, 9-10.

Meszaros, J.R., Asch, D.A., Baron, J., Hershey, J.C., Kunreuther, H. & Schwartz-Buzaglo, J. (1996). Cognitive processes and the decision of some parents to forego pertussis vaccination for their children. *Journal of Clinical Epidemiology*, 49 (6), 697-703.

Meikle, J. (2005). Warning for students as mumps cases soar. *Guardian*, March, <http://www.guardian.co.uk/society/2005/mar/25/health.studenthealth>

Miller, S.M. & Mangan, C.E. (1983). Interesting effects of information and coping style in adapting to gynaecological stress: should a doctor tell all? *Journal of Personality and Social Psychology*, 45, 223-236.

Miniard, P.W. & Cohen, J.B. (1981). An examination of the Fishbein behavioral intentions model's concept and measures. *Journal of Experimental Social Psychology*, 17, 309-329.

Miniard, P.W. & Cohen, J.B. (1991). An examination of the Fishbein-Ajzen behavioral intentions model's concepts and measures. *Journal of Experimental Social Psychology*. 17(3) 309-339.

Minichiello, V., Aroni, R., Timewell, E. & Alexander, L. (1990). *In-Depth Interviewing: Researching People*. Melbourne, Vic: Longman Cheshire.

Mishra, A. K. (1996). Organizational responses to crisis: The centrality of trust. In R. M. Kramer & T R. Tyler (Eds), *Trust in Organizations: Frontiers of Theory and Research*, pp261-287. Thousand Oaks, CA: Sage.

Monti, E.J. & Tinggen, M.S. (2009). Multiple paradigms of nursing science. In: A.M. Barker (Ed), *Advanced Practice Nursing: Essential Knowledge for the Profession*. London: Jones and Bartlett Publishers.

Morgan, D. (1998a). Practical strategies for combining qualitative and quantitative methods: applications to health research. *Qualitative Health Research*, 8 (3), 362-376.

Morgan, D. (1998b). *The Focus Group Guidebook, The Focus Group Kit:1*. Thousand Oaks, CA: Sage.

Morton Robinson, K. (2001). Unsolicited narratives from the internet: a rich source of data. *Qualitative Health Research*, 11 (5), 706-714.

Moser, C. & G. Kalton. (1971). *Survey Methods in Social Investigation*. London: Heinemann Educational Books Limited.

Mrozek-Budzyn, D., Kiełtyka, A. & Majewska, R. (2010). Lack of association between measles-mumps-rubella vaccination and autism in children: a case-control study. And its relationship to MMR immunization rates in the United States. *Pediatric Infectious Disease Journal*, 29(5), 397-400.

Murphy-Lawless, J. (2003). Risk, ethics, and the public space: The impact of BSE and foot-and-mouth disease on public thinking. In B.H. Hawthorn & L. Oaks (Eds), *Risk, Culture, and Health Inequality: Shifting Perceptions of Danger and Blame*, pp209-230. Westport, CT: Praeger.

Myers, M. (2002). Qualitative research and the generalizability question: standing firm with proteus. *The Qualitative Report*, v (3/4), <http://www.nova.edu/ssss/QR/QR4-3/myers.html>

National Association of Colitis and Crohn's disease (2010). <http://www.nacc.org.uk/downloads/LanguageCD/English-understandingWeb.pdf>

National Network for Immunization Information (2010). <http://www.immunizationinfo.org/vaccines/measles>

National Statistics (2004). *The national statistics socio-economic classification manual*. http://www.statistics.gov.uk/methods_quality/ns_sec/

New, S.J. & Senior, M.L. (1991). "I don't believe in needles": Qualitative aspects of a study into the uptake of infant immunisation in two English health authorities. *Social Science & Medicine*, 509-518.

Nightingale, D.J. & Cromby, J. (1999) (Eds). *Social Constructionist Psychology: A Critical Analysis of Theory and Practice*, Buckingham: Open University Press

Nisbett, R.E. & Ross, L. (1980). *Human Inference: Strategies and Shortcomings of Social Judgment*. Englewood Cliffs, N.J: Prentice-Hall.

Norman, P. & Conner, M. (1996). Predicting health check attendance among prior attenders and non-attenders: The role of prior behaviour in the theory of planned behaviour. *Journal of Applied Social Psychology*, 26, 1010-1026.

Norman, P., Searle, A., Harrad, R. & Vedhara, K. (2003). Predicting adherence to eye patching in children with amblyopia: An application of protection motivation theory. *British Journal of Health Psychology*, 8, 67-82.

NHS Central Lancashire (2009). Immunisation Policy. <http://www.centrallancashire.nhs.uk/Library/Documents/policies/Immunisation%20Policy.pdf>

NHS Choices (2008). <http://www.nhs.uk/Conditions/MMR/Pages/FAQs.aspx>

NHS Choices (2009). <http://www.nhs.uk/conditions/mmr/Pages/Introduction.aspx>

NHS Grampian Report (2004). www.hi-netgrampian.org/hinet/file/189/IDRreport050609ghb.doc

NHS Immunisation Information (2004). <http://www.dh.gov.uk/en/PublicHealth/Information/index.htm>

Ogden, J. (2000). *Health Psychology: A textbook*. Buckingham: Open University Press.

Oliver, C. (2011). Critical realist grounded theory: a new approach for social work research. *British Journal of Social Work*, 1-17.

Oliver, R.L. & Bearden, W.O. (1985). Crossover effects in the theory of reasoned action: A moderating influence attempt. *Journal of Consumer Research*, 12, 324-340.

Opdenakker, R. (2006). Advantages and disadvantages of four interview techniques in qualitative research. *Forum: Qualitative Social Research*, 7 (4), <http://nbn-resolving.de/urn:nbn:de:0114-fqs0604118>.

Orbell, S. & Sheeran, P. (1998). 'Inclined abstainers': A problem for predicting health-related behaviour. *British Journal of Social Psychology*, 37, 151-165.

Outhwaite, W. (1983). Toward a realist perspective. In G. Morgan (Ed.), *Beyond method: Strategies for social research*, pp. 321-330. London: Sage.

Pareek, M. & Pattison, H.M. (2000). The two-dose measles, mumps, and rubella (MMR) immunisation schedule: factors affecting maternal intention to vaccinate. *British Journal of General Practice*, 50, 969-971.

Parsons, T. (1951). *The Social System*. London: Routledge and Kegan Paul.

Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods* (2nd Edn). Newbury Park, CA: Sage.

Paunio, M., Virtanen, M., Peltola, H., Cantell, K., Paunio, P., Valle, M., Karanko, V. & Heinonen, O.P. (1991). Increase of vaccination coverage by mass media and individual approach: Intensified measles, mumps, and rubella prevention program in Finland. *American Journal of Epidemiology*, 133 (11), 1152-1159.

Peltola, H., Patja, A., Leinikki, P., Valle, M., Davidkin, I., & Paunio, M. (1998). No evidence for measles, mumps, and rubella vaccine-associated inflammatory bowel disease or autism in a 14-year prospective study. *Lancet*, 351, 1327-28.

Petrovic, M., Roberts, R. & Ramsay, M. (2001). Second dose of measles, mumps, and rubella vaccine: Questionnaire survey of health professionals. *British Medical Journal*, 322, 82-85.

Petts, J. (1992). Incineration risk perceptions and public concern: experience in the UK improving risk communication. *Waste Management and Research*, 10, 169-182.

Petts, J. & Niemeyer, S. (2004). Health risk communication and amplification: learning from the MMR vaccination controversy. *Health, Risk & Society*, 6 (1), 7-23.

Pidgeon, N., Hood, C., Jones, D., Turner, B., & Gibson, R. (1992). Risk perception. In *Risk: Analysis, Perception and Management: A Report of the Royal Society Study Group*. London: Royal Society.

Pielak, K.L. & Hilton, A. (2003). University students immunized and not immunized for measles: a comparison of beliefs, attitudes, and perceived barriers and benefits. *Canadian Journal of Public Health*, 94, 193-196.

Piscane, A., Continisio, G. I., Aldinucci, M., D'Amora, S., & Continisio, P. (2005). A controlled trial of the father's role in breastfeeding promotion. *Pediatrics*, 116(4), 494-498.

Pitts, M. (1998). An introduction to health psychology. In M. Pitts & K. Philips (Eds), *The Psychology of Health: An Introduction*. London: Routledge.

Poland, G., Murray, D. & Bonilla-Guerro, R. (2002). Science, medicine and the future: New vaccine development. *British Medical Journal*, 324, 1315-1319.

Poltorak, M., Fairhead, J., Leach, M. & Cassell, J. (2005). 'MMR talk' and vaccination choices: an ethnographic study in Brighton. *Social Science and Medicine*, 61, 3, 709-719.

Pope, C., Ziebland, S. & Mays, N. (2000). Qualitative research in health care: Analysing qualitative data. *British Medical Journal*, 320, 114-116.

Press Association (2004).
<http://www.guardian.co.uk/society/2004/may/21/students.education>

Raithatha, N., Hoolland, R., Gerrard, S. & Harvey, I. (2003). A qualitative investigation of vaccine risk perception amongst parents who immunize their children: A matter of public health concern. *Journal of Public Health Medicine*, 25 (2), 161-164.

Ramsay, M.E., Yarwood, J., Lewis, D., Campbell, H. & White, J. (2002). Parental confidence in measles, mumps and rubella vaccine. *British Journal of General Practice*, 52, 912-6.

Reicher, S. (2000). Against methodolatry: some comments on Elliot, Fischer, and Rennie. *British Journal of Clinical Psychology*, 39, 1-6.

Rempel, L.A. & Rempel, J.K. (2004). Partner influence on health behavior decision-making: Increasing breastfeeding duration. *Journal of Social and Personal Relationships*, 21 (1), 92-11.

Richard, R., van der Pligt, J., & de Vries, N.K. (1995). The impact of anticipated affect on (risky) sexual behavior. *British Journal of Social Psychology*, 34, 9-21.

Rimal, R.N. & Real, K. (2003). Understanding the influence of perceived norms on behaviors. *Communication Theory*, 13 (2), 184-203.

Ritchie, J.E., Herscovitch, F., & Norfor, J.B. (1994). Beliefs of blue collar workers regarding coronary risk behaviours. *Health Education Research*, 9, 95–103.

Robinson, N. (1999). The use of focus group methodology - with selected examples from sexual health research. *Journal of Advanced Nursing*. 29 (4), 905-913.

Rogers, R.W. (1975). A protection motivation theory of fear appeals and attitude change. *The Journal of Psychology*, 91, 93-114.

Rogers, R.W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In: J.T. Caccioppo and R.E. Petty (Eds), *Social Psychophysiology: A Source Book*, pp153-176. New York: Guildford Press.

Rogers, A. & Pilgrim, D. (1995). The risk of resistance: perspectives on the mass childhood immunisation programme In J. Gabe. (Ed), *Medicine, Health and Risk: Sociological Approaches*. Oxford: Blackwell Publishers Ltd.

Rosen, R. & Dewar, S. (2004). On being a doctor: redefining medical professionalism for better patient care. *King's Fund* .

Rosenstock, I.M. (1966). Why People Use Health Services. *Milbank Memorial Fund Quarterly*, 44, 94-124.

Ross, S.E., Niebling, B.C. & Heckert, T. M. (1999). Sources of stress among college students. *College Student Journal*, 33, 312-317.

Rossman, G. B., & Wilson, B. L. (1985). Numbers and words: Combining quantitative and qualitative methods in a single large-scale evaluation study. *Evaluation Review*, 9(5), 627-643.

Roter, D. & Hall, J. (1987). Physician interviewing style and medical information obtained from patients. *Journal of General Internal Medicine*, 2, 326-329.

Rowell, A. (2003). *Don't Worry, It's Safe to Eat: The True Story of GM Food, BSE and Foot and Mouth*. London: Earthscan.

Safran, D., Kosinski, M., Tarlov, A., Rogers, W., Taira, D., Liberman, N. & Ware, J. (1998). The primary care assessment survey: Tests of data quality and measurement performance. *The Medical Care*, 36 (5), 728-739.

Sandelowski, M. (1995). Sample size in qualitative research. *Research in Nursing and Health*, 18, 179-183.

Sarantakos, S. (1998). *Social Research* (2nd Edn). Basingstoke: Sage.

Savage, E., White, J.M., Brown, D.E.W. & Ramsay, M.E. (2006). Mumps epidemic-United Kingdom, 2004–2005. *Morbidity and Mortality Weekly Report*, 55, 173-5.

Schattner, A. (2005). Consequence or coincidence? The occurrence, pathogenesis and significance of autoimmune manifestations after viral vaccines. *Vaccine*, 23, 3876-3886.

Schers, H., Webster, S., van den Hoogen, H., Avery, A., Grol, R. & van den Bosch, W. (2002). Continuity of care in general practice: a survey of patients' views. *British Journal of General Practice*, 52 (479), 459-62.

Schlegal, R.P., D'Avernas, J.R., Zanna, M.P., & DeCourville, N.H. (1992). Problem drinking: a problem for the theory of reasoned action? *Journal of Applied Social Psychology*, 22, 358-385.

Schofield, P.E., Pattison, P.E., Hill, D.J & Borland, R. (2001). The influence of group identification on the adoption of peer group smoking norms. *Psychology and Health*, 16, 1-16.

Schwartz, S.H. & Tessler, R. (1972). A test of a model for reducing measured attitude-behavior discrepancies. *Journal of Personality and Social Psychology*, 24, 225-236.

Searle, A., Vedhara, K., Norman, P., Frost, A. & Harrad, R. (2000). Compliance with eye patching in children and its psychological effects: A qualitative application of protection motivation theory. *Psychology, Health and Medicine*, 5, 43-54.

Seibold, C. (2004). Young single women's experiences of pregnancy, adjustment, decision-making and ongoing identity construction. *Midwifery*, 20, 171-180.

Seitz, R. (1944). How mail surveys may be made to pay. *Printer's Ink*, 209, 17-19.

Sheeran, P. & Abraham, C. (1999). The health belief model. In M. Conner & P. Norman (Eds.), *Predicting Health Behaviour*. Buckingham: Open University Press.

Sheeran, P. & Orbell, S. (1999). Augmenting the theory of planned behaviour: Roles for anticipated regret and descriptive norms. *Journal of Applied Social Psychology*, 29, 2107-2142.

Sherif, M. (1936). *The Psychology of Social Norms*. New York: Harper and Brothers.

Silverman, D. (1993). *Interpreting Qualitative Data*. Thousand Oaks, CA: Sage.

Singelis, T.M. (1994). The measurement of independent and interdependent self-construals. *Personality and Social Psychology Bulletin*, 20, 580-591.

Slovic, P. (1987). Perception of risk. *Science*, 236, 280-285.

Slovic, P., Fischhoff, B. & Lichtenstein, S. (1980). Facts and fears: Understanding perceived risk. In R. Schwing and W. A. Albers, Jr. (Eds.), *Societal risk assessment: How safe is safe enough?*, pp181-214. New York: Plenum Press.

Slovic, P., Flynn, J., & Layman, M. (1991). Perceived risk, trust and the politics of nuclear waste. *Science*, 254, 1603-1607.

Smailbegovic, M.S., Laing, G.J. & Bedford, H. (2003). Why do parents decide against immunization? The effect of health beliefs and health professionals. *Child: Care, Health & Development*, 29, 303-311.

Smeeth, L., Cook, C., Fombonne, E., Heavey, L., Rodrigues, L.C., Smith, P.G. & Hall, A.J. (2004). MMR vaccination and pervasive developmental disorders: A case-control study. *Lancet*, 364, 963-969.

Smith, J.K. (1983). Quantitative versus qualitative research: An attempt to clarify the issue. *Educational Researcher*, 12 (3), 6-13.

Smith, J.A., Jarman, M. & Osborn, M. (1999). Doing interpretative phenomenological analysis. In M. Murray & K. Chamberlain (Eds), *Qualitative Health Psychology: Theories and Methods*, pp 218-240. London: Sage Publications.

Smith, A., Young, J.A. & Gibson, J. (1999). How Now, Mad-cow? Consumer Confidence and Source Credibility During the 1998 BSE Scare. *European Journal of Marketing*, 33 (11,12), 1107-1122.

Smith, M.J., Ellenberg, S.S., Bell, L.M. & Rubin, D.M. (2008). Media coverage of the measles-mumps-rubella vaccine and autism controversy and its relationship to MMR immunization rates in the United States. *Pediatrics*, 121 (4), 836-843.

Sparks, P. (1994). Food choice and health: Applying, assessing and extending the theory of planned behaviour. In D.R. Rutter & L. Quine (Eds), *Social Psychology and Health: European Perspectives*, pp25-45. Aldershot: Avebury.

Spier, R.E. (2002). Perception of risk of vaccine adverse events: A historical perspective. *Vaccine*, 20, S78-S84.

Sporton, R.K. & Francis, S.-A. (2001) Choosing not to immunize: are parents making informed choices. *Family Practice*, 18, 181–188.

Starfield, B. (1994). Primary care tomorrow: is primary care essential? *Lancet*, 344, 1129-1133.

Stasson, M. & Fishbein, M. (1990). The relation between perceived risk and prevention action: Within-subject analysis of perceived driving risk and intentions to wear seat belts. *Journal of Applied Social Psychology*, 20, 1541-1547.

Stephoe, A., Sutcliffe, I., Allen, B. & Coombes, C. (1991). Satisfaction with communication, medical knowledge, and coping style in patients with metastatic cancer. *Social Science and Medicine*, 32, 627–32.

Stevenson, J., Murdoch, G., Riley, A., Duncan, B., McWhirter, M. & Christie, P. (1998). Implementation and evaluation of a measles/rubella vaccination campaign in a campus university in the UK following an outbreak of rubella. *Epidemiology and Infection*, 121 (1), 157-164.

Stewart, M., Brown, J.B., Weston, W.W, McWhinney, I.R., McWilliam, C.L. & Freeman, T.R. (1995). *Patient-Centred Medicine. Transforming the Clinical Method*. Thousand Oaks, CA: Sage Publications.

Stiles, W.B., Putman, S.M., Wolf, M.H. & James, S.A. (1979). Interaction exchange structure and patient satisfaction with medical interviews. *Medical Care*, 17, 667-681.

Straten, G.F.M., Friele, R.D. & Groenewegen, P.P. (2002). Public trust in Dutch health care. *Social Science and Medicine*, 55 (2), 227-234.

Strauss, A.L. (1987). *Qualitative Analysis for Social Scientist*. New York: Cambridge University Press.

Strauss, A.L. & Corbin, J. (1990). *Basics of Qualitative Research: Procedures and Techniques*. London: Sage.

Strauss, A.L. & Corbin, J. (1998). *Basics of Qualitative Research: Procedures and Techniques* (2nd Edn). London: Sage.

Strobino, D., Keane, V., Holt, E., Hughart, N. & Guyer, B. (1996). Parental attitudes do not explain underimmunization. *Pediatrics*, 98 (6), 1076-1083.

Szatmari, P., Archer, L., Fisman, S., & Steiner, D.L. (1994). Parent and teacher agreement in the assessment of pervasive developmental disorders. *Journal of Autism and Developmental Disorder*, 24, 703-717.

Sze-Tho, R. & Gill, D.G. (1982). Measles virus and vaccination-a survey of parental attitudes. *Irish Medical Journal*, 75 (7), 250–251.

SUSA Website (2007). <http://www.nus.org.uk/en/Students-Unions/Stirling-University-Students-Association/>

Tabachnick, B.G. & Fidell, L.S. (2001). *Using Multivariate Statistics*. London: Allyn and Bacon.

Tajfel, H. & Turner, J.C. (1979). An integrative theory of intergroup conflict. In S. Worchel W. Austins (Eds), *Psychology of intergroup relations* (2nd edn). Chicago: Nelson-Hall.

Taylor, S. J., & Bogdan, R. (1984). *Introduction to Qualitative Research Methods: The Search for Meanings*. New York: John Wiley & Sons.

Taylor, B., Miller, E., Farrington, C.P., Petropoulos, M., Favot-Mayoud, I., Li, J. & Waight, P.A. (1999). Autism and measles, mumps, rubella vaccine: No epidemiological evidence for a causal association. *Lancet*, 353, 2026-2029.

Terry, D.J. & Hogg, M.A. (1996). Group norms and the attitude-behavior relationship: A role for group identification. *Personality and Social Psychology Bulletin*, 22, 776-793.

Terry, D.J., Hogg, M.A. & White, K.M. (1999). The theory of planned behaviour: Self-identity, social identity and group norms. *British Journal of Social Psychology*, 38, 225-244.

Thom, D.H. (2001). Physician behaviours that predict patient trust. *Journal of Family Practice*, 50, 323-328.

Thomas, D.Rh., Salmon, R.L. & King, J. (1998). Rates of first measles-mumps-rubella immunisation in Wales (UK). *Lancet*, 351, 1927.

Thompson, G. (2009). Measles and MMR statistics. House of Commons Library. <http://www.parliament.uk/briefing-papers/SN02581>

Thompson, M. & Rise, J. (2001). *The Theory of Planned Behaviour and the Role of Social Influence in Predicting Regular Exercise*. (unpublished manuscript)

Thompson, N.P., Montgomery, S.M., Pounder, R.E., & Wakefield, A.J. (1995). Is measles vaccination a risk for inflammatory bowel disease? *Lancet*, 345, 1071-1074.

Thorne, S.E. & Robinson, C.A. (1989). Guarded alliance: Health care relationships in chronic illness. *Journal of Nursing Scholarship*, 21 (3), 153-157.

Tickner, S., Leman, P.J. & Woodcock, A. (2009). Parents' views about pre-school immunization: An interview study in Southern England. *Child: Care, Health and Development*. DOI: 10.1111/j.1365-2214.2009.01020.x

Tickner, S., Leman, P.J. & Woodcock, A. (2010). Parents' views about preschool immunisation: An interview study in southern England. *Child: Care, Health & Development*, 36, 190-197.

Titmuss, R.M. (1968). *Commitment to Welfare*. Reading: George Allen & Unwin.

Towbes, L.C. & Cohen, L.H. (1996). Chronic stress in the lives of college students: Scale development and prospective prediction of distress. *Journal of Youth and Adolescence*, 25, 199-217.

Trachtenberg, F., Dugan, E. & Hall, M.A. (2005). How patients' trust relates to their involvement in medical care. *Journal of Family Practice*, 54 (4), 344-352.

Trafimow, D. & Finlay, K. (1996). The importance of subjective norms for a minority of people. *Personality and Social Psychology Bulletin*, 22, 820-828.

Trafimow, D. & Fishbein, M. (1994a). The importance of risk in determining the extent to which attitudes affect intentions to wear seat belts. *Journal of Applied Social Psychology*, 24, 1-11.

Trafimow, D. & Fishbein, M. (1994b). The moderating effect of behavior type on the subjective norm-behavior relationship. *The Journal of Social Psychology*, 134, 755-763.

Trafimow, D. & Fishbein, M. (1995). Do people really distinguish between behavioral and normative beliefs? *British Journal of Social Psychology*, 34, 257-266.

Trafimow, D., Triandis, H.C. & Goto, S.G. (1991). Some tests of the distinction between the private self and the collective self. *Journal of Personality and Social Psychology*, 60, 649-655.

Triandis, H.C. (1994). *Culture and Social Behavior*. New York: McGraw-Hill, Inc.

Trochim, M.K. (2006). Research Methods Knowledge Base: Deduction and induction. <http://www.socialresearchmethods.net/kb/dedind.php>

Tsoukas, H. (1989). The validity of ideograph research explanations. *Academy of Management Review*, 14(4), 551-561.

Turner, J. (1982). Toward a cognitive redefinition of the social group. In H. Tajfel (Ed), *Social Identity and Intergroup Relations*. Cambridge: Cambridge University Press.

Turner, J.C., Hogg, M.A., Oakes, P.J., Reicher, S.D. & Wetherall, M.S. (1987). *Rediscovering the Social Group: A Self-Categorization Theory*. Oxford: Blackwell.

Uhlmann, V., Martin, C. M., Sheils, O., Pilkington, L., Silva, I., Killalea, A., Murch, S.B., Walker Smith, J., Thomson, M., Wakefield, A.J., & O'Leary, J. J. (2002). Potential viral pathogenic mechanism for new variant inflammatory bowel disease. *Molecular Pathology*, 55, 84-90.

Vallerand, R.J., Deshaies, P., Cuerrier, J-P., Pelletier, L.G. & Mongeau, C. (1992). Ajzen and Fishbein's theory of reasoned action as applied to moral behavior: A confirmatory analysis. *Journal of Personality and Social Psychology*, 62, 98-109.

Van den Putte, B. (1991). 20 years of the theory of reasoned action of Fishbein and Ajzen: A meta-analysis. Unpublished manuscript, Cited in Trafimow, D. & Finlay, K. (1996). The importance of subjective norms for a minority of people. *Personality and Social Psychology Bulletin*, 820-828.

Van der Velde, F.W. & Van der Pligt, J. (1991). AIDS-related health behavior: Coping, protection motivation, and previous behavior. *Journal of Behavioral Medicine*, 14 (5), 429-451.

Van Manen, M. (1990). Researching lived experience: human science for an action sensitive pedagogy. Albany, NY: SUNY Press. Cited in: Willig, C. (2008). *Introducing Qualitative Research in Psychology*. Berkshire: Open University Press.

- Vygotsky, L.S. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.
- Vygotsky, L.S. (1981). The genesis of higher mental functions. In J.V. Wertsch (Ed & Trans), *The Concept of Activity in Soviet Psychology*. White Plains, NY: Sharpe.
- Wakefield, A.J., Murch, S.H., Anthony, A., Linnell, J., Casson, D.M., Malik, M., Berelowitz, M., Dhillon, A.P., Thomson, M.A., Harvey, P., Valentine, A., Davies, S.E. & Walker-Smith, J.A. (1998). Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet*, 351, 637-641.
- Walonick, D.S. (1997-2010). *Survival Statistics*. Bloomington: StaPac Inc.
- Walsham, G. (1995). Interpretive case studies in IS research: nature and method. *European Journal on Information Systems*, 4, 74-81.
- Warshaw, P.R. (1980). A new model for predicting behavioral intentions: An alternative to Fishbein. *Journal of Marketing Research*, 17 (2), 153-172.
- Waternaux, C.M. (1976). Asymptotic distribution of the sample roots for a nonnormal population. *Biometrika*, 63(3), 639-645. Cited in: Tabachnick, B.G. & Fidell, L.S. (2001). *Using Multivariate Statistics*. London: Allyn and Bacon.
- Weiner, C.L. & Wymans, W.M. (Eds) (1990). *Grounded Theory in Medical Research: From Theory to Research*. Amsterdam: Swets and Zeitlinger.
- Willig, C. (2008). *Introducing Qualitative Research in Psychology*. Berkshire: Open University Press.
- Wilson, D., Zenda, A., McMaster, J. & Lavelle, S. (1992). Factors predicting Zimbabwean students' intentions to use condoms. *Psychology and Health*, 7, 99-114.
- Winterburn, S., Moyez, J., & Thompson, J. (2003). Maternal grandmothers and support for breastfeeding. *Journal of Community Nursing*, 17, 4-9.

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, 59, 329-349.

Wolfberg, A.J., Michels, K.B., Shields, W., O'Campo, P., Bronner, Y., & Bienstock, J. (2004). Dads as breastfeeding advocates: results from a randomized controlled trial of an educational intervention. *American Journal of Obstetrics and Gynaecology*, 191, 708-12.

Wollin, A.S. (1995). A hierarchy-based punctuated-equilibrium model of the process of emergence and change of new rural industries. Unpublished doctoral thesis, Griffith University, Faculty of Commerce and Administration, Brisbane, Australia. Cited in: Krauss, S.E. (2005). Research paradigms and meaning making: A primer. *The Qualitative Report*, 10 (4), 758-770.

Wood-Harper, J. (2005). Informing education policy on MMR: Balancing individual freedoms and collective responsibilities for the promotion of public health. *Nursing Ethics*, 12 (1), 43-58.

World Health Organization (1999). <http://www.euro.who.int/document/health21/wa540ga199heeng.pdf>

World Health Organisation (2005). <http://www.euro.who.int/Document/E87772.pdf>

Wroe, A. L., Bhan, A., Salkovskis, P. & Bedford, H. (2005). Feeling bad about immunising our children. *Vaccine*, 23, 1428–1433.

Wurtele, S.K. & Maddux, J.E. (1987). Relative contributions of protection motivation theory components in predicting exercise and behavior. *Health Psychology*, 6 (5), 453-466.

Yarwood, J. (2006). Communicating vaccine benefit and risk - lessons from the medical field. *Veterinary Microbiology*, 117, 71-74.

Yates, J.F. & Stone, E.R. (1992). In J. Yates (Ed), *Risk Taking Behavior*, pp1-25.
New York: Wiley.

Ybarra, O. & Trafimow, D. (1998). How Priming the Private Self or Collective Self
Affects the Relative Weights of Attitudes and Subjective Norms. *Personality and
Social Psychology Bulletin*, 24 (4), 362-370.

Appendix I

- Study 1: Parents' Introductory Letter & Consent Slip
- Study 1: Parents' Thank-You Letter
- Study 1: Parents' Information Sheet
- Study 1: Parents' Questionnaire

Study 1: Parents' Introductory Letter and Consent Form

Tayside NHS Board
(*Headed Paper*)

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Research on Parents' Views on MMR immunisation

Dear Sir/Madam,

NHS Tayside and Stirling University are working together to carry out a study on parents' views to MMR (measles, mumps and rubella) immunisation. We hope the results from this research will help us to understand parents' views on MMR immunisation better in the future. We are writing to all parents/guardians of children born between January 1999 and December 2000 in the Dundee area. We would like to invite you to complete a brief questionnaire about your MMR immunisation decision for the child named on the label above.

Researchers from the University of Stirling will carry out the study, with support of staff from NHS Tayside. The study has been approved by the University of Stirling: Department of Psychology Ethics Research Committee, and the Tayside Committee on Medical Research Ethics.

We are inviting you to fill out a questionnaire. This should take about 15 minutes to complete. Completing the questionnaire is voluntary, and any information you provide will be confidential. No data which would identify you will be held on computer, in accordance with the Data Protection Act, 1998. Please send the tear-off slip below in the pre-paid envelope enclosed with this letter by 18th May or soon after.

If you have any queries or would like more information regarding this study please contact Ms Binder Kaur (Research Psychologist: Department of Psychology, University of Stirling) on (01786) 466843.

Yours sincerely,

(Signature from Dr Mike Roworth)

Dr Mike Roworth

Consultant in Public Health Medicine (CD & EH)

Tayside NHS Board

Please sign below if you are willing for the researchers to contact you. If this slip is not returned then we will assume that you are not willing to take part in the study.

Guardian's signature.....

Return address: Binder Kaur, Department of Psychology, University of Stirling, FK9 4LA

CHI No:

Study 1: Parents' Thank-You Letter

Tayside NHS Board

(Headed Paper)

Directorate of Public Health
Fings Cross Hospital
Cleington Rd
Dundee
DD3 8EA
Telephone 01382 818479
Fax 01382 596985

www.show.scot.nhs.uk/nhsfv

Date
Your Ref
Our Ref

Enquiries to Binder Kaur
Extension
Direct Line 01786 466843
Email binder.kaur@stir.ac.uk

All enquires to be made to MS Binder Kaur on 01786 466843

Research on Parents' Views on MMR immunisation

Dear Sir/Madam,

Thank you for agreeing to take part in this research.

The questionnaire should take approximately 15 minutes to complete, and your answers will be confidential. No data which would identify you will be held on computer (in accordance with the Data Protection Act, 1998). Most questions refer to the child named on the label above. However, some questions refer to children in general and to other children you may have. Either parent or guardian of the child is requested to fill out the questionnaire. Please can you return the completed questionnaire in the pre-paid envelope as soon as possible.

Please read through each question carefully and answer by ticking a box or circling a number that applies to you.

If you have any problems please contact MS Binder Kaur (Research Health Psychologist: Department of Psychology, University of Stirling) on 01786 466843.

Thank you for your help.

Yours sincerely,

(Signature from Dr Mike Roworth)

Dr Mike Roworth
Consultant in Public Health Medicine (CD & EH)
Tayside NHS Board

Healthy Volunteer Information Sheet

Research Project: MMR Immunisation - The Role of Parental Views

We invite you to participate in a research project. We believe it to be of potential importance. However, before you decide whether or not you wish to participate, we need to be sure that you understand firstly why we are doing it, and secondly what it would involve if you agreed. We are therefore providing you with the following information. Read it carefully and be sure to ask any questions you have, and, if you want, discuss it with outsiders. We will do our best to explain and to provide any further information you ask for now or later.

The background to the study

There has been a lot of debate concerning the use of the MMR (measles, mumps and rubella) immunisation. Most research has focused on uptake rates, with fewer studies asking about parents' views to the MMR immunisation. Parents' views towards the immunisation are important, and therefore this research will focus on parents' views to the MMR immunisation. We hope the findings from this research will help health care providers to understand parents' views to MMR immunisation better in the future. Researchers from the University of Stirling will carry out the study, with support from Tayside Health Board and Tayside (NHS) Primary Care Trust. 800 parents of children born between 01/01/99 to 31/12/00 have been randomly chosen to take part in this study.

What does the study entail?

The study simply requires you to complete a questionnaire regarding your views to the MMR immunisation. The whole procedure should take approximately 15 minutes to complete.

What will happen to the information collected in the study?

The data collected in the study will be treated confidentially, and no data which would identify you will be held on computer (in accordance with the Data

Protection Act, 1998). Your GP will not be sent the results of your questionnaire. The only people who will have access to the questionnaire data will be MS Binder Kaur and Dr Vivien Swanson from the University of Stirling. A Data Protection form has been approved by the Tayside Health Board, and a declaration has been signed for confidentiality and security by the above persons. You can obtain information about the results of the study after completion by contacting MS Binder Kaur at the University of Stirling (01786 466843).

What are my rights?

If you would like more information before deciding whether to take part, please contact MS Binder Kaur (Research Health Psychologist, University of Stirling) on 01786 466843. Please feel free to discuss the study with friends, relatives or your GP before deciding to take part.

Participation in this study is entirely voluntary and you are free to refuse to take part or to withdraw from the study at any time without having to give a reason and without this affecting your future medical care or relationship with medical staff looking after you.

The Tayside Committee on Medical Research Ethics, which has responsibility for scrutinising all proposals for medical research on humans in Tayside, has examined the proposal and has raised no objections from the point of view of medical ethics. The Committee will also receive regular reports from NHS Tayside Monitors who will examine the records of the research while it is in progress.

Study 1: Parents' Questionnaire

Parents' Questionnaire: MMR (Measles, Mumps and Rubella)
Immunisation

PLEASE ANSWER QUESTIONS 1-16 ABOUT THE CHILD NAMED ON THE LETTER

Please tick one box per question:

	Yes	No	
1) This child has received the first MMR immunisation.	<input type="checkbox"/>	<input type="checkbox"/>	
2) This child has received the single vaccines for measles, mumps and rubella.	<input type="checkbox"/>	<input type="checkbox"/>	
3) I have not yet reached a decision whether this child will receive the MMR immunisation.	<input type="checkbox"/>	<input type="checkbox"/>	
	Yes	No	Unsure
4) When this child was born did you intend to have him/her immunised with the first MMR vaccine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) This child has received the booster (second) MMR vaccine.	<input type="checkbox"/>	<input type="checkbox"/>	
6) I intend to have this child immunised with the booster (second) MMR vaccine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tick one box per illness:

7) How worried would you be if this child were diagnosed with:

	Very worried	Quite worried	Slightly worried	Not at all worried	Don't know
Measles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mumps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rubella	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8) At the time considering the first MMR immunisation, how easy or difficult was it for you to take this child to have the MMR immunisation with regard to the following:

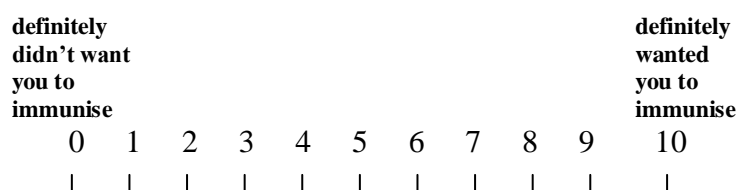
	Very easy	Easy	Neither easy or difficult	Difficult	Very difficult
a) The time of appointment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Taking time out to attend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Other children to care for	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Transport problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Your own health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) This child's health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Very easy	Easy	Neither easy or difficult	Difficult	Very difficult
g) This child's distress (from previous injections)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Your anxiety regarding the immunisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Your capability of looking after this child after the immunisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For questions 9 and 10, we would like to know whether other people wanted you to have your child immunised with the MMR vaccine, and whether you followed their advice.

9) Please **circle a number** (between 0-10) for each person listed regarding whether or not the following people wanted this child to have the MMR immunisation. 0 = definitely didn't want you to have your child immunised, 10 = definitely wanted you to have your child immunised. If you did not discuss the MMR immunisation with the person then please tick the box.

a) **Partner**



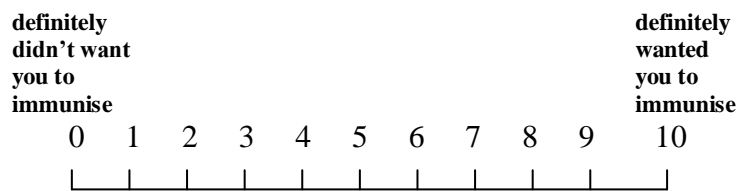
I did not discuss MMR immunisation with this person

b) Child's grandparents



I did not discuss MMR immunisation with these people

c) Friends



I did not discuss MMR immunisation with these people

d) GP (doctor)



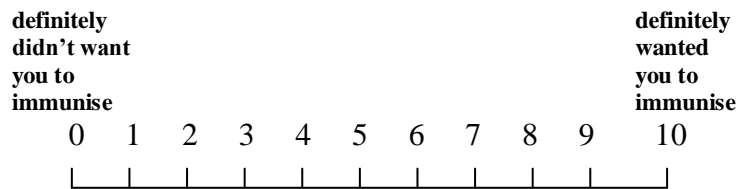
I did not discuss MMR immunisation with this person

e) **Health visitor**



I did not discuss MMR immunisation with this person

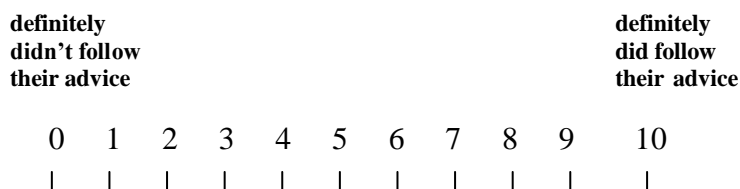
f) **Practice nurse**



I did not discuss MMR immunisation with this person

10) Please **circle a number** (between 0-10) for each person listed regarding how much you followed their advice. 0 = definitely didn't follow their advice, 10 = definitely did follow their advice. If you did not discuss the MMR immunisation with the person then please tick the box.

a) **Partner**

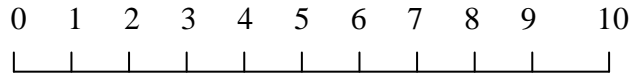


I did not discuss MMR immunisation with this person

b) **Child's grandparents**

**definitely
didn't follow
their advice**

**definitely
did follow
their advice**

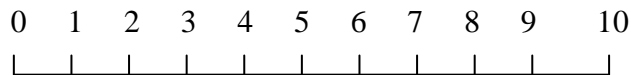


I did not discuss MMR immunisation with these people

c) **Friends**

**definitely
didn't follow
their advice**

**definitely
did follow
their advice**

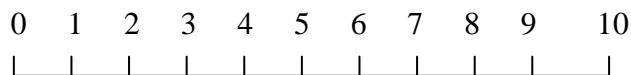


I did not discuss MMR immunisation with these people

d) **GP (doctor)**

**definitely
didn't follow
their advice**

**definitely
did follow
their advice**

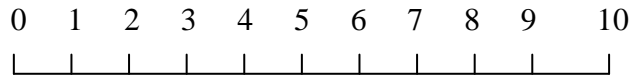


I did not discuss MMR immunisation with this person

e) **Health visitor**

**definitely
didn't follow
their advice**

**definitely
did follow
their advice**

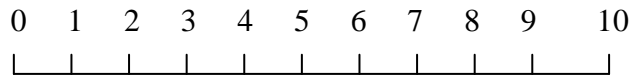


I did not discuss MMR immunisation with this person

f) **Practice nurse**

**definitely
didn't follow
their advice**

**definitely
did follow
their advice**



I did not discuss MMR immunisation with this person

11) How important to you is information about MMR immunisation from the following:

	Very important	Important	Fairly important	Not at all important	Don't know
Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GP (doctor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health visitor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Media (TV, newspapers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE ANSWER QUESTIONS 12-15 WITH REFERENCE TO ALL CHILDREN IN GENERAL

Please tick one box per question:

12) How far do you agree or disagree with the following statements:

	Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly disagree
a) There is strong evidence of a link between MMR immunisation and autism.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) MMR immunisation may result in a severe allergic reaction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) MMR immunisation reduces the risk of developing meningitis.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) MMR immunisation is not effective.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Giving 3 separate vaccines for measles, mumps and rubella may reduce the risk of side-effects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) There is no strong evidence that MMR immunisation causes inflammatory bowel disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) It is more dangerous for a child to have the MMR immunisation than to have measles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly disagree
h) MMR immunisation will prevent the occurrence of measles, mumps and rubella.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) MMR immunisation will prevent the occurrence of measles, mumps and rubella.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) MMR immunisation weakens a child's immune system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) MMR immunisation will reduce the risk of side-effects from measles, mumps and rubella.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13) What would be the risk of developing the following illnesses with children in general who are **not immunised** with the MMR vaccine:

	High risk	Slight risk	Low risk	No risk	Don't know
Measles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mumps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rubella	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

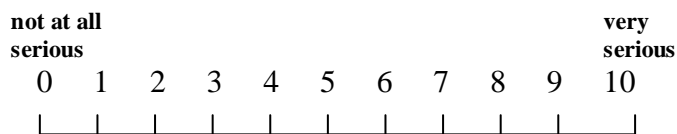
14) What would be the risk of developing the following illnesses with children in general who are **immunised** with the MMR vaccine:

	High risk	Slight risk	Low risk	No risk	Don't know
Autism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inflammatory bowel disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

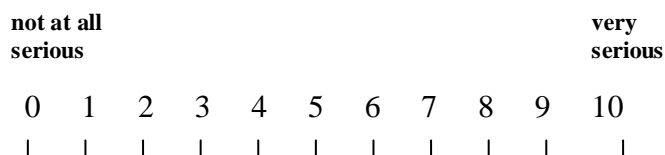
For each question please state how serious you believe each disease to be by circling a number from 0 to 10 for each illness: 0 = not at all serious, 10 = very serious

15) How serious are the following illnesses for children in general who **have not been immunised** with the MMR vaccine:

a) Measles



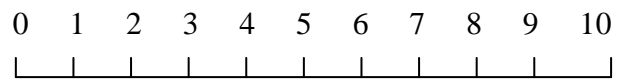
b) Mumps



c) **Rubella**

not at all
serious

very
serious



PLEASE ANSWER QUESTIONS 16-19 ABOUT YOURSELF

16) Please state your relationship with the child named on the letter:

Mother

Father

Grandparent

Other - please specify.....

17) Please state your age _____

18) Please state your gender:

Male

Female

19) Please state your ethnic origin (tick one box only):

Ethnic Origin			
White	Black/Black British	Asian/Asian British	Mixed
British <input type="checkbox"/>	Caribbean <input type="checkbox"/>	Indian <input type="checkbox"/>	White & Black Caribbean <input type="checkbox"/>
Irish <input type="checkbox"/>	African <input type="checkbox"/>	Pakistani <input type="checkbox"/>	White & Black African <input type="checkbox"/>
Other White <input type="checkbox"/>	Other Black <input type="checkbox"/>	Bangladeshi <input type="checkbox"/>	White & Asian <input type="checkbox"/>
		Chinese <input type="checkbox"/>	Other mixed background <input type="checkbox"/>
		Other Asian <input type="checkbox"/>	Any other ethnic group <input type="checkbox"/>

Thank you for completing the questionnaire

Appendix II

- Study 2: Students' Introductory Letter
- Study 2: Students' Questionnaire

Research on Students' Views on MMR immunisation

Dear Student,

In response to the MMR vaccine currently being offered on campus, we are carrying out research on students' views on MMR (measles, mumps and rubella) immunisation. We would like to invite you to complete a brief questionnaire about your MMR immunisation decision. We hope the results from this research will help health care providers to understand views towards MMR immunisation.

The research will be conducted by researchers from the University of Stirling (psychology dept), with support from NHS Tayside. The study has been approved by the University of Stirling: Department of Psychology Ethics Research Committee.

The questionnaire should take approximately 15 minutes to complete, and your answers will be confidential. No data which would identify you will be held on computer (in accordance with the Data Protection Act, 1998).

Please read through each question carefully and answer by ticking the boxes/circling numbers that apply to you.

Thank you for your help.

Binder Kaur
(PhD Research Student)

Study 2: Students' Questionnaire

Students' Questionnaire: MMR (Measles, Mumps and Rubella)
Immunisation

Please tick one box per question:

1a) I have received the MMR immunisation?

Yes - if 'yes' please go to question 1b

No - if 'no' please go to question 1c

1b) If you answered 'yes' – when did you have the MMR immunisation?

.....
.....
.....

	Yes	No	Don't know
1c) If you answered 'no' – do you intend to have the MMR immunisation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Do you think you need to be immunised with the MMR vaccine?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) If you had children in the future do you intend to have them immunised with the MMR vaccine?	<input type="checkbox"/>	<input type="checkbox"/>	

Please tick one box per illness:

4) How worried would you be if you were diagnosed with:

	Very worried	Quite worried	Slightly worried	Not at all worried	Don't know
Measles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mumps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rubella	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) Please answer this question in reference to one of the categories (i or ii) given below:

i) If you have had the MMR immunisation - how easy or difficult was it for you to have the immunisation with regard to the following:

ii) If you have not had the MMR immunisation - how easy or difficult can you foresee the following to be:

	Very easy	Easy	Neither easy or difficult	Difficult	Very difficult
a) The time of appointment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Taking time out to attend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) University work (essays, exams etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Transport problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Your own health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

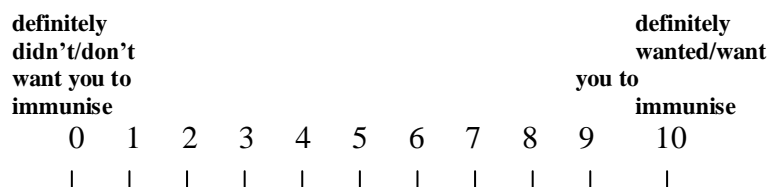
	Very easy	Easy	Neither easy or difficult	Difficult	Very difficult
f) Your distress (regarding your experiences from previous injections)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Your anxiety regarding the immunisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Your capability of looking after yourself after the immunisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6) Please answer this question in reference to one of the categories (i or ii) given below:

i) If you have had the MMR immunisation: please circle a number (between 0-10) for each person listed regarding whether or not the following people wanted you to have the MMR immunisation. 0 = definitely didn't want you to have the immunisation, 10 = definitely wanted you to have the immunisation. If you did not discuss the MMR immunisation with the person then please tick the box.

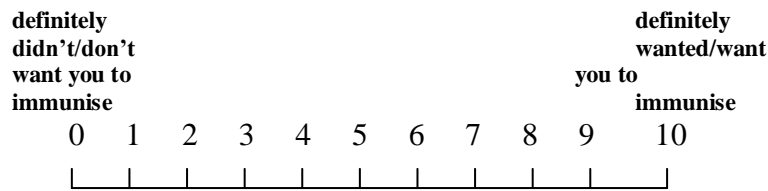
ii) If you have not had the MMR immunisation: please circle a number (between 0-10) for each person listed regarding whether or not the following people want you to have the MMR immunisation. 0 = definitely don't want you to have the immunisation, 10 = definitely want you to have the immunisation. If you did not discuss the MMR immunisation with the person then please tick the box.

d) **Partner**



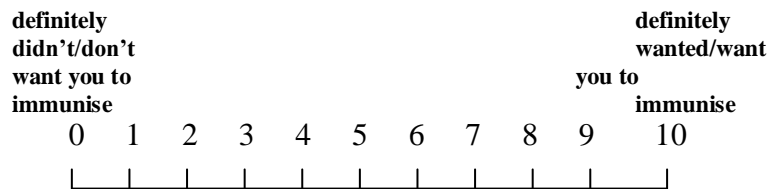
I did not discuss MMR immunisation with this person

b) **Family**



I did not discuss MMR immunisation with these people

c) **Friends**



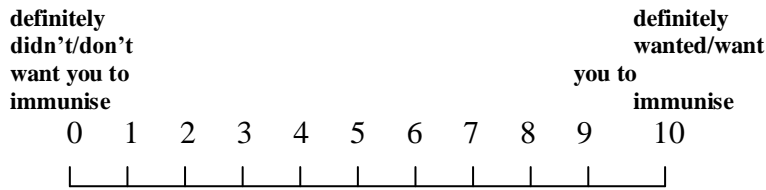
I did not discuss MMR immunisation with these people

d) **GP (doctor)**



I did not discuss MMR immunisation with this person

e) **Practice nurse**



I did not discuss MMR immunisation with this person

7) **Please answer this question in reference to one of the categories (i or ii) given below:**

i) *If you have had the MMR immunisation:* please circle a number (between 0-10) for each person listed regarding how much you followed their advice. 0 = definitely didn't follow their advice, 10 = definitely did follow their advice. If you did not discuss the MMR immunisation with the person then please tick the box.

ii) *If you have not had the MMR immunisation:* please circle a number (between 0-10) for each person listed regarding how much you will follow their advice. 0 = definitely won't follow their advice, 10 = definitely will follow their advice. If you did not discuss the MMR immunisation with the person then please tick the box.

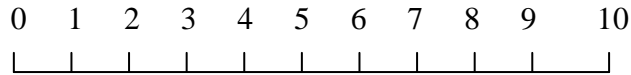
b) **Partner**



I did not discuss MMR immunisation with this person

c) **Family**

definitely
didn't/won't
follow their
advice

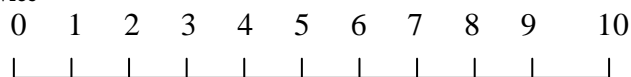


definitely
did/will follow
their advice

I did not discuss MMR immunisation with these people

c) **Friends**

definitely
didn't/won't
follow their
advice

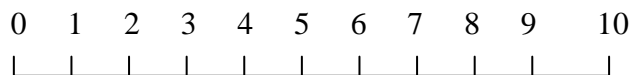


definitely
did/will follow
their advice

I did not discuss MMR immunisation with these people

d) **GP (doctor)**

definitely
didn't/won't
follow their
advice



definitely
did/will follow
their advice

I did not discuss MMR immunisation with this person

e) **Practice nurse**

definitely didn't/won't follow their advice+	definitely did/will follow their advice
0 1 2 3 4 5 6 7 8 9 10	

I did not discuss MMR immunisation with this person

8) How important to you is information about MMR immunisation from the following:

	Very important	Important	Fairly important	Not at all important	Don't know
Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GP (doctor)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Practice nurse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Media (TV, newspapers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9) Do you know someone on campus who has had mumps?

Yes - please go to question 10)

No - please go to question 11)

10) Did knowing someone with mumps on campus influence your own decision to have/not have the MMR vaccine? **Please tick 1 box and give details.**

Yes

No

Please give details:

.....

.....

.....

Please tick one box per question:

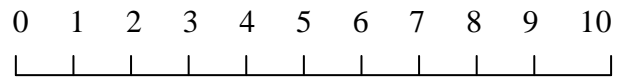
11) How far do you agree or disagree with the following statements:

	Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree
a) There is strong evidence of a link between MMR immunisation and autism.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) It is more dangerous to have rubella than to have MMR immunisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) There is strong evidence that MMR immunisation causes inflammatory bowel disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) It is more dangerous for a student to have the MMR immunisation than to have measles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) MMR immunisation weakens the immune system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) It is more dangerous for a student to have the MMR immunisation than to have mumps.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

c) **Rubella**

**not at all
serious**

**very
serious**



14) Do you know if there have been cases of mumps on campus in the past month or so?

Yes

No

15) Do you know if Airthrey Park Medical Centre (on campus) is offering students the MMR vaccine?

Yes

No

General Questions

16) Do you live on campus?

Yes

No

17) What year are you in at the moment:

1st

2nd

3rd

4th

Master's

PhD

Other (please specify)

18) Please state your age _____

19) Please state your gender:

Male

Female

20) Please state your ethnic origin (tick one box only):

Ethnic Origin			
White	Black/Black British	Asian/Asian British	Mixed
British <input type="checkbox"/>	Caribbean <input type="checkbox"/>	Indian <input type="checkbox"/>	White & Black Caribbean <input type="checkbox"/>
Irish <input type="checkbox"/>	African <input type="checkbox"/>	Pakistani <input type="checkbox"/>	White & Black African <input type="checkbox"/>
Other <input type="checkbox"/>	Other Black <input type="checkbox"/>	Bangladeshi <input type="checkbox"/>	White & Asian <input type="checkbox"/>
White		Chinese <input type="checkbox"/>	Other mixed background <input type="checkbox"/>
		Other Asian <input type="checkbox"/>	Any other ethnic group <input type="checkbox"/>

Thank you for completing the questionnaire.

Appendix III

- Study 3: Parents' Introductory Letter
- Study 3: Focus Group Interview Guide
- Study 3: Focus Group Coding Frame/Grid

Study 3: Parents' Introductory Letter

University of Stirling

(Headed paper)

Dear Parent,

My name is Binder Kaur and I am a health psychology PhD student (University of Stirling). I am currently in the process of recruiting parents to take part in a study aiming to understand parents' MMR immunisation decision. This study involves taking part in a group discussion on MMR (measles-mumps-rubella) immunisation. The study will be looking at parents' attitudes towards the MMR vaccine and will also focus on social issues surrounding the vaccine. This study provides the perfect opportunity for parents to air their views, and will allow for a greater understanding of parents' decision-making process in relation to the MMR vaccine.

The groups will consist of 3-6 parents and will take place in a convenient location (decided nearer to the time). The discussions will last approximately 45 minutes to 1 hour. Parents will also receive a token gift of appreciation for taking part in the discussion groups. The interviews will be transcribed but will remain confidential. All information collected from this study will be kept strictly confidential.

Parents with children born after 1998 and who have been offered the MMR vaccine are requested to take part in this study. If you are interested and would like to take part please provide your name and contact details to the playgroup leader and I will contact you asap. If you have any questions relating to this study then please do not hesitate to contact me: bk3@stir.ac.uk or 01786 466843.

Kind regards

Binder Kaur

Study 3: Focus Group Interview Guide

- 1) Can you tell me what the MMR vaccine is?
 - When is it administered?
 - Who has it?
 - Associated side-effects?

- 2) Did you intend to immunise your child with the vaccine?
 - Reasons

- 3) What kind of factors do you think affected your decision?
 - Referents?
 - Groups?
 - Others?

- 4) Did you discuss the MMR vaccine with others?
 - Who – were you close to these people? Who would you classify as close?
 - When?
 - What was discussed?
 - Details/examples

- 5) Did the people close to you affect your MMR decision making?
 - Who?
 - How?
 - What did they say?
 - How did it affect you?
 - Details/examples

- 6) At the time when you were making the MMR decision, do you think seeing other parents opt for or refuse the MMR immunisation affect your own decision?
 - Who?
 - How?
 - What was seen?
 - How did it affect your decision?
 - Details/examples

- 7) Do you think people can be affected by seeing others immunisation behaviour?
 - How?
 - Why?

8) Did you make the MMR immunisation decision with other people in mind?

- Who?
- How?
- Details/Examples

8) Do you think parents in general make the MMR immunisation decision with other people in mind?

- Who?
- How?
- Details/Examples

9) Did you feel any moral obligation to have/not have your child immunised?

- In what way?
- Reasons
- Details

10) Do you think there is a moral obligation for parents in general to have or not to have their child immunised?

- In what way?
- Reasons
- Details

Thank you for taking part in this focus group. Is there anything else you would like to add?

Study 3: Focus Group Coding Frame/Grid

	Participant 1	Participant 2	Participant 3	Participant 4
<i>Parental attitudes</i>				
<i>Close referents – (identify?)</i>				
<i>Group norms/ attitudes/ advice</i>				
<i>Group influences/ motivation to comply (subjective norm)</i>				
<i>Others' immunisation behaviour – who (descriptive norm)</i>				
<i>Important sources of information</i>				
<i>Dominant personal attitudes(private self)</i>				
<i>Attitudes shared with partner (relational self)</i>				
<i>Dominant group attitudes(collective self)</i>				
<i>Obligations to child (moral)</i>				
<i>Obligation to society (moral)</i>				

Appendix IV

- Study 4: Parents' Introductory Letter
- Study 4: Parents' Consent Form
- Study 4: Parents' Information Sheet
- Study 4: GPs' Letter
- Study 4: Interview Guide
- Study 4: Interview Coding Frame/Grid

Study 4: Parents' Introductory Letter

Forth Valley NHS Board
(Headed Paper)

33 Spittal Street
Stirling
FK8 1DX
Telephone 01786 463031
Fax 01786 451474

www.show.scot.nhs.uk/nhsfv

Date
Your Ref
Our Ref

Enquiries to Binder Kaur
Extension
Direct Line 01786 466843
Email binder.kaur@stir.ac.uk

Dear Parent/Guardian,

The University of Stirling and NHS Forth Valley are working together to understand parents' views of the MMR (measles-mumps-rubella) vaccine, and the influence of health professionals on the MMR vaccine decision. We are writing to parents/guardians of children born between 2001 and 2003 in Forth Valley. We hope to interview several parents (the main caretaker of the child) who have immunised their child and several parents who have decided not to immunise their child with the MMR vaccine. The researcher (MS Binder Kaur) will not have information regarding your child's immunisation status, and will not have access to this information unless you agree to participate. We would like to invite you to take part in a short interview at a venue convenient to you. Any travel expenses will be reimbursed.

A researcher from the University of Stirling will carry out the interview. The study has been approved by Forth Valley and Fife Committee on Medical and Research Ethics, and University of Stirling, Department of Psychology Ethics Research Committee.

The interviews will last about 30-45 minutes. Taking part in the interviews is voluntary, and any information you provide will be confidential. The interviews will be recorded but any names mentioned will be changed when the interviews are

transcribed and the tapes will be erased once the study is completed. No data which would identify you will be held on computer, in accordance with the Data Protection Act, 1998. Further information about the study is provided in the information sheet enclosed.

If you would like to take part in the study, please send the completed consent form in the pre-paid envelope enclosed with this letter by 28th June or soon after. Alternatively you can contact Binder Kaur (researcher, Department of Psychology, University of Stirling) on (01786) 466843 or by email - binder.kaur@stir.ac.uk

Yours sincerely

(Signature from Dr Henry Prempeh)

Dr Henry Prempeh

(Consultant in Public Health Medicine, Forth Valley Health Board)

Study 4: Parents' Consent Form

Forth Valley NHS Board
(Headed paper)

33 Spittal Street
Stirling
FK8 1DX
Telephone 01786 463031
Fax 01786 451474

www.show.scot.nhs.uk/nhsfv

Date
Your Ref
Our Ref

Enquiries to Binder Kaur
Extension
Direct Line 01786 466843
Email binder.kaur@stir.ac.uk

CONSENT FORM

Title of Project: Understanding parents' MMR immunisation decision: An investigation of parental attitudes and health professionals' influences

Name of Researcher: Binder Kaur

Please initial box

1. I confirm that I have read and understand the information sheet for the study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.

3. I understand that the interview will be audio-taped.

4. I agree to take part in the above study.

Name of Parent/Guardian

Date

Signature

Contact telephone number
you

Convenient times for the researcher to contact

Return address: Binder Kaur, Department of Psychology, University of Stirling, Stirling, FK9 4LA
CHI No:

Study 4: Parents' Information Sheet

Health Volunteers Information Sheet

I would like to invite you to participate in a research project. However, before you decide whether or not you wish to participate, I need to be sure that you understand what it would involve. Please read the information carefully and be sure to ask any questions you have.

Topic area covered by the interview

There has been a lot of debate concerning the MMR (measles, mumps and rubella) vaccine. Most research has focused on whether or not parents decide their child should have the vaccine, with few studies asking about parents' views of the vaccine. Information from parents is important for future planning of health services, so this research will focus on parents' views. The interviewer will also ask about information received from health professionals, and how that information may have affected your decision about the MMR vaccine. Ms Binder Kaur, a postgraduate researcher from the University of Stirling will carry out the study.

What does the study entail?

The study requires you to take part in a one-to-one interview that will last approximately 20-30 minutes. Questions relating to your views of the MMR vaccine and how health professionals may have influenced that view will be covered. The interview will be tape-recorded to make sure none of the information you provide is missed. The researcher will then listen to and write down what was said in the tapes once the interview is over. Once the study has been completed, you will be sent a summary of the main findings and will also be invited to comment on the results (whether you agree, disagree or would like to add any further thoughts to the findings) by post or telephone.

What will happen to the information collected in the study?

The data collected in the study will be treated confidentially. No names will be written down when the tapes are listened to. The tapes will be erased once the study is completed. The only person who will have access to the tape will be Ms Binder

Kaur from the University of Stirling. A Data Protection form has been approved by the Forth Valley Health Board and University of Stirling, and a declaration has been signed for confidentiality and security by Binder Kaur.

What are my rights?

If you would like more information before deciding whether to take part, please contact MS Binder Kaur (Research Health Psychologist, University of Stirling) on 01786 466843. Please feel free to discuss the study with friends, relatives or your GP before deciding to take part.

The researcher (MS Binder Kaur) will not have information regarding your child's immunisation status, and will not have access to this information unless you agree to participate.

Participation in this study is entirely voluntary and you are free to refuse to take part or to withdraw from the study at any time without having to give a reason and without this affecting your future medical care or relationship with medical staff looking after you.

The Fife and Forth Valley Research Ethics Committee, which has responsibility for scrutinising all proposals for medical research on humans in Forth Valley and Fife, and the University of Stirling, Dept. of Psychology Research Ethics Committee have examined the proposal and has raised no objections from the point of view of medical ethics.

Study 4: GPs' Letter

Forth Valley NHS Board
(*Headed paper*)

33 Spittal Street
Stirling
FK8 1DX
Telephone 01786 463031
Fax 01786 451474

www.show.scot.nhs.uk/nhsfv

Date
Your Ref
Our Ref

Enquiries to Binder Kaur
Extension
Direct Line 01786 466843
Email binder.kaur@stir.ac.uk

Dear Sir/Madam,

We are writing to inform you that the University of Stirling and NHS Forth Valley are working together to carry out a study on parents' views of the MMR (measles-mumps-rubella) vaccine. We are writing to parents/guardians of children born between 2001 and 2003 in Forth Valley, some of whom may attend your surgery. We hope to interview several parents (or guardians) who have immunised their child and several parents who have decided not to immunise their child with the MMR vaccine. This will help us to understand some of the factors involved in their immunisation decision. We are also interested in the parents views on the way in which health professionals influence the decision making process.

All data collected will be anonymous and confidential. Parents will be asked not to name any individuals (including health professionals) in the interviews, and if names are mentioned they will be deleted when the interviews are transcribed and the tapes will be erased once the study is completed. We would like to assure you that the aim of the study is to understand parents' decisions with regards to the MMR vaccine.

Researchers from the University of Stirling will carry out the study, with support of staff from NHS Forth Valley. The study has been approved by Fife and Forth Valley

Research Ethics Committee, and University of Stirling: Department of Psychology
Research Ethics Committee.

If you have any queries or would like more information regarding this study please
contact MS Binder Kaur (Main researcher, Department of Psychology, University
of Stirling) on (01786 466843) or by email: bk3@stir.ac.uk

Yours sincerely,

(Signature from Dr Henry Prempeh)

Dr Henry Prempeh

Consultant in Public Health Medicine, Forth Valley Health Board

Study 4: Interview Guide

1. Tell me about your child? What was he/she like as a baby?
2. Has your child had the MMR vaccine?
 - Why/why not? Reasons?
3. How did you come to making that decision?
 - What affected your decision?
4. Can you describe your experiences up to the point you made your decision?
 - Details - feelings
 - How did you perceive the MMR vaccine? Do you still feel the same way?
5. Did you share your experiences with anyone?
 - Who?
 - How?
6. What was the most important factor when making your immunisation decision?
 - Details
7. Did you receive any information about the MMR vaccine?
 - What?
 - Source?
8. Did you talk to any health professionals about the MMR vaccine?
 - Who?
 - What was discussed?
 - What information was given?
 - Experiences
 - Were there views valued? Trusted?

9. What is your relationship like with your GP or health visitor?
 - Good vs. bad – reasons, experiences

10. Do you think your relationship with HP had any effect on your decision?
 - How?
 - What impact – details?

11. Did you trust your GP/health visitor when making the MMR decision?
 - Why/why not?
 - Experiences/details
 - What do you mean by trust?

12. How far do you trust the medical profession in general?
 - Reasons

13. Did you trust them with the information they gave you about the MMR vaccine?
 - Why?
 - Experiences/details

14. How did you feel about the government when making the MMR decision?
 - Why?
 - Experiences/details

15. What are your feelings towards the government?
 - Details
 - Experiences

16. What are your feelings towards the single vaccines?
 - Why?
 - Details?

17. If single immuniser – what was your experience of the single vaccine clinics and health professionals who administered the single vaccines?

- Experiences

18. Is there anything you would have liked to have seen or done differently when you were making your MMR decision?

- What?
- How?

Thank you for taking part in this interview. Is there anything else you would like to add?

Study 4: Interview Coding Frame/Grid

	Relationship (positive/negative)	Information received	Past experiences	Present experiences	Influence?	Confidence	Trust (examples)
<i>Own Health Professional</i>							
<i>General Health Professionals</i>							
<i>Government</i>							
<i>Single Vaccines</i>							
<i>Other important referents</i>							
<i>General attitudes</i>							
<i>Other important points</i>							