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WHAT ARE THEY UP TO?

DEVELOPMENTAL PATHWAYS OF PARANOID THINKING:

AN ANALOGUE STUDY

Major Research Project & Clinical Research Portfolio

Part One

(Part Two bound separately)

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Submitted in partial fulfillment of the requirements for the degree of

Doctor of Clinical Psychology.

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Faculty of Medicine Graduate School

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Psychology and Psychotherapy: Theory, Research and Practice (see Appendix A).

SYSTEMATIC REVIEW

Title: Mental state language in caregivers and the influence on that of their children.

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Abstract

Purpose: Mental state discourse between parents and their children is linked to the development of children's capacity to represent theirs and others mental states (Carpendale & Lewis, 2004). Conversations about others and one's own mental world may be crucial for the development of social understanding. Methods: MEDLINE, PsycINFO, ERIC, HMIC, MWIC, Social Policy and Practice databases were searched electronically producing ten studies exploring the relationship between parental use of Mental State Language (MSL) and a) subsequent children's use of MSL or b) subsequent ToM performance were included in this review. Only studies employing a longitudinal design were included. Results: All but one study revealed a positive relationship between parental use of MSL and subsequent use of MSL or performance on a ToM task in children. However, a wide range of methodological issues are highlighted. Conclusion: Research to date, despite not being of high volume, supports the hypothesis that parental use of MSL promotes social cognitive development in children. MSL is a promising window to investigate the effect of social context on social cognitive development. However, future research is required, and would benefit from focusing on the total amount of MSL children encounter in their environment (i. e. not only mother-child dyads).

Self-knowledge comes from knowing other men.

Johann Wolfgang Von Goethe

Introduction

The remarkable immaturity and vulnerability of newborn human primates and their unusually extended period of youth development has long been noted (e.g. Montagu, 1989). Human infants are born helpless and about one year premature compared with apes (Montagu, 1989) leaving the human infant very dependent on adults for an extended period. Most scientists have assumed that the slow maturation process was merely a co-product of a selection process for another characteristic: intelligence (see Bjorklund, 2007). Increasing intelligence, and especially an increase in social intelligence, is assumed to have driven evolution of larger brains, housed inside larger heads. A complex and large brain takes a lot of time to develop, and in humans much of this development has to occur after birth, because bipedalism limits the size of the maternal birth canal, which has been assumed to constrain the head size of newborns (Bjorklund, 2007). There have been arguments however how the extended period of immaturity, both on a physical as well as cognitive level, is adaptive (e.g. Bjorklund and Green, 1992) and natural selection may have favoured a long childhood because it had benefits that outweighed its costs (Bjorklund, 2007). Bjorklund et al. (1992) have argued that some aspects of children's cognition may render them optimal for the acquisition of social-cognitive milestones such as attachment and language.

Bowlby (1969/1982) highlighted how attachment behaviour is crucial for the development of a representational system of mental states. That is, it is only in the presence of a caregiver that infants have a chance to develop internal working

models that allow an understanding of psychological characteristics of other people, and differentiating those states of others from the self (Fonagy, 2001). Internal working models enable a child, and later the adult, to interpret experiences of self and others in terms of intentional attributes, such as desires, emotions, and beliefs and intentions. As Fonagy (2001) highlights, this environmental feature of a reflecting adult is crucial for the expression of genes, as the representational system of a child (and later the adult) may be the mechanism by which it is determined which genotype is expressed in the phenotype. Therefore, pre-maturity and extended period of youth in human primates have adaptive interpersonal functions. The human infant can only acquire representational systems that are the basis of complex social cognitive functioning in the presence of others, making it necessary to come out of the womb and complete brain development in a social context. Montagu (1989) most fittingly describes, there is an "advantage of immaturity: a womb with a view". It is in the context of attachment that cognitive, especially social cognitive, development can take place (Fonagy, 2001).

This important role of social context for social cognitive development very much resonates with Vygotsky's work (1978; Lloyd & Fernyhough, 1999). He also proposed that development is a social process from birth onward, which is fostered by a collaboration between adult and child, within the child's zone of proximal development:

> "The zone of proximal development defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the 'buds' or 'flowers' of development rather than the 'fruits' of development." (Vygotsky, 1978, p. 86).

As to the role of adults and peers he specifies:

"We propose that an essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of developmental processes that are able to operate only when the child is interacting with people in his environment and in collaboration with his peers." (Vygotsky, 1978, p. 90).

Vygotsky's (1978; Lloyd & Fernyhough, 1999) process of 'internalisation' is a helpful theoretical concept by which the role of mental state discourse can influence development. According to Vygotsky's theory, reasoning about mental states becomes internalised in children from participation in interpersonal discourse about thoughts and feelings about self and others with their parents and caregivers.

Mental state discourse between parents and their children has been proposed to be one significant contributor to the development of children's capacity to represent theirs and others mental states (Carpendale & Lewis, 2004). Conversations about others and one's own mental world have been proposed to be crucial for the development of social understanding. A source of evidence for this comes from research with deaf children. Deaf children with hearing parents are delayed in their development of false belief understanding, whereas deaf children with deaf parents are not. The reason for this may be that hearing parents are not as fluent at sign language as deaf parents, and therefore their children may not be exposed to complex conversations about people's actions, beliefs and emotions (Peterson & Siegal 2000; Woolfe, Want, & Siegal, 2002). Further evidence for the relevance of mental state discourse is that types of family talk about mental states have been reported to relate to later performance on false belief tasks (e. g. Dunn et al. 1991). Meins et al. (1999, 1998) have also shown that mothers, who think of their children

in mentalistic terms, and most likely talk to their children about the psychological world, have children who are more advanced in understanding beliefs than are other children. Astington and Jenkins (1999) found that earlier language abilities predict later false belief performance but earlier false belief competence does not predict later language abilities, supporting the conclusion that language is important in social cognitive development.

Mental state language (MSL) has been defined by various researchers, and coded according to a variety of systems (e. g. Bartsch and Wellman, 1995; Ruffman et al., 2002). Talk about mental states can be divided into words that refer to <u>cognitive</u> and <u>emotional</u> states, as well as <u>desires</u>. Words describing cognitive states included believe, think, know, believe, wonder, remember, forget, guess, pretend, understand, and expect. Terms related to mind, imagination, intellect, or metacognition are also included in the category of cognitive mental state language. Emotional mental state language includes words relating to feelings (e.g. happy, sad, angry, cross, grumpy, excited, hurt). Desire terms include want, hope, wish, desire, prefer, keen on, need, and care, as well as phrases that reflect desire states. MSL appears to provide a promising construct through which to explore the development of the child's use of MSL and understandings of mental states. Given the above evidence on the relationship between parental use of MSL and the development of children's social cognitive ability, it is timely to review the literature in a more systematic way.

Objectives

Studying, or even merely summarizing, the evidence supporting a social interactionist framework in which social environment input facilitates the development of children's social cognition is inherently a complex task. Due to the

social environment being such a complex one, with multiple interacting factors, investigation of isolated factors is hardly possible. In this systematic review an attempt is made at focusing on a more defined factor, namely that of MSL. But as quickly becomes apparent, a true focus on just one factor is not possible even in this case. Multiple factors affect the level of mental state utterances, and the concept possibly overlaps heavily with other factors such as and carer attunement attachment (Meins, Fernyhough, Wainwright, Das Gupta, Fradley, & Tuckey, 2002). In addition, as the question is asked in a developmental context, the object of study (the child) is continuously developing. Therefore studying any causal relationships is further complicated.

In the following an attempt is made in reflecting this complex nature by focusing on several specific questions, and an additional section to cover the rich complexity of methodological issues that are inherent in the subject.

The current review will address the following questions:

1) Does parental Mental State Language (MSL) effect child's subsequent MSL?

2) Does parental MSL effect child's subsequent Theory of Mind (ToM)?

3) What are the methodological issues to consider when investigating the causal nature of parental MSL on children's subsequent MSL or ToM?

4) Are there consistent ways in which future research of the relationship between caregiver and child use of MSL can still be strengthened?

Methodology

<u>Search strategy</u>

Search terms were initially drawn up by identifying the key components of the review questions and creating all possible permutations. The resulting search terms were then used to conduct a search using Ovid MEDLINE(R) <1950 to 2010>, PsycINFO, ERIC - Educational Resources Information Center <1965 to May 2010>, HMIC - Health Management Information Consortium, MWIC - Maternity and Infant Care <1971 to May 2010>, EMBASE <1980 to 2010>, Social Policy and Practice. The following key search terms were combined using the Boolean AND operator:

> 1) (children or childhood or child or toddler* or pre?school or infan* or baby or babies or youth or young person* or young people or teen* or adolescen*)
>
> 2) (mental state language* or mental state expression* or mental state utterance* or mental state discourse).

Duplicate references were removed from the results of this search. All of the remaining references' abstracts were inspected and those not meeting inclusion criteria were removed. All studies filtered into the inclusion category were then examined at full-text level prior to inclusion. Key papers were further hand-searched for references that may have been missed by electronic search strategy.

<u>Inclusion and exclusion criteria</u>

> <u>Criteria for inclusion:</u>
>
> 1. Studies published in the English language, without time constraint.
>
> 2. Studies measuring use of mental state language in parent.
>
> 3. Studies measuring use of mental state language in child or other ToM related measurement (e.g. false belief task).

4. Studies using a prospective design, measuring parental use of MSL at an earlier time point before measurement of child's use of MSL or other ToM related measure.

Criteria for exclusion:

1. Studies not published in English.

2. Studies that only measure mental state language at one time point.

3. Studies involving clinical populations (e.g. deaf children, children with cochlea implants, children on the autistic spectrum).

4. Studies that use an experimental manipulation (e.g. training parents in use of mental state language).

5. Studies of insufficient quality to obtain information on how mental state utterances were recorded and coded.

6. Unpublished dissertations or single case research designs, as well as research collections in book form.

Results of literature search

The search and exclusion process is presented in Figure 1. Electronic database searching using the specified terms and hand-searching reference lists of the key papers identified initially produced a total of 63 potentially relevant studies. Of these studies, 39 were excluded following application of the inclusion and exclusion criteria and a further 14 duplications were also excluded. On this basis 10 studies were included in the current review.

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INSERT FIGURE 1 ABOUT HERE

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<u>Quality Ratings</u>

The structured rating scale developed to assess the quality of studies under review is presented in Table 1. All papers were rated using this scale, and a sub-set of papers was rated by a second reviewer. The rating allowed a structured overview of the variation in methodological quality of the papers included in this review, and guided the presentation of the result section. A summary of each reviewed study is presented in Table 2.

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INSERT TALBE 1 ABOUT HERE

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Results

The results of the review are considered in four sections as defined by the review questions. Firstly, the results relating to the relationship between parental and subsequent child MSL, and secondly ToM performance, will be presented. This will be followed by an analysis of the range of methodological issues, and how the range of studies included in this study do, or do not, account for these pertinent to the interpretation of these studies. Finally, and leading on from methodological issues, ways in which future research of the relationship between caregiver and child use of MSL can still be strengthened, will be explored.

<u>Parental mental state language and child's subsequent mental state language</u>

Six studies included in this review (Furrow et al., 1992; Ruffman et al., 2002;

Jenkins et al., 2003; Rudek et al., 2005; Tamoepeau et al., 2006, 2008) measured child's subsequent MSL, of which five reported positive relationship between maternal (or family, in the case of Jenkins et al., 2003) use of MSL and subsequent use in their children. In the following a short overview of the five studies revealing a positive interaction will be given, as well as one study (Rudek et al., 2005), which did not reveal an interaction. See Table 2 for an overview of studies, and Figure 2 for an overview of the duration of longitudinal studies included in this section.

INSERT FIGURE 2 ABOUT HERE

Jenkins et al. (2003) studied 37 children over six observational sessions (duration: each 90 min) in the homes of participants at Time 1 (age $\underline{M}$ = 2.4 yrs) and 2 (age $\underline{M}$ = 4.4 yrs). Data were collected in an equal division of mother-only and mother-father sessions. Families were not given any task but carried on with their daily activities (except video games or watching TV, which they were discouraged from doing), and an experimenter was present for recording of sessions at all times. This is the only study included that explicitly studied family-wide use of mental state language (mother, father, older and younger siblings). Rates of mental state terms (rates of talk per hour were calculated) were low at both time points, but varied greatly between families. MSL was divided into cognitive, desire and feeling talk. A hierarchical regression analysis, investigating family members' mental state talk on younger siblings' mental state talk, revealed that family member's cognitive (Time 1) was a significant predictor of change in younger children's cognitive talk, accounting for an additional 9% of the variance in change in children's cognitive talk (Time 2). A similar result was found for feeling talk, where family members feeling

talk explained 10% of the variance in change in children's feeling talk. No such effect was observed for desire talk. Unfortunately, Jenkins et al. (2003) did not report results across all types of MSL, to allow an evaluation of the question whether overall family members' MSL has an effect on childrens' MSL. To control for effects of language, Jenkins et al. (2003) determined whether younger children's mean length of utterance (MLU) at Time 1 was a significant predictor of younger children's mental state talk. This was only the case for cognitive talk, and therefore MLU was entered in the hierarchical regression analysis for this type of mental state language. Even after taking children's general language competence into account, as well as their specific use of cognitive terms (at Time 1), their change in cognitive talk was predicted by their exposure to cognitive talk by mothers, fathers and older siblings.

Taumoepeau et al. (2006, 2008) conducted a study of 74 (at Time 1 and 2; and 72 at Time 3) parent infant dyads with three time points (2006 paper: Time 1, 14.8 mths; and Time 2, 24.2 mths.; 2008 paper: Time 3, 32.8 mths.). The majority of participants were mother-infant pairs (with only three father-infant pairs, for which reason Taumoepeau et al., 2006 and 2008 only refer to mothers). They were instructed to engage in a short picture-describing task in the lab environment (Time 1, 2 and 3), during which experimenter left the room. The pictures used for this task depicted adults and children expressing a range of emotions (60% of all pictures), as well as people and animals. This is important to note, as the specific task participants were asked to engage in carried a bias towards MSL. In addition, only parental MSL was measured directly (i.e. coded from session transcripts), whereas child MSL was acquired by parental rating-scales. At all three time points, the MacArthur Communicative Development Inventory (MCDI: Fenson, Dale, Reznick,

Bates, Hartung, Pethick, & Reilly, 1993) was used to rate child language as well as MSL. At Time 1 mostly receptive language was measured (parents were asked to indicate which words or gestures their child understood or produced). At Time 2, they indicated only words that their children produced. In addition, a supplementary checklist of internal state was included as part of the general MCDI checklist. At Time 1 this included terms of mental state, physical state, emotion, and the senses. At Time 2 a further set of cognitive terms and modulation of assertion were added. In order to control for verbosity in parents, mental state utterances were examined as a percentage of total utterances. Linear regression analyses were used to investigate the predictive value of parental MSL. Parental use of desire language at Time 1 was a unique predictor of child total MSL at Time 2 (Taumoepeau et al., 2006). There was no relation between child MSL and later mother desire language, suggesting a unidirectional relation between early mother desire language and later child MSL. Parental emotion, desire, and think/know talk at Time 2 accounted for 10% of the variance over and above the variance attributed to other child and parent variables at Time 3 (e.g. SES, parent-rated child language ability). However, it is particularly parental talk about thoughts and knowledge that emerges as the more consistent predictor of child MSL at Time 3. Taumoepeau et al. (2008) highlight changes in what type of mother talk is important—first desire talk about the child, then think/know talk about others—are crucial to understanding the specifics of how mothers help children.

Ruffman et al. (2002) studied 82 mother-child dyads at Time 1 (age $\underline{M}$ = 3.01 yrs), but only 79 dyads at Time 2 (age $\underline{M}$ = 3.41 yrs), and 72 dyads at Time 3 (age $\underline{M}$ = 4.04 yrs). Ruffman et al. (2002) used a lab-based picture-describing task to collect MSL data in mothers. However, at Time 1 the picture set was of people engaged in

common tasks, whereas Time 2 and 3 were of more emotionally charged situations, which leaves open the possibility that they differed in the amount of mental state talk that they provoked. Partial correlations between mother mental state utterances and later child mental state utterances were significant for all comparisons (Time 1-2: r = .41, Time 1-3: r = .51, Time 2-3: r = .39; taking into account child MSL at Time 1). Child utterances never predicted later mother utterances, which the authors interpret as indication for a unique role for mother utterances. Linear regressions in which mother mental state utterances were directly compared to language ability, to determine which accounted for more variance in MSL use in children, were not reported. This type of linear regression was however reported for subsequent ToM performance (see next section), and revealed that language ability was highly related to ToM understanding, but that mother MSL use explained a comparable or even greater amount of unique variance in children's ToM performance. Unfortunately we cannot assume that this result would have been the same for MSL use, and therefore it is regrettable this additional analysis was not reported for MSL use in children.

Furrow et al. (1992) studied 19 mother-child dyads at two time points (Time 1: age $\underline{M}$ = 2 yrs.; Time 2: age $\underline{M}$ = 3 yrs.). They, similar to Jenkins et al. (2003), used a home-base observation, without a specific task. Mothers told that the purpose of the study was to look at mother and child conversations during mealtime, reading time, and playtime. Mothers were told to follow their normal pattern of interaction as much as possible. Proportions were calculated using a denominator for all comprehensible utterances during that session for that age. Mothers' use of mental terms at Time 1 predicted their children's use of these terms a year later ($\underline{r}$ = .50, $\underline{p}$ = .05). Furrow et al.'s (1992) study is the most methodologically weak study included

in this review that investigated the prospective relationship between maternal and child MSL. It took no account of other variables, such as child language ability, child's level of MSL use at Time 1, SES and education level of mother, although the authors do highlight that a complex reciprocal relationship is possible. It should be noted that this study was the first to look at the prospective relationship between maternal and child MSL in a systematic way, paving the path for future research on the central importance in our understanding of the development of children's theory of mind.

Rudek et al. (2005) studied 21 mother-infant dyads at two time points (Time 1: age $\underline{M}$ = 30 mths., Time 2: $\underline{M}$ = 42.4 mths). This study different from all of the above in that the context in which data on MSL were collected was very different. Participating mother-child dyads were asked to talk about three past experiences. A researcher guided the mother in selecting an event to discuss (special, one time experiences that they had with their children in the past; e.g. trip to the zoo, picnic, visit with grandparents). Mothers were invited to elicit their children's recall of these events in as natural way as possible. Only utterances that were on task (i.e. reminiscing about past event) were included in coding. Mediational analysis revealed that mother's mental term use at Time 1 no longer significantly accounted for variance in children's Time 2 use once children's Time 1 use was also included in the equation. Only children's Time 1 use uniquely predicted use at Time 2. The Time 1 use of MSL by mothers and children was a better at predicting their respective use at Time 2, than the Time 1 use of their partner. These results differ from the above studies that all revealed a significant relationship between parental MSL at Time 1 and child MSL at Time 2. However, as the task under which the MSL data were collected is so different from previous studies, it is unclear whether

specific memory-related conversation is a determining factor. The fact that no association between general language abilities and both mothers' and children's mental state term were found, as several other studies have, may indicate that the specific context of data collection may be in deed relevant. In addition, Rudek et al.'s (2005) sample is relatively small, which inevitably will have led to a smaller range on both language, and specifically MSL, in the data.

Overall, the majority of studies included in this review show that parental use of MSL does predict subsequent child's use of MSL. The majority of studies (Jenkins et al., 2003; Taumoepeau et al., 2006, 2008; Rudek et al., 2005) did include general language ability in their analysis, to investigate whether variance in use of MSL was merely due to variance in overall language ability. In the studies by Jenkins et al. (2003) and Taumoepeau et al. (2006, 2008) this was done in the more methodologically diligent way by including language ability (e.g. MLU) in the regression analysis. Rudek et al. (2005) approached the question of a general language ability confound, but did so in a separate correlation analysis, which revealed that increases in children's MSL use during reminiscing are not simply related to increases in their language skills. There was one significant correlation however, between language ability at Time 1 and children's Time 2 use of mental terms to express desires ($r = .48$, $p = .05$). This indicates that an inclusion of language ability in the regression analysis would have been desirable.

All studies above, bar Furrow et al. (1992), controlled for Time 1 use of MSL in children. This satisfies the methodological consideration that later use of MSL is likely to be highly correlated with early use. This way the variance explained by parental early use of MSL can more safely be interpreted as causal in children's later use.

<u>Parental mental state language and child's subsequent Theory of Mind</u>

Seven studies included in this review (Dunn et al., 1991a, 1991b; Meins et al., 2002; Ruffman et al., 2002; Symons et al., 2006; Taumoepeau et al., 2006, 2008) measured child's subsequent ToM performance, and all reported positive relationship between parental use of mental state language and subsequent ToM performance in their children. However, the tasks used and specific interactions tested varied widely between studies. Therefore in the following a short overview of the studies will be given. See Figure 3 for an overview of the duration of longitudinal studies included in this section. As can be seen in Figure 3, first and final data collection differed widely between studies. In addition, the distance between first and final data point differed greatly, with three studies (Dunn et al., 1991a; Meins et al., 2002; Symons et al., 2006) spanning on average across approximately 43 months. Dunn et al. (1991b), Ruffman et al. (2002) and Taumoepeau et al.'s (2006, 2008) studies on the other hand spanned over an average of 12 months. This variability is important to note given that the subject matter of investigation in all studies involved developmental processes.

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INSERT FIGURE 3 ABOUT HERE

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Meins et al. (2002) studied 57 mother-infant dyads (Time 1: age $\underline{M}$ = 6 mths., Time 2: age $\underline{M}$ = 45 mths., Time 3: age $\underline{M}$ = 48 mths.), and used a lab-based free play session, where mothers were not given any specific instructions, other than being invited to play with their children as they would at home. Interactions were videotaped, and the experimenter was not present. Mother's behaviors were classified for maternal mind-mindedness according to Meins et al.'s (2001) system

of five categories: maternal responsiveness to change in infant's direction of gaze, maternal responsiveness to infant's object-directed action, imitation, encouragement of autonomy, and mind-related comments. In this review it is only the final category that shall be considered, and yet it is important to keep in mind that this variable may be somewhat different to MSL measurements in other studies. Apart from comments on the infant's mental state, mental process, level of emotional engagement, the infant's attempts to manipulate other people's beliefs, the mother ''putting words into her infant's mouth'' so that her discourse took the form of a dialogue was also coded (Meins et al., 2001). As Meins et al. (2001) argued previously as being necessary, an independent measure of whether each mind-related comment was appropriate or inappropriate was added. To control for verbosity, comments in the appropriate and inappropriate mental comments categories were calculated as proportion of the total number of maternal comments produced during the session. The data on ToM performance were collected in the family home environment, as opposed to the measure of mental comments by mothers at Time 1. Children were tested on three ToM tasks. Firstly they took part in the appearance–reality task (Flavell et al., 1983), in which children are shown an object whose appearance is deceptive (e.g. a sponge that looked like a football, a frog pencil sharpener). Children passed this test when they could correctly answer two test questions: (a) ''What is this really and truly?'' and (b) ''When you look at it with your eyes right now, does it look like a [football] or does it look like a [sponge]?'' Secondly, children took part in the deceptive box task (Hogrefe et al., 1986), in which they were asked what they thought was inside a candy tube. Children were then shown that the tube contained pencils, rather than candies. Once the lid was replaced to the tube, children were introduced to a toy animal and asked

to predict what the toy animal would think was in the tube. The final ToM test was an unexpected transfer task (Wimmer & Perner, 1983), more commonly referred to at the Sally-Anne task (Leslie & Frith, 1988). A forward regression revealed that children's language scores were the best predictor of overall ToM performance ($\underline{R}^2$ = .16, $\underline{T}$ = 3.29, $\underline{\beta}$ = .41, $\underline{p}$ = .005), followed by appropriate mind-related comments ($\underline{R}^2$ = .11, $\underline{T}$ = 2.80, $\underline{\beta}$ = .33, $\underline{p}$ = .01). Mothers' appropriate mind-related comments accounted for 11% of the variance in overall ToM performance. It should be noted that no analysis for was reported for the predictive value of all mental state utterances by mothers at Time 1 and children's ToM performance at Time 2, but only for appropriate mind-related comments. Although maternal sensitivity (Meins et al., 1998) was positively correlated with mother's proportional scores for appropriate mind-related comments, this variable was not a significant predictor of ToM performance. This indicates that Meins' variable of mind-related comments (or MSL for the purpose of this review) is to some extend independent from maternal sensitivity (although they were found to be significantly correlated).

Symons et al. (2006) studied 43 dyads at two time points (Time 1: age $\underline{M}$ = 24.7mths., Time 2: age $\underline{M}$ = 69.2 mths). Their study was similar to Meins et al.'s (2002) study in that at Time 1 mothers were asked to play with their toddler in a laboratory setting for ten minutes, which was videotaped, transcribed and coded for mental state utterances. Statements were coded for appropriateness according to Meins et al. (2002). However, different from Meins et al. (2002), frequency counts, as opposed to proportions of total talk, were used. An estimate for children's language ability was included, in form of MLU. ToM performance was measured with two sets of tests at Time 2. Firstly, six items of a deceptive box task (e.g., the Smarties task, Gopnick & Astington, 1988) were used. Secondly, children

completed five items of the unexpected transfer task (Wimmer & Perner, 1983). ToM was positively associated with the mother's appropriate desire state language, but not her appropriate cognitive state language, nor any other dependent measures. A hierarchical regression was conducted in which the background variables (child's age, SES, maternal sensitivity) were entered at step 1. The child 's language measures were entered at step 2, and then appropriate maternal desire state language was entered in step 3. Neither background variables nor language ability accounted for a significant amount of variance. Maternal appropriate desire state language accounted for an additional 11 per cent of the variance in the ToM performance. It is possible that child desire state language accounted for their ToM performance rather than maternal appropriate desire state language, particularly as these two language measures were positively related. Therefore the regression was rerun with the child desire state language as an additional predictor at step 3. This did not affect the additional variance accounted for by this step nor the total variance accounted for by this step. However, this overall regression equation was not significant after step 3, and neither child nor maternal appropriate desire state language were significant predictors of ToM. Unconditional counts of neither desire nor cognitive state words by mothers were predictive of their later ToM, and the desire state language of mothers was only predictive of their ToM when it was designated as appropriate. Unfortunately, language ability was not measured at Time 2 in this study, therefore not allowing control for this influence on ToM performance at Time 2. In addition, the mother's level of MSL and child's language ability were assessed both at Time 1, from the same play session. This makes it difficult to interpret the interrelations of the language of mother and child, as either an individual difference of a session, dyad, or person.

As the studies by Taumoepeau et al. (2006, 2008) have been described in the previous section, only the two ToM tests and results will be mentioned here. Firstly, a child emotion situation task was used, in which children were tested at the second time point on their ability to discern how a person felt. Children were presented with cartoon-style vignettes designed to elicit a specific emotional reaction from the protagonist (e.g., a boy being chased by a lion). The protagonist's face was blanked out and the only clues to how the protagonist was feeling were from situational clues. Children were then presented with the original picture of the person-situation and two other pictures of a person's head expressing a choice of two emotions, from which they had to choose one. Secondly, a child body emotion task was used. In this task children were also tested on their ability to discern how a person was feeling, but this time from their body position. The person's face was not visible and the only clues were through body position (e.g., head in hands). The child was then required to point to the face that best depicted how the person was feeling. Mothers were administered two emotion recognition tasks as well. The first task, taken from Sullivan and Ruffman (2004), tested their ability to match a verbal emotional expression with a corresponding picture. The second task examined mothers' ability to match a picture of an emotional expression with a corresponding emotion word. Linear regression was used to examine which of the significant mother MSL variables accounted for the most variance in later child emotion situation task performance. In the first step all potentially confounding variables were entered (e.g., SES, mother emotion task performance, total Time 1 child language, other significant correlates) with the targeted predictor variable entered in the second step. Only mother desire talk at Time 1 remained a significant correlate and predictor of later child emotion situation task performance at Time 2 ($\underline{R}^2$ = .08, $\underline{T}$ = 2.08, $\underline{\beta}$ = .28,

$p < .05$). Mother think/know talk at Time 2 was the only predictor of children's performance on the emotion situation task at Time 3 performance ($R^2 = .11$, $T = 2.65$, $\beta = .38$, $p < .05$). Mother talk about thinking and knowing accounted for 11% of the variance, over and above child language and emotion situation task performance at Time 2, mother performance on the emotion tasks and SES. Although mother talk about desires continued to contribute variance in later child talk about mental states, mother talk about thoughts and knowledge emerged as a more consistent correlate. As with Symons et al.'s (2006) study, the MSL measure for mother and child were acquired from the same session, leaving open the possibility of interrelationship.

As Ruffman et al.'s (2002) study has been described in the above section, additional information on ToM tasks and results will be described only. A false-belief transfer task was given at all three time points and was based on the study by Wimmer and Perner (1983), a desire–emotion task was based on Wellman and Wooley (1990), and an emotion–situations task was based on Denham (1986). At Time 3, the ToM task increased in complexity, and children were also asked for justifications (e.g. "Why will she think there are crayons inside?"). At Time 3 an additional ambiguity task, based on a study by Taylor (1988), was given to the children. The combination of ToM tasks used in this study is different to the previously discussed studies, in that it involved a greater number of tasks, as well as more complex versions of tasks at Time 3. Linear regression analyses were used. Mothers' mental state utterances were predictors of later ToM when partialing out early ToM performance, early child mental state utterances, early language, and maternal education (SES). Mothers' mental state utterances correlated with subsequent theory of mind at all three sets of time points. Analogous analyses were carried out for language, after

partialing out early mother mental state utterances. Having accounted for all such potentially confounding variables, there was clear evidence that both mother utterances and language played a unique causal role in facilitating theory of mind. Dunn et al.'s (1991a, b) studies are overall methodologically weaker than the studies discussed previously. However, it should be noted that Dunn et al.'s studies were leading in opening the now vast field of investigation on early parental variables and later social cognitive function in children. In Dunn et al. (1991a) the study involved 41 children at two time points (Time 1: age $\underline{M}$ = 36 mths., Time 2: age $\underline{M}$ = 6.5 yrs.). In Dunn et al. (1991a) the study involved 50 children at two time points much closer together (Time 1: age $\underline{M}$ = 33 mths., Time 2: age $\underline{M}$ = 40 mths.). Dunn et al. (1991a, b) collected their data in home-based observations, without an explicit task being given. The authors developed a categorization system for the analysis of conversations in which family members referred to feeling states. The analysis was limited to feeling state references, and therefore internal state terms regarding volition, motivation or cognition were not included. This is a major difference to any of the previously discussed studies. In their earlier study (Dunn et al., 1991a), children's ability to identify others' emotions was assessed with the Rothenberg (1970) test of social sensitivity at Time 2. This test requires children to listen to tape-recorded scenarios, in which a character is depicted undergoing a change in feelings (e.g. feeling happy at the start of scenario, and scared at the end), and point to the correct emotion on photos depicting a range of emotions. It should be noted that this test was not used by any of the other studies included in this review. No reliability data is reported for this test, making it overall difficult to assess the quality of this measure, and its usefulness in measuring ToM performance. Partial correlations (controlling for child MLU) were calculated and revealed significant

results for feeling state talk from mother to child and subsequent emotion-recognition task. The same was true when controlling for total mother-child talk.

In their later study Dunn et al. (1991b) used the same coding system for feeling state references. This study focused on younger children (Time 1: M = 33 mths; Time 2: M = 40 mths) and used a different set of tasks to evaluate ToM related performance. Firstly a false belief task (Bartsch & Wellman, 1989) and an affective perspective-taking task (Denham, 1986) were used. The latter task involved several vignettes centred on emotion-inducing situations that were acted out with hand puppets. The task was designed to require inference about a puppet, who was expressing an emotion different from the emotion typical for the child in that situation (as established from previous interview with mothers, who were asked to indicate whether their child would be e.g. happy or sad to come to nursery, whether they would be happy about or fearful of big dogs). After each vignette children were asked what the puppet was feeling. Correlation analyses revealed significant relation between mother-child feeling state talk at Time 1 and both social understanding measures used at Time 2. Multivariate regressions were calculated, but will not be reported her as they unfortunately did not focus on the specific question this review is concerned with.

Overall, the results from these studies indicate that parental MSL has an influence on later ToM performance. However, the studies included in this review proved to be very heterogeneous with respect to timing of data collection, coding systems used for MSL, and tasks used to measure ToM performance in children. The study by Meins et al. (2002) collected data at the earliest Time 1 point of all studies (6 mths), where children had no productive, and most likely also no receptive language skills. Together with Symons et al.'s (2006) study, which overlaps considerably in the

choice of coding system used for MSL and tasks used to measure ToM, this allows an overview of development of the relationship between parental MSL and ToM between 6 and 69 months. The studies by Meins et al. (2002) and Symons et al. (2006) both focused on appropriate MSL, which forms a sub-set of all MSL and limits how comparable the results between these studies and others are. Finally, the type of tasks used to measure ToM spanned from emotion recognition tasks (Taumoepeau et al., 2006, 2008), to false belief tasks most commonly thought of in relation to ToM function (Dunn et al., 1991b; Meins et al., 2002; Ruffman et al., 2002; Symons et al., 2006) and a somewhat less widely used affective perspective taking task (Dunn et al., 1991a). This variety can either be interpreted as making the evidence for a relationship between parental MSL and ToM stronger. It can however also be seen a barrier to comparing the results.

Methodological issues

In the following a number of methodological issues shall be outlined that are relevant in relation to the research papers that have been included in this review.

Interdependence of measures: All studies included in this review that measure MSL for parent and child at Time 1 do so within the same session (i.e. picture describing task used by Ruffman et al., 2002). Consequently, the measure of MSL for parent and child are not independent. This might be problematic, as it precludes interpretation of individual differences as that of the particular test session, dyad, or person. This is a fundamental interdependence of maternal and child language measures. This problem could be overcome by measuring parental use of MSL, e.g. with the help of a picture describing task, and then measure the child's use of MSL in an independent situation with another adult or a peer. That in itself is theoretically interesting.

Frequency or proportion measures: Measuring use of MSL of parents as well as children is potentially confounded with the overall amount of verbal output produced by a person. Adults or children that are more verbose might for this reason produce more mental state utterances. For example, Jenkins et al. (2003) found that raw counts of children's mental state talk were correlated with conversation turns for all family members, and that raw counts of children's MSL were correlated with raw counts of their mothers' and fathers' MSL. However, when Jenkins et al. (2003) controlled for the number of conversation turns many of these relationships were no longer significant. This highlights how parents and children showed similarity in their use of MSL in the raw data simply because they showed similarity in the amount that they talked.

To control for this, researchers have used various methods. Meins et al. (2002) calculated scores for mind-related comments as proportion of the total number of comments produced in the play session between parent and infant. They chose not to calculate this score relative to all mind-related comments, arguing that this allows a truer picture of the frequency with which mothers make appropriate and inappropriate mind-related comments during the test session. Symons et al. (2006) and Ruffman et al. (2002) on the other hand used frequency scores, as opposed to proportion scores. They argue that each word used by parents may have a direct impact on the child's ToM development, and that a proportional representation would not capture this as well. The increased use of mental state terms by parents could also affect ToM abilities regardless of whether or not it is simply a function of the verbosity of parents. Therefore Symons et al. (2006) recorded the mother's total number of words as well, to address parental verbosity. In this review two studies included the number of mental state utterances (Ruffman et al., 2002; Symons et al., 2006) and controlling for verbosity separately, four studies used proportion scores

(Rudek et al., 2005; Jenkins et al., 2003; Meins et al., 2002; Taumoepeau et al., 2006, 2008), and two (Dunn et al., 1991a, b) use a different metric entirely (rate per hour). Overall, whether researchers choose either way of measuring MSL may be critical when trying to compare outcomes from various studies. Were there differences in the outcomes observed in these studies?

Inclusion of I know and I don't know: Studies included in this review differed as to whether utterances such as "I know" or "I don't know" were included in the coding for mental state utterances. Ruffman et al. (2002) only included such utterances if they referred to a lack of knowledge (e.g. "I don't know what that is.") or questioned a source of knowledge (e.g. "How do you know that?"). The response "I don't know" was not coded as a mental state utterance if there was no elaboration as to what is unknown, making unclear whether the utterance simply is meant as "I can't answer". Jenkins et al. (2003) and Taumoepeau et al. (2006, 2008) handled this issue of coding in a similar way. Meins et al. (2002) did not specifically mention "know/don't know" utterances, possibly as they did not occur in conversations mothers were having with their only 6-month-old infants, and did not exclude these. Symons et al. (2006) on the other hand excluded all "I don't know" utterances. Rudek et al. (2005) interestingly formed a separate formulaic category into which "I don't know" utterances were included, and all subsequent analyses only included nonformulaic mental state utterances. It is therefore a possibility that this difference in coding utterances contributes to Rudek et al.'s (2005) study being the only one that in this review does not reveal a positive correlation of parental and subsequent child's use of MSL. As Rudek et al. (2005) however also used a very different task to measure MSL (reminiscing task) it is unclear whether either of these two factors may have led to the lack in findings.

Tasks used to measure ToM ability: The range of tasks used across the studies included in this review, which aim to measure ToM ability, is large. Dunn et al. (1991a) for example used a no longer widely utilised Rothenberg (1970) test of social sensitivity. This test requires children to listen to tape-recorded scenarios and point to the correct emotion on photos depicting a range of emotions. Dunn et al. (1991b) used an affective perspective-taking task (Denham, 1986), which involves vignettes being acted out with hand puppets. Children are required to make inference about a puppet. In other studies false-belief tasks were utilised, which are qualitatively very different from the above tasks. Amongst the group of false belief tasks, the Appearance Reality (Flavell et al., 1983), Deceptive Box (Hogrefe et al., 1986), and Unexpected Transfer task (Wimmer & Perner, 1983; more commonly referred to as Sally-Anne task, Leslie & Frith, 1988), which have been described in more detail in the above body of text. Taumoepeau et al. (2006, 2008) on the other hand have used emotion recognition tasks as primary indicator for ToM ability.

It has been highlighted how the development of ToM includes understanding multiple concepts acquired in an extended series of developmental accomplishments (Wellman, 2002), and has led some researchers to develop a scale of ToM tasks (Wellman & Liu, 2004). This calls into question whether the measures of ToM utilised in the different studies included in this review are comparable, and inevitably makes comparison of results between studies difficult.

Unidirectional effect of maternal MSL and child ToM performance: Even with longitudinal designs, one has to be very cautious in inferring causality (from parental use of MSL to subsequent child ToM ability). For instance Dunn et al. (1991a, b) used a single measure at Time 1 (e.g. mother's frequency in using feeling state terms) and a single measure of child ToM at Time 2. There are two reasons

why it is difficult to infer a true causal role for mother MSL from such data. First, it is possible that mother MSL at Time 1 predict ToM performance at Time 2 indirectly, through variance they share with ToM understanding at Time 1. That is, ToM at Time 1 would be expected to correlate with ToM at Time 2. If mother use of MSL and child's ToM at Time 1 correlate with one another, then early mother MSL might correlate with later ToM simply through the shared variance with early ToM, and not because they have a unique causal role in facilitating ToM. In order to avoid this, early ToM (Time 1) ability in children has to be controlled for in order to be able to draw more firm causal conclusions. Those studies that do this (Ruffman et al., 2002; Taumoepeau et al., 2006, 2008) find that parental use of MSL has predictive value towards subsequent ToM in children.

Similarly, children's early social cognitive ability may shape parents' early use of MSL. It is uncertain, whether parental use of MSL towards children at Time 1 facilitates subsequent ToM, or whether parents used more MSL with their children at Time 1 because they had picked up on their children's higher social cognitive ability (evidenced through advanced child mental state talk). For the above reasons it is essential to partial out early ToM ability and children's early MSL when considering whether early parental MSL use facilitates later ToM ability. The only study that attempts this is that by Taumoepeau et al. (2006, 2008). However, it should be noted that MSL is rated by parents. This leaves open the possibility that parents who assume their child to have higher ToM ability also choose more MSL options on the check-list used to measure MSL. Also, the ToM tasks employed by Taumoepeau et al. (2006, 2008) are emotion recognition tasks, and not false belief tasks that more commonly are understood to be good measures of ToM ability.

The studies included in this review which did control for early MSL and/or ToM

were those by Ruffman et al. (2002), Jenkins et al. (2003), Rudek et al. (2005), Symons et al. 2006) and Taumoepeau et al. (2006, 2008), and are therefore more likely to allow links between parental use of MSL to be interpreted as causal.

<u>Age and developmental trajectories:</u> The majority of research into the relationship between parental and child MSL has been on children 3 – 5 years old. Only two of the studies included in this review include data with the first time point lying before the children's first birthday (Dunn et al., 1991b; Meins et al., 2002). The remaining studies (see Table 2) have first time points between children's first and third birthday. As for second time points (subsequent child MSL or ToM), the range is even greater (between 2 and 6 years). The majority of studies have the second data point between the third and fourth birthday, with only three of the included studies measuring MSL or ToM after the 5th birthday (Dunn et al., 1991a; Meins et al., 2002; Symons et al., 2006). The reason time of testing and age are an important issue is that the period of language development before age 2 is fertile growing ground to a vast amount of general vocabulary and conversational knowledge. With regard to ToM the claim has been made that there is an early onset (between 9 and 18 months) of aspects contributing to ToM, such as understanding goals, intentions and desires (e. g. Meltzoff, 1995). Jenkins et al. (2003) found that family talk was not associated with change in older children's MSL. This may indicate that the factor of exposure to MSL is important to the development of mental state talk when children are between 2 and 4 years old, but after that MSL is influenced by more intrinsic factors, such as their individual developmental trajectory. The large variation in time points of testing across the studies therefore does not allow drawing firmer conclusions on what the critical periods, where parental MSL may have a beneficial effect on the development of children's social

cognitive function, may be.

Language development: In this review the social environment and their effect on the social cognitive development of children is of primary interest. However, the role of endogenous factors related to a child's own general language have to be taken into account. Biological maturity is the basis for the development of linguistic structures that become increasingly sophisticated over development. It is possible that parents' and children's talk about mental states may correlate with one another through mechanisms other than exposure to MSL. It could be genetically mediated language processes that account for an association between child and parent mental state talk. Therefore it is important that studies control for children's language ability as a proxy for the level of language development that they have reached. The mean length of utterances (MLU) and use of MSL at Time 1, as an estimate measure for endogenous factors related to individual differences in cognitive functioning, has therefore been included in some studies, in order to isolate effects of exposure to MSL from other mechanisms in children's MSL acquisition (e.g. Ruffman et al., 2002). However, although MLU measure linguistic production, it does not directly measure linguistic understanding. It may be important to control for language ability using standardised language tests (e.g. Meins et al., 2002).

The absence of fathers: The majority of research reported in this review focuses on mothers and their children. Only two of the studies that are part of this review included fathers (Jenkins et al., 2003; Taumoepeau et al., 2006, 2008). Jenkins et al. (2003) measured mental state utterances in two contexts: mother and father present with children, or mother alone with children. Interestingly they did not add a condition of father alone with children. This does not allow decisive conclusions to be drawn concerning gender effects in the use of MSL (mothers were

reported to use more MSL than their partners when in company of partner; but it is not possible to draw conclusions on fathers using less MSL in general and when on their own with children). It further reflects an approach of merely being interested in fathers in terms of how they may moderate the mother's behaviour, rather than being of interest in their own right. In the study by Taumoepeau et al. (2006, 2008) three fathers were included in the sample. It is therefore surprising that throughout the result and discussion section of both papers the authors only ever refer to mothers. Again, it does reflect the general bias towards the infant-mother relationship. Evidence reveals that at least in families with two parents, children whose fathers used more diverse vocabularies had greater language development and that mothers' vocabulary did not significantly affect a child's language skills (Pancsofar & Vernon-Feagansa, 2006). This highlights that the language environment of children is much more diverse, and a focus of research exclusively on the mothers is most likely limited. In addition, the composition of family members seems to have an effect on the amount of MSL used. Mothers used more MSL when they are with their children on their own than when the children's father was present too (Jenkins et al., 2003). It is important to note that Jenkins et al. (2003) only recorded mother or father utterances if they were directed towards their children. This precludes all MSL that mother and father may be using in conversation with each other, which is likely to contribute to the total number of MSL that a child encounters, let alone occurring in the context of a child's first and foremost learning opportunity about close relationships (i.e. how their mother and father relate to each other, hold each other in mind, etc.). To summarise, the lack of studies including fathers is a serious limitation to the research into the contribution of MSL used by primary carers on children's development of MSL and ToM. This

however highlights a more general point addressed in the following paragraph.

Family factors affecting exposure to MSL: Two studies controlled explicitly for family constellation by adding number of older siblings as independent variable (e.g. Meins et al., 2002). Other studies (Rudek et al., 2005; Ruffman et al., 2002; Taumoepeau et al., 2006, 2008) do not report whether the children in their sample had siblings, or they mention proportion of participants that had siblings but do not account for it in the analysis (e.g. Symons et al., 2006). As several studies have shown that children with relatively more siblings and extended family do better on a variety of ToM tasks (e.g. Jenkins & Astington, 1996), the presence or absence of siblings in the environment of a child is important. It has been suggested that the effect may be restricted to children with older siblings (Ruffman, Perner, Naito, Parkin, & Clements, 1998), but evidence is there for older as well as younger siblings (Peterson, 2002) to affect false-belief task performance. Overall this suggests that the presence of siblings, younger or older, have an effect on the development of self and other understanding. However, the specific mechanisms have not been studied much. Jenkins et al. (2003) showed that children with older siblings are exposed to more talk about cognitive states than children without older sibling, possibly indicating why children with older siblings may have higher use of MSL a number of years later. This increase in exposure is for one surely the verbal output of older siblings per se, but possibly also the increased opportunity younger children have listening to their parents interacting with their older siblings, and using MSL in that context. However, the inclusion of siblings is by far not an adequate description of the (family) environment that exposes a child to MSL. Grandparents and extended family as well as non-related alloparents (friends of family or, e.g., in formal settings nursery staff) contribute to the world of language

that a child encounters. Research not taking into account the wide multitude of social learning environments, which can range from a single child being cared for mostly by one parent, to that of a child with multiple siblings, cared for by mother and father as well as nursery staff and grandparents, is at risk of missing important information.

Parental socioeconomic status and level of education: Recent research has shown beneficial effects of having siblings on the performance on false belief tasks, however only for older but not younger siblings (Ruffman et al., 1998). The sibling effect was not replicated, however, in two more studies involving working-class families (Cole & Mitchell, 2000; Cutting & Dunn, 1999). This highlights how socioeconomic status is a variable that is not to be neglected when studying socialisation effects on social cognitive functioning. Studies included in this review have not all reported measures of socio-economic status (SES) for families participating in their studies. Some have simply stated their sample was drawn from middle class families without reporting measures (Furrow et al., 1992; Rudek et al., 2005), or only stated parents' educational background (Jenkins et al., 2003), without including this information in the data analysis. Meins et al. (2002) included mother's level of education as independent variable. Ruffman et al. (2002) explicitly measured SES and found this variable to correlate with later ToM understanding in children. Symons et al. (2006) also measured SES and found it not to be correlated with any of the dependent measures. Use of MSL may be related to the amount of time parents have spent in education, as maternal educational level has been found to correlate positively with children's ToM performance (Cutting & Dunn, 1999; Meins & Fernyhough, 1999). Taumoepeau et al. (2006, 2008) coded mothers' education level as a measure of SES, and partialed this variable out of subsequent

correlation analyses. However, no correlations of SES with any of the dependent variables are reported.

Firstly, the variable inclusion or exclusion of SES across the studies included in this review makes drawing conclusions on the generalisability of the results difficult. Further, the high proportion of studies that included families from relatively high socioeconomic background, leave open whether the results generalise to children from families with lower SES. Ruffman et al. (2002) speculate that it is possible that mothers of working-class children do not use MSL to the same extent, so that there are fewer benefits to be had for their children.

Confounding factors: Parents that differ in their use of MSL are likely to also differ in other respects, for example in their emotional expressiveness or ability to recognise emotions, or their own social cognitive abilities. The study by Taumoepeau et al. (2006, 2008) is the only one included in this review that measured parental performance on an emotion recognition task and partialed out mothers' performance from correlations of MSL and subsequent child ToM. The results revealed that it was what mothers said, their talk about mental states, rather than their mental state (emotion recognition task performance) that correlated with later child mental state understanding. The authors therefore interpreted their results as consistent with recent findings that most of the variance in preschool children's false-belief understanding is determined by environmental rather than genetic factors (Hughes, Jaffee, Happe, Taylor, Caspi, & Moffitt, 2005). However, none of the other studies have controlled for parental ToM, and therefore it is unclear whether it is the shared genetic make-up between parents and children that leads children, whose parents use more MSL, to have subsequent higher ToM performance.

Strengthening the future research

Some of the ways in which future research on the influence of MSL on the social cognitive development in children can be improved follows naturally from the methodological issues that have been highlighted above.

With respect to procedural aspect of future research, there are a number of points to be made. Firstly, consistent coding of mental state utterances is required. Authors, such as Taumoepeau et al. (2006, 2008) have already done so by making their coding comparable to previously published data. This allows for direct comparison of results, and is preferable for future research. Apart from the coding convention that is being used, the setting and task given, or not given, during the measurement of MSL is also important. As has been shown above, the circumstances under which parental use of MSL was measures varied considerably between studies. It would be preferable for future research to have more consistency in the conditions under which MSL is measured. For example, it is possible that giving parents an explicit task (e.g. talking about a set of pictures) highlights the difference between those parents that use MSL frequently and those that do not. Unfortunately the comparison between a study, that provided parents with an explicit task (e.g. Ruffman et al., 2002) and one that did not (e.g. Jenkins et al., 2003), to see whether they do produce greater variability in use of MSL, is not easily possible. This is the case as studies differ on the way data are reported (i.e. frequency or proportion measures). Future research could be improved by reporting both types of information, in order to allow further comparison of past and future research. Finally, measures for parental and child use of MSL ideally should be sampled separately, for example during different sessions, with different people. This would allow for greater clarity on whether variability in use of MSL is due to person characteristics, and not due to dyadic

factors. In order to gather further information on the unidirectional effect of exposure to MSL on subsequent development of MSL and ToM in children, MSL, general language ability and ToM performance at Time 1 has to be controlled for. However, apart from these more procedural issues, there are several other factors that future research should include, in order to allow clearer conclusions from data. These suggestions all fall under the category of increased generalisability. For one, the SES of participants included in future research should have a wider range. In addition, rather than focusing exclusively on the infant-mother dyad, future research would benefit from incorporating a better estimate of a child's overall exposure to MSL. This of course will include not only conversations with their mother, but as has been pointed out above and by others (Jenkins et al., 2003) it most likely will also include fathers, siblings, grandparents, alloparents, nursery staff. It would further be of interest to include the use of MSL in media that a child is exposed to. Previously it has been shown that audible television is associated with decreased exposure to human adult speech and decreased child vocalizations. These results may explain the association between infant television exposure and delayed language development (Christakis, Gilkerson, Richards, Zimmerman, Garrison, Xu, Gray, & Yapanel, 2009). However, it would be valuable to utilise the methods Christakis et al. (2009) used, to investigate a fuller sample of MSL a child is exposed to. Children wore a digital recorder in a vest with a chest pocket, held at a specific distance from the mouth to captured everything the child said and also heard during continuous 12 to 16 hour periods (Christakis et al., 2009). This would allow a full sample of all MSL a child is exposed to, in the different environments that a child may move in, and with the full range of individuals that a child may be in contact with, either direct (i.e. conversation with parent) or indirect (i.e. listening to

conversation between parent and sibling, or even characters in a children's program). A further valuable source of data could be found in an approach that only recently has become available through the Human Speechome Project (Roy, Patel, DeCamp, Kubat, Fleischman, Roy, Mavridis, Tellex, Salata, Guiness, Levit, & Gorniak, 2006). Roy et al. (2006) have developed a way of recording vast amounts of auditory and visual data for a child from birth. This data could hold valuable information on the use of MSL in adults and the emergence of MSL in the child, despite the limitation of being a single case study.

Discussion

This review set out to evaluate if MSL, as a marker of social environment, facilitates the development of children's social cognitive function, represented by their own use of MSL or performance on ToM tasks. Overall the review has highlighted a number of methodological issues. However, there are some studies (e.g. Taumoepeau et al., 2006, 2008; Jenkins et al., 2003) that are methodologically rigorous (for example control for confounding factors, such as use of MSL at Time 1, and estimate of language ability), and reveal a positive relationship between parental use of MSL and subsequent MSL and ToM performance in children.

However, the overall volume of such studies is rather small. It should be noted that this is partly due to the restriction of only including truly longitudinal studies, as this is the most valuable type of study design when investigating developmental questions. Even within this small volume of studies, the age range of participants, the variation in measures used to assess ToM ability, and the variability in coding MSL is making the empirical evidence rather slim. The conclusions drawn from this review have to therefore be cautious. On the other hand, the fact that despite the

large variation in studies (measures, time points) there has been a consistent report of a positive relationship between parental MSL and subsequent MSL and/or ToM performance in children, indicates further research is justified and necessary.

Social cognitive processes have most likely evolved to facilitate interpersonal functioning (Cosmides & Tooby, 1992). If MSL therefore contributes to the development of social cognitive functioning, it is of interest to consider that Ruffman, Slade, Devitt, and Crowe (2006) showed how initial frequencies of maternal talk about mental states predicted unique variance in children's later performance in measures of conflict/cooperation with a friend.

If the use of MSL by parents has a facilitating effect on the use in their children, and even their subsequent ToM performance, this of course has clinical implications. Efforts to train parents in using a more elaborative reminiscing style, with a focus on emotion (Van Bergen, Salmon, Dadds, & Allen, 2009), have been shown to result in subsequently higher use of such language in conversations between parents and children. These findings highlight that an elaborative and emotion-rich reminiscing style can be taught to parents, with potential benefits for children's emotion knowledge development. This is interesting to consider together with the by now large literature pointing towards pretend play to have an important role in theory of mind (e.g. Astington, Harris, & Olson, 1988; for overview see Lillard, 2001).

Raikes and Thompson (2006) found that, in a longitudinal study of mothers and 2-year-old toddlers, secure attachment relationships support children's emotion understanding by promoting mother-child discussion of emotion. They found emotion understanding (approximately 12 months later) to be directly impaired by maternal depression. This has implications when considering intervention that could lessen the impact of maternal depression on the development of children.

Limitations of this review

Methodological limitations of the studies included in this review have been outlined above. Further, all studies included in this review understood MSL to include words and utterances that seem the most obvious mental state terms. However, subtler forms of MSL may be relevant. For example, it has been argued that even simple words like "look" and "see" uttered during play has implications for mental states, because they require an understanding of the partner's perspective (Carpendale & Lewis, 2004). There are further expressions, such as 'to hide', that involve understanding how people know things, and how one can prevent people from knowing things (Turnbull & Carpendale, 1999), which are not included in all coding systems for MSL. Of course studying the linguistic environment of a child, and the effect on the child's social cognitive development, becomes very complex when widening the investigation to such expressions. However, it is possible that such terms or phrases, which in the case of 'to hide', are much more action and play related, have a substantial impact on the development of understanding of minds. Children have been shown to pass the false belief task when using "where would Sally look" or "what would Sally say" questions (Chandler & Hala 1994; Nelson, Plesa Skwerer, Goldman, Henseler, Presler, & Walkenfeld, 2003) before they can pass the test using the "what would Sally think" probe. This further indicates that a great deal of talk that is based on an understanding of knowledge acquisition and the mental world, and may involve terms what we would usually not consider to be mental state terms.

Conclusions

Longitudinal research reviewed here indicates that the MSL a child is exposed to has an influence on their development of social cognitive function. This review has of

course only focused on one of the factors (MSL) that have been proposed to influence social cognitive development. Other factors, such as pretend play (Lillard, 2001), have been proposed and widely investigated.

A number of methodological issues have been highlighted within this review, which means the empirical evidence to support MSL influencing social cognitive function is still in its infant shoes. However, with the advancement of new ways of collecting longitudinal data for children, that capture better their total exposure to MSL, future research may change this. Further, research investigating the effect of training (e. g. encouraging more use of MSL) on subsequent social and social cognitive functioning may complement this endeavour.

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Table and Figure Captions

Table 1. Quality Rating Scale.

Table 2. Summary of Reviewed Papers.

Figure 1. Flow chart of Search Strategy and Results.

Figure 2. Overview of Duration of Studies Included (Time 1 to Time 2 or 3), Investigating MSL in children.

Figure 3. Overview of duration of studies included (Time 1 to Time 2 or 3), Investigating ToM in children.

Objectives

1. Are the aims/question/hypotheses clearly stated or described?

Sampling

2. Baseline demographic & characteristics of the group are specified to allow appropriate comparisons (e.g. SES, education status of parents)
3. Type of sample group:
   Geographic cohort, convenience, highly selective; Geographic cohort; Convenience; Highly selective
4. How many participants are included in the study? Is the sample size based on adequate power calculations?
5. Was a well matched control group employed or in the absence of a control group were attempts to control for confounding variables in design?

Design

6. Is the study design appropriate to test the hypotheses?
7. Were confounders accounted for in the study design? Baseline ability e.g. use of mental state language at T1, language ability, maternal sensitivity

Assessment

8. Are standardised assessments used to measure parental use of mental state language in a standard way? This includes clear description of coding system used, with e.g. reference to previous studies and the convention used).
9. Are standardised assessments used to measure children's use of a) mental state language or b) false belief task performance in a standard way?
10. Reliable measure used and reliability co-efficients given?

Analysis

11. The analysis is appropriate to aims, design and type of outcome measure.
12. The study clearly indicates how many people asked to take part did so, and percentage of those who dropped out before completion.
13. Is there adequate reporting of summary statistics?
14. Have effect sizes (incl. correlations) and confidence intervals been reporte

Results and Discussion

15. Do the findings relate to the aims/questions/hypotheses
16. Are recommendations for clinical practice/ future research discussed in relation to the findings?
17. Are limitations of the study clearly expressed?

Note: Raters chose from the following options: Adequate; Partial; Inadequate; Not Applicable. Each study was given a percentage score based on the number of items achieved, and items not applicable to the design of the study were not scored or included in the percentage calculation.

Study	Participants	Measurement of parental variables	Dependent Variable	Results	Methodological Issues or Comment
Dunn et al. (1991a)	N = 41 (21 girls), age at T1: 36 mths., at T2: 6.5 yrs.	Home-based observation, no task.	Affective Perspective Taking: Rothenberg Test of Social Sensitivity.	Children growing up in families frequently engaging in feeling-state talk, were better at age 6 in making judgments about the emotions in affective perspective-taking task. Mother-child feeling-state turns correlated with Rothenberg scores: r(40) = .40; controlling for child's MLU: r(40) = .38; controlling for total mother-child talk: r(40) = .35 (all significant at p < .05).	Affective Perspective taking tasks not widely used. Analysis limited to feeling state references (different from MSL coding in other studies).
Dunn et al. (1991b)	N = 50 (27 girls), age at T1: 33 mths., At T2: 40 mths.	Home-based observation, no task.	Performance on False-belief task.	Mother's feeling talk is correlated with false belief task performance.	Analysis limited to feeling state references (different from MSL coding in other studies).
Furrow et al. (1992)	N = 19 (12 girls), age at T1: 2 yrs., At T2: 3 yrs.	Home-based observation (lunch time, story reading, joint play session), no specific task given.	Use of Mental state terms.	Mothers use of MSL when child 2 predicted the child's use at 3 (r = .50).	Correlation analysis did not control for child's level of MSL at T1. No analysis to control bidirectional nature of correlations.

Meins et al. (2002)	N = 57 (28 girls), age at T1: M = 6 mths,. at T2: M = 45 mths., at T3: M = 48 mths.	20 min free play session in lab. No specific instruction given.	ToM tasks; T2: Appearance reality task, and Deceptive box task. T3: unexpected transfer task.	Children of mothers that make more appropriate mental state comments when they are 6 mths old, perform better on ToM tasks aged 45 and 48 mths. (r = .34, p < .05).	No data reported on total MSL used by mothers. Data only presented for appropriate and inappropriate mental state comments.
Ruffman et al. (2002)	T1: N = 82 (41 girls), age M = 3.01 yrs, T2: N = 79 (40 girls), age M = 3.41 yrs, T3: N = 72 (36 girls), age M = 4.04 yrs.	Mothers asked to talk about series of 10 pictures with their child.	Mental state utterances, ToM performance.	Partial correlations between mother MSL and later child MSL (Time 1-2: r = .41, Time 1-3: r = .51, Time 2-3: r = .39; taking into account child MSL at Time 1). Mothers' MSL predicted later ToM (partialing out early ToM, MSL, language, and maternal education/SES), at all three time points.	In contrast to previous research, authors control for MSL at Time 1 and language ability. Mothers level of MSL predicted ToM better than language ability.
Jenkins et al. (2003)	N = 37, T1 age M = 2.4 yrs, T2: M = 4.4 yrs. Ages stated are for younger siblings.	Home-based observation, no task.	Mental state utterances.	Regression analyses: cog. and feeling talk by family members at T1 predicted change in younger children's cog. and feeling talk (respectively) at T2 (controlling for initial MSL and general language ability).	Did not report results across all types of MSL which does not allow an evaluation whether overall family members' MSL has an effect on childrens' MSL.
Rudek et al. (2005)	N = 21 (11 girls), T1 age M = 30 mths., T2: M = 42.4 mths.	Dyads asked to discuss several previously experienced events.	Mental state utterances.	Mothers' and children's early use better predicted their own later use of mental terms than did the early mental term use of their partner. So in this study there is no evidence for the mother's use of mental terms predicting the later use of such terms by the child.	Unclear whether specific memory-related conversation is determining factor.

Symons et al. (2006)	N = 43 (20 girls), T1 age M = 24.7 mths., T2: M = 69.2 mths.	Mothers asked to play with toddlers in lab (10 min. video taped).	ToM tasks: unexpected identity and contents task, changed location Tasks.	ToM was positively associated with the mother 's appropriate desire state language, but not her appropriate cognitive state language.	No measure of child language at T2, in order to control for this potentially confounding variable.
Taumoepeau et al. (2006)	N = 74 (33 girls), T1 age M = 14.8 mths., T2: M = 24.2 mths.	Mothers asked to engage child in picture-describing task in lab. Pictures of people and children expressing a rang of emotions.	MSL use as rated by mother, two emotion recognition tasks.	T1 mother desire terms correlated with all three categories of child mental state language (emotion, desire, total MSL) at T2 as well as the emotion situation task. No other type of mother MSL correlated with later child language or emotion task performance.	In this study mental state utterances by children were not rated from actual performance in picture describing task (as for maternal level of MSL) but by asking mothers to rate their child no a words and gestures checklist (T1: what child understood and/or produced, T2: only words that child produced). This adds a potential error to this variable.
Taumoepeau et al. (2008)	Same sample as Taumoepeau et al. (2006), added T3, age M = 32.8 mths., N = 72.	Same sample as Taumoepeau et al. (2006), added T3.	At T3 MSL use as rated by mother, shortened emotion recognition task.	Mothers' reference to others' thoughts and knowledge at T2 was the most consistent predictor of children's MSL at T3. Only mothers think/know talk at T2 correlated with child's performance on emotion task at T3.	As above, MSL for children was based on self-report measure by mother, which might add a potential error to this variable.

Note: MLU – mean length of utterance. MSL – mental state language.

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┌─────────────────────────────────────────────────────────┐
│  Search terms entered into electronic databases: MEDLINE,│
│  PsycINFO, ERIC, HMIC, MWIC, EMBASE, Social Policy and   │
│  Practice                                                 │
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│ Hand search of   │   │ 63 references        │   │ 10 references pass on│
│ key paper        │──▶│ identified for       │──▶│ inclusion/exclusion  │
│ reference lists  │   │ filtering using      │   │                      │
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                       └──────▶│ 53 excluded  │
                               └──────────────┘
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Age in months

| 12 | 24 | 36 | 48 |

Furrow et al. (1992)

Ruffman et al. (2002)

Jenkins et al. (2003)

Rudek et al. (2005)

Taumopeau et al. (2006, 2008)

Age in months

| 6 | 12 | 24 | 36 | 48 | 60 | 72 |

Dunn et al. (1991a)

Dunn et al. (1991b)

Meins et al. (2002)

Symons et al. (2006)

Taumopeau et al. (2006, 2008)

Ruffman et al. (2002)

MAJOR RESEARCH PROJECT

Title: What are they up to? Developmental pathways of Paranoid Thinking: an analogue study.

Running Title: Developmental pathways of paranoid thinking.

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Abstract

Introduction: Recent evidence points to a continuum of paranoid thinking in the normal population. Some studies have proposed direct relationships between trauma and paranoia, and others have suggested that attachment theory may be useful in mapping pathways from early life experience to paranoia. Most of these studies have highlighted broad 'cognitive' mechanisms. However, attachment theory highlights the consequences of early childhood experience with a primary caregiver for affect regulation and mentalising. Methods: A total of 722 participants (all University students, 456/266 women/men, median age = 23 years) took part in an online questionnaire-based study. Participants completed measures of paranoia, early life experience, attachment anxiety/avoidance, positive and negative affect, empathy and social comparison. Results: Regression analyses highlighted a role of early life experience, affect and empathy in predicting paranoia. Structural Equation Modeling revealed a more complex double mediation between early life experience and paranoia. Attachment anxiety/avoidance only had a strong predictive effect for paranoia when taking positive and negative affect into account. Empathy was shown to mediate the relationship between early life experience and paranoia. Conclusions: The results highlight possible developmental pathways to paranoia. Both developmental pathways implicating affect regulation and mentalisation are relevant to paranoia in a non-clinical sample.

Introduction

Persecutory delusion (also referred to as paranoia) is characterised by the belief that one is at risk of harm, coupled with the belief that a persecutor has the intention to cause harm (Freeman & Garety, 2000). This emphasis on intentionality is important for the distinction between paranoia and anxiety.

The content of persecutory thoughts, in terms of type and timing of threat, the target of the harm, and the identity and intention of the persecutor, can vary greatly (Freeman, Garety, & Kuipers, 2001). Many have argued that paranoia might be better understood as lying on a continuum of severity in the general population (e.g. van Os & Verdoux, 2003). At one end there are persecutory delusions seen in psychotic disorders, and along the continuum lie non-clinical paranoid experiences (or paranoid thinking). Non-clinical and clinical paranoid experiences have been associated with the same risk factors (Freeman, 2007; Myin-Germeys, Krabbendam, &van Os, 2003), and non-clinical paranoia experiences increase the likelihood of subsequent diagnosis of psychotic disorder (Poulton et al., 2000). This suggests that studying paranoid thinking may inform our understanding of more clinically severe paranoia.

Paranoid beliefs are held by 10-15% of the general population, according to a conservative estimate by Freeman (2007), and even subtypes of paranoia have been identified in a non-clinical sample (Combs et al., 2007). This is in tune with the position that psychosis (and psychotic experiences) can be seen as part of the mainstream developmental psychology (Bentall, Fernyhough, Morrison, Lewis, & Corcoran, 2007). After a long dominant position of neuro-cognitive models of

psychosis, which tended not take developmental theories of interpersonal functioning and affect regulation into account, emotional-interpersonal pathways, that may play a role in psychosis, have been highlighted in more recent years (e.g. emotion regulation important for understanding development and course of psychosis: Gumley, White, & Power, 1999; Gumley & Schwannauer, 2006).

Aspects of attachment theory have stimulated thinking and research into developmental routes to psychotic experiences. Early attachment experiences with a primary caregiver, Bowlby proposed, become internalised and are the foundation of core relational schemata of ourselves in relation to others (Bowlby, 1973). These attachment styles are internal working models (Bretherton & Munholland, 1999) of the self in relation to others that, once formed early in childhood, guide perception and behaviour in adulthood (Bowlby, 1988). In paranoia, when others are viewed as threatening and negative, this is hypothesised to reflect internal working models that involve representations of others as threatening. Links between attachment style and psychosis have been demonstrated (e. g. Dozier, Stovall, & Albus, 1999; see Berry, Barrowclough & Wearden (2007) for a review of the role of adult attachment style in psychosis), however, the research is still limited. However, it has been noted that no unique developmental pathways have been mapped out for psychosis (Liotti & Gumley, 2008).

<u>Direct effects of trauma</u> have been suggested, which view paranoia as an understandable response to trauma. A number clinical and non-clinical studies have found an association of trauma and psychotic symptoms (e.g. Bebbington et al., 2004; Read, van Os, Morrison, & Ross, 2005), with a history of trauma having been shown to add a 10-fold increase in risk to develop psychotic symptomatology

(Janssen et al., 2004). There have been several theoretical attempts at explaining how trauma may increase the likelihood of delusions and hallucinations (e.g. Morrison, Frame, & Larkin, 2003; Fowler et al., 2006; Read, Agar, Argyle, & Aderhold, 2003). With regard to paranoia, a history of trauma has been shown to be significantly associated with both persecutory ideation and hallucinations in an analogue sample (Freeman & Fowler, 2009). Trauma has been speculated to have an impact on persecutory thinking via anxiety (Freeman & Garety, 1999; Freeman et al., 2009).

As part of a cognitive approach it has been suggested that attachment history shapes attitudes and interpersonal schemata, in form of models of self and other. These lead persons to differ on two dimensions, that of attachment anxiety and attachment avoidance. Attachment anxiety is associated with a negative self-image, an excessive need for approval from others, together with a fear of rejection and abandonment. Attachment avoidance is associated with a negative image of others and is defined in terms of either an excessive need for self-reliance or a fear of depending on others. In a non-clinical sample, it has been shown that anxiety in attachment relationships were correlated with non-clinical psychotic phenomena (Berry, Wearden, Barrowclough & Liversidge, 2006), and even after controlling for negative affect, a significant relationship was observed between attachment anxiety and paranoia.

However, it has been highlighted how the self-report measures assessing attachment style are less robust. They have a severe limitation as they rely on self-report, when individuals may not be able to consciously access underlying attachment processes (Crowell, Fraley & Shaver, 1999). The Adult Attachment Interview (Main & Goldwyn, 1998), by means of discourse analysis, tries to access underlying

attachment processes. This narrative paradigm has been highlighted to tap into adults' non-conscious processes for regulating emotion during discussion of attachment related experiences during childhood (Jacobvitz, Curran & Moller, 2002). This tool allows further measuring of a person's reflective functioning, now commonly termed mentalising (Allen & Fonagy, 2006). Mentalising refers to the ability to reflect on one's own and others' mental states, and is a developmentally acquired skill (Fonagy & Target, 2002) that develops in a social context of an infant with a caregiver. Building on the above, a <u>developmental affect regulation route</u> forms an important extension to cognitive models of psychotic experiences, and paranoia in particular. Robust evidence has now emerged to show that mentalisation is impaired among persons with a diagnosis of schizophrenia compared to non-patient controls (Sprong, Schothorst, Vos, Hox, & van Engeland, 2007). Deficits in the development of mentalisation are proposed to emerge in early attachment experiences. It has been suggested that a likely consequence of early attachment disorganisation is a deficit in mentalising (Bateman & Fonagy, 2004; Fonagy et al., 2004). A deficit in mentalising limits the ability to affect-regulate in both personal and interpersonal domains. Further, the ability to reconsider (internal or external) experiences and seek other peoples' opinions may be limited. Not only may mentalisation deficits impact on a person's ability to evaluate other people's actions. It has been proposed that mentalisation deficits further impacts on a person's ability to reflect about themselves. This makes it more likely for underlying negative interpersonal schemata, related to interpersonal trauma, to remain unprocessed, compartmentalized and fragmented, and thus emerge in the contents of psychotic experiences (Liotti & Gumley, 2008).

To sum up, a person's attachment history impacts on their ability to mentalise

(Bateman & Fonagy, 2004) and affect regulate (e. g. Conklin, Bradley and Westen, 2006). Both processes are likely to impact on the development and maintenance of paranoia. This study seeks to investigate the link between early life experiences with paranoia, in a non-clinical sample of University students. More specifically, it seeks to highlight the pathway between early childhood experience and attachment style as well as ability to reflect about the mental states of others. Structural equation modeling will be used to test direct effects of early life experience with paranoid thinking, cognitive effects of attachment style (in terms of attitudes about self and others) as well as developmental effects of emotion regulation.

Method

Participants

All participants were students at the University of Glasgow. A total of 886 people started completing the online study, of which 726 (82%) completed the entire set of research questions. Following this, four participants were excluded as data screening revealed a pattern of response repetition on one or more of the self-report measures. This led to a total sample of 722 participants (456 women, 266 men). The age range was 16 to 62 years (mean = 25.48 years, SD = 7.37 years, median = 23 years, interquartile range = 7 years). The majority of participants described themselves as "white British" (73%), or "white other" (14%). The remaining participants (13%) described themselves to belong to other ethnic groups, and the majority was "Asian or Asian British – Indian" or "Chinese". Nearly all participants (98%) chose to enter the prize draw to win an ipod nano™.

Procedure

All students (undergraduate and post-graduate level) of six (out of the total of nine)

Faculties of the University were contacted by email and invited to take part in a research study. Students willing to take part could click a link embedded in the email, which directed them to the online study. The study was hosted by a web-based survey tool (www.surveymonkey.com). Participants gave informed consent before being asked for some demographic information. Thereafter participants completed the self-report measures in the following order: The International Positive and Negative Affect Schedule, short-form (Thompson, 2007), Psychosis Attachment Measure (Berry et al., 2006), Empathy Quotient (Baron-Cohen & Wheelwright, 2004), Paranoia Scales (Fenigstein & Vanable, 1992), The Early Life Experiences Scale (Gilbert, Cheung, Grandfield, Campey & Irons, 2003) and Social Comparison Scale (Allan & Gilbert, 1995). After completing the self-report measures, participants had the opportunity to enter the prize draw, which had been mentioned in the initial contact email. Email addresses were stored separately from responses on self-report measures to ensure anonymity. Ethical permission was obtained from the Faculty of Medicine Research Ethics Committee, University of Glasgow.

Measures

All measures were inspected for item or response frequency problems. None of the measures were found to have item or response frequencies above 74% of the total sample. The data for all measures were tested for suitability for factor analytic modeling (Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity). Data from all measures were found to be suitable. A maximum likelihood factor analytic model was chosen for all factor analyses described in the following section. An oblique rotation technique (oblimin) of items was chosen, as for all measures it had to be assumed that factors are correlated.

Paranoia Scale (PS): The PS (Fenigstein et al., 1992) was designed to

measure the incidence of paranoia in a college population. The scale consists of 20 items, measuring paranoid experience (e.g., 'I sometimes feel as if I am being followed') and paranoid beliefs (e.g., 'It is safe to trust no-one'). Items are answered on a 5-point Likert scale, ranging from 1 (not at all applicable to me) to 5 (extremely applicable to me). Responses are summed to produce a score, which ranges from 20 to 100; higher scores reflect higher levels of subclinical paranoia. The scale has high internal consistency, with Cronbach's alpha of 0.91. This is somewhat higher than the Cronbach's alpha reported by Fenigstein et al. (1992). Every item loaded positively on the first factor derived from a maximum likelihood factor analysis with subsequent oblique rotation (oblimin). This factor explained 39.7% of the total variance of the scale, whereas the second factor only explained 6.2%. These results are consistent with the general factor solution reported by Fenigstein et al. (1992). The subsequent analyses used a single score for the PS. See Appendix B for items of the PS.

Psychosis Attachment Measure (PAM): This 16-item measure by Berry et al. (2006) was based on existing measures of attachment (Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998) and validated with a large analogue sample. Participants are asked to rate the extent to which each item is characteristic of them using a four-point Likert scale (1 = 'not at all' to 4 = 'very much'; see Appendix for items). A revised version of the measure, based on Berry et al.'s (2006) paper (personal communication with Katherine Berry, Oct. 2009), was used in this study. Anxiety and avoidance subscale scores were derived by averaging scores for the 8 anxiety and 8 avoidance items. See Appendix D for items of the PAM. A maximum factor analysis with subsequent oblique rotation (oblimin) was performed. Three factors had Eigenvalues above one, and inspection of the scree plot also suggested a

factor structure of three. The first factor, representing attachment avoidance, accounted for 26.6% of the variance. The items loading on this factor fully replicated the results reported by Berry et al. (2006). The second factor accounted for 19.9% of the variance and the third factor explained 6.4% of additional variance. The second and third factor loaded on all other items that in Berry et al. (2006) contributed to the attachment anxiety subscale. Items loading on the second factor ('I worry that if other people get to know me better, they won't like me', 'I worry a lot about my relationships with other people', 'I worry that if I displease other people, they won't want to know me anymore', 'I worry about having to cope with problems and difficult situations on my own', 'I feel uncomfortable when other people want to get to know me better') were related to <u>discomfort with closeness</u>. On the other hand, items that loaded on the third factor ('I tend to get upset, anxious or angry if other people are not there when I need them', 'I worry that key people in my life won't be around in the future', 'I ask other people to reassure me that they care about me', 'If other people disapprove of something I do, I get very upset') were more related to <u>fear of abandonment</u>. Goodness of fit tests however revealed that both two and three factor solutions were poor fit to data (two factor solution $Chi^2 = 459$; three factor solution $Chi^2 = 301$). We therefore chose to utilise the two-factor solution, to allow comparison with previous research. A score for attachment anxiety and attachment avoidance was calculated for each participant respectively. The internal consistency of each dimension was high. Cronbach's alpha for the attachment anxiety and avoidance dimension was 0.81 and 0.81 respectively. We also note inconsistent reliability for factors in three factor solution (Cronbach's alpha for the <u>anxiety</u>, <u>discomfort with closeness</u> and <u>fear of abandonment</u> dimension was .81, .80 and .67 respectively), which may be related to low number of items).

This highlights a need for further development of the scale.

The Early Life Experiences Scale (ELES): This scale was developed by Gilbert et al. (2003) to measure recall of personal feelings of perceived threat and subordination in childhood. This measure presents a departure from traditional measures which investigate recall of parental behaviour. The ELES proves high correlation with recall of parental behaviour measure (short form of EMBU, Swedish acronym for my memories of upbringing; Arrindell et al., 1999), and therefore no separate measure was used in this study. The ELES consists of 15 items (see Appendix F). Participants were required to rate how true each statement was for them in their childhood (1 = completely untrue, 2 = very occasionally true, 3 = sometimes true, 4 = fairly true, 5 = very true). A maximum likelihood factor analysis with subsequent oblique rotation (oblimin) revealed a three-factor structure, explaining 64.4% of the total variance. The pattern of items loading on the three factors was identical to that reported by Gilbert et al. (2003). The first factor (explaining 48.3% of total variance) relates mostly to perceived threat (e.g. 'In order to avoid getting hurt I used to try to avoid my parents'). The second factor (explaining 8.8% of total variance) includes six items that related to submissive behaviour, such as, 'I often had to go along with others even when I did not want to' and 'I often had to give in to others at home'. A third factor (explaining 7.3% of total variance) loads on the three items, 'feeling equal, feeling relaxed, and able to assert self in the family'. These were unnamed by Gilbert and colleagues however it was noted that this scale is most closely conceptually linked to behaviour consistent with secure attachment and was therefore named Freedom and Autonomy. Subsequent reliability analysis of the three subscales revealed a Cronbach alpha of 0.87 for threat, 0.85 for submissiveness and 0.81 for freedom and autonomy.

Cronbach alpha for the total scale was .75, indicating satisfactory consistency. The three-factor solution was used in subsequent analyses.

Empathy quotient (EQ): The EQ (Baron-Cohen et al., 2004) was used to assess empathy. The EQ is a self-report questionnaire, containing 40 empathy items and 20 filler items (see Appendix C). On each empathy item a person can score 2, 1, or 0, so the EQ has a maximum score of 80 and a minimum score of zero. The EQ has been shown to have high test–retest reliability (r=0.835; Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004). It has further been shown to be associated with performance on the Eyes Task (Baron-Cohen et al., 2001), a non-verbal mental state inference test. The EQ also has a moderate association with the Interpersonal Reactivity Scale (Davis, 1980), another tool measuring empathy. These results indicate concurrent validity. Lawrence et al. (2004) report that only three EQ items correlated with the Social Desirability Scale (Crowne & Marlowe, 1960) indicating that the EQ has a satisfactory construct validity. Cronbach alpha for the EQ (40 items) was .87 in the current study, indicating high internal consistency. Two models of the EQ were tested, based on the 28-item version by Lawrence et al. (2004) and the 15-item version by Muncer and Ling (2006). Firstly, a maximum likelihood factor analysis with subsequent oblique rotation (oblimin) was performed on the 28 items that Lawrence et al. (2004) included in their analysis (items that were removed: 10, 11, 15, 18, 28, 34, 37-39, 46, 49, 60). As with Lawrence et al. (2004) both scree plot and Eigenvalues indicated that the first three factors were the strongest, accounting for 40.8% of the total variance. The pattern of items loading on the first three factors was identical to that reported by Lawrence et al. (2004), and the three factors overlap with traditional ideas of empathy: cognitive empathy (includes items that measure the appreciation of others' affective states), emotional

reactivity (includes items of emotional reaction in response to others' mental states) and social skills (includes items that explore the spontaneous use of social skills and/or a lack of intuitive social understanding). Cronbach alpha for the 28-item cognitive empathy score was .64, for the emotional reactivity score it was .76, and for the social skills score it was .63. Secondly, a recent confirmatory factor analytic study by Muncer and Ling (2006) further allow a short 3 factor version of the EQ with five items per subscale. A maximum likelihood factor analysis was conducted with the 15 items Muncer et al. (2006) report. A three-factor solution emerged, explaining 46.2% of the total variance. Following oblique rotation (oblimin) the item-loading pattern completely matched that reported by Muncer et al. (2006; cognitive – items 25, 26, 44, 52, 54, emotional – items 6, 27, 32, 50, 59, social skills – items 4, 8, 12, 14, 35). Cronbach alpha for the 5-item cognitive empathy score (Muncer et al., 2006) was .80, for the emotional reactivity score it was .58, and for the social skills score it was .64. These results are similar to those reported by Muncer et al. (2006). As Cronbach alphas for the 28-item version of the EQ were less variable, these three subscale scores (cognitive empathy, emotional reactivity, social skills) were used in subsequent regression analyses.

Social Comparison Scale (SCS): The SCS was developed by Allan and Gilbert (1995) and dimensions of social comparison are measured, focusing on judgments of social rank, relative attractiveness and group fit. Participants were asked to rate how they, in relationship to others, generally feel, by putting a mark on a 5-point scale anchored with 11 bipolar constructs (e.g. inferior-superior, incompetent-competent, unlikable-likable; for complete set of items see Appendix G). Due to an error participants were asked to make their rating on a 5-point scale, rather than a 10-point scale as Allan et al. (1995) had done. This will have led to a

smaller variance on this scale for the sample reported here, and means will not be directly comparable to previously published results. A maximum likelihood factor analysis with subsequent oblique rotation (oblimin) was conducted. As with Allan et al. (1995) scree plots and eigenvalues revealed that two factors explained 61% of the total variance. The pattern of items loading on the two factors was very close to that reported by Allan et al. (1995) but not completely replicated. Items 9 (undesirable-more desirable) and 10 (unattractive-more attractive) loaded strongly on the rank factor, rather than on both the rank and social group fit factor as reported by Allan et al. (1995). Item 3 (unlikable-likable) only loaded on the social group fit factor, whereas Allan et al. (1995) had reported it to load equally strong on both factors. Allan et al. (1995) describe the three items (3, 9, 10) as all measuring social attractiveness, which overlaps with both rank and social fit judgments, but are not easily captured in a separate factor (i.e. clinical population in Allan et al., 1995). In the present study a score for subscales rank (items 1, 2, 6-10) and social fit (items 3-5, 11) were calculated and used in all subsequent analyses. Cronbach alpha for the rank and social fit subscale Cronbach alpha was .87 and .80 respectively.

The International Positive and Negative Affect Schedule, short-form (I-PANAS-SF): The PANAS is self-report measure of positive (PA) and negative affect (NA) developed by Watson, Clark, and Tellegen (1988). NA and PA reflect dispositional dimensions, with high-NA being marked by subjective distress and unpleasurable engagement, and low NA by the absence of these feelings. By contrast, PA represents the extent to which an individual experiences pleasurable engagement with the environment. PANAS NA and PA scales index two distinct, but moderately negatively correlated, factors (Crawford & Henry, 2004). Thompson (2007) developed a 10-item international short-form, which was used in this study.

A maximum likelihood factor analysis revealed two or three factors. Following oblique rotation the loading pattern of items on factors was identical to that reported by Thompson (2007), with the only exception of item 'hostile', which loaded on the third factor on its own. Therefore two scores were calculated for each participant, one for positive and one for negative affect. The PA subscale had a Cronbach's alpha of 0.67, indicating a borderline adequate reliability. The NA subscale had a Cronbach's alpha of 0.71, indicating adequate reliability. The PA and NA subscales were correlated with each other (r = -.28, p < .00), similar to what Thompson (2007) reported for their data set. Participants were asked to 'Thinking about yourself and how you normally feel, to what extent do you generally feel;' and then were presented with 10 different words (e.g. hostile, inspired). Items were answered on a 5-point Likert scale, ranging from 1 (always feel like this) to 5 (never feel like this). See Appendix E for items of the I-PANAS-SF.

<u>Data analyses</u>

Data were analysed using PASW (formerly SPSS) Statistics for Windows version 18. Structural Equation Modeling (SEM) was conducted using EQS version 6.1 (Bentler, 1996). SEM is a hypothesis testing approach where a theoretical models of the relationship of dependent and predictor variables is hypothesised and subsequently tested for how well the model fits the data.

The dependent variable, Paranoia Scale score, and the predictor variables (age, gender, PAM, ELES, EQ, SCS and I-PANAS-SF) were entered into two multiple regression analyses: hierarchical, then stepwise. The hierarchical method was used first, to test the contribution of predictors that have previously not been used to predict propensity for paranoid thinking in an analogue study (i.e. EQ and ELES). Stepwise regression was selected because the hierarchical model included one non-

significant coefficient, indicating that a variable (SCS) did not contribute to the model. The order of measures entered into the regression was gender, age, PNS, ELES, PAM, EQ, SCS).

For the SEM, robust model statistics were reported that are corrected for non-normal distributions. Goodness of fit of all models was evaluated using the Satorra–Bentler robust fit statistics: The Satorra–Bentler χ^2 (S–B χ^2) and the Robust Comparative Fit Index (RCFI; Bentler, 1998). The chi-squared is the most commonly used measure of model fit, with a high chi-squared value with a significant $\underline{p}$ value suggesting a poor fit of the model to the data. It should be noted that S-B χ^2 is most likely too conservative a test for the large sample at hand, and produces an excess of Type I errors (Fouladi, 2009). The RCFI ranges from 0 to 1 with values greater than 0.90 indicating a good fit. The Root Mean Square of Approximation (RMSEA; Browne & Cudeck, 1993) is a measure of fit that takes into account a model's complexity where a RMSEA of 0.10 or less indicates a good model fit.

Results

Means and Standard Deviations for Measures

Measures of central tendency are given in Table 1, together with information on skewness and kurtosis. For comparison, the descriptive data from previously published studies are also illustrated. Kolmogorov-Smirnov tests revealed data for all measures to be non-normal. It was decided to use untransformed data for all subsequent analyses.

Paranoia Scale

The responses on the PS were skewed towards the low end, indicating that participants were more likely to not report paranoid thoughts. However, 51.7% of

participants selected a response that indicated agreement with paranoid statements to some extent (i.e. 21.8% selecting option 2, 14.4% option 3, 10.2% option 4 and 5.2% option 5) on 5-point Likert scale. This is very similar to the data from a student sample reported by Feiningstein et al. (1992; see Table 1). In order to evaluate which items were most likely to be endorsed by participants as applicable or highly applicable to them (option 4 or 5 on the 5-point Likert scale) see Table 2. As with the data reported by Freeman (2007), items regarding social evaluative concerns are those most commonly endorsed by participants ('have been talked about behind my back'). On the other hand, items regarding severe threat ('Someone has it in for me') are only endorsed by a small number of participants. As with Freeman (2007) we find a hierarchical organisation in relation to the endorsement of paranoid thoughts.

The distribution of ELES scores was strongly left skewed indicating that the majority of participants overall recall low numbers of perceived threat or subordination in childhood.

The results for the entire sample revealed gender difference in empathy (EQ), which is congruent with previously reported results (Baron-Cohen et al., 2004).

Exploration of Data

Males had significantly higher scores on the Paranoia Scale (z = -6.35, p < .000). Table 3 illustrates the correlations between the measures used in this study. It was noted that younger participants tended to have higher PS scores (r = -.12, p < .000). Gender and age were added as covariate in all subsequent analyses.

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Predicting paranoia

Regression analyses: For the hierarchical model, the predictor variables were entered in the following order: gender, age, I-PANAS-SF (PA and NA), ELES (threat, submissiveness, autonomy), PAM (anxiety, avoidance), EQ (cognitive, emotional, social skills) and SCS (fit, rank). The correlation matrix for all predictor variables and the outcome variable and the results of the multiple regression analyses for paranoid thinking (PS) are presented in Table 3 and 4.

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In the hierarchical method of multiple regression, on step 1 when age and gender were entered the multiple $\underline{R}$ was 0.261, $\underline{R}^2$ was 0.068, adjusted $\underline{R}^2$ was 0.066 and significant ($\underline{F}$ = 26.33, $\underline{p}$ < .000). On step 2, when the I-PANAS-SF variables were entered the multiple $\underline{R}$ was 0.541, $\underline{R}^2$ was 0.292, adjusted $\underline{R}^2$ was 0.288, and the increment in $\underline{R}^2$ 0.224 and significant ($\underline{F}$ = 113.56, $\underline{p}$ < .000). On step 3 when the ELES variables were entered the multiple $\underline{R}$ was 0.645, $\underline{R}^2$ was 0.416, the adjusted $\underline{R}^2$ was 0.410 and the increment in $\underline{R}^2$ 0.123 was significant ($\underline{F}$ = 50.14, p < .000). On step 4 when the PAM variables were entered the multiple $\underline{R}$ was 0.68, $\underline{R}^2$ was 0.426, the adjusted $\underline{R}^2$ was 0.455, the increment in $\underline{R}^2$ of 0.046 was significant ($\underline{F}$ = 30.56, $\underline{p}$ < .000). On step 5 when the EQ variables were entered the multiple $\underline{R}$ was 0.696, $\underline{R}^2$ was 0.485, the adjusted $\underline{R}^2$ was 0.476, the increment in $\underline{R}^2$ of 0.023 was significant ($\underline{F}$ = 10.51, $\underline{p}$ < .000). On the final step when the SCS variables were entered, the multiple $\underline{R}$ was 0.698, the $\underline{R}^2$ was 0.487, adjusted $\underline{R}^2$ was 0.477 and the

increment in R^2 of 0.003 was not significant (F = 1.7, p < 0.172), indicating that the addition of SCS variables did not account for any additional variance.

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When all predictor variables (n = 14) were entered into the stepwise model, 11 variables remained significant for inclusion and accounted for 47% of the variance. ELES submissiveness accounted for 24.2% of the variance with R^2 of 0.242, with a multiple R of 0.492. I-PANAS-SF negative affect (NA) accounted for an additional 9.5% of the variance with an increment in R^2 of 0.095, R^2 of 0.337 and multiple R of 0.580. EQ emotional reactivity accounted for an additional 5.3% of the variance with an increment in R^2 of 0.053, R^2 of 0.39 and multiple R of 0.625. PAM attachment anxiety accounted for an additional 3.3 % of the variance with an increment in R^2 of 0.033, R^2 of 0.423 and multiple R of 0.651. PAM avoidance accounted for an additional 1.7% of the variance with an increment in R^2 of 0.017, R^2 of 0.440 and multiple R of 0.663. Age accounted for an additional 1.7% of the variance with an increment in R^2 of 0.017, R^2 of 0.457 and multiple R of 0.676. Gender accounted for an additional 1% of the variance with an increment in R^2 of 0.01, R^2 of 0.467 and multiple R of 0.683. EQ cognitive empathy accounted for an additional 0.6% of the variance with an increment in R^2 of 0.006, R^2 of 0.437 and multiple R of 0.688. EQ social skills accounted for an additional 0.5% of the variance with an increment in R^2 of 0.005, R^2 of 0.478 and multiple R of 0.691. ELES autonomy accounted for an additional 0.3% of the variance with an increment in R^2 of 0.003, R^2 of 0.481 and multiple R of 0.693. ELES threat accounted for an additional 0.3% of the variance with an increment in R^2 of 0.003, R^2 of 0.484 and multiple R of 0.696.

Structural equation models: The Paranoia Scale (Fenigstein et al., 1992) was the dependent variable for all models that were explored. As set out in the introduction, several paths have been suggested to contribute to the development and maintenance of paranoia: directly path from early life experience, cognitive path, and an affect regulation pathway.

For the first model ('cognitive model'; Figure 1) it was hypothesised that early life experiences (as latent variable, with the three sub-scales of the ELES loading on it), mediated by attachment anxiety/avoidance (direct measurement variables) and Empathy (as latent variable, with sub-scale cognitive empathy and emotional reactivity of EQ loading on it) would predict paranoia. This model had a relatively poor fit: S-B χ^2 = 792.79 (p = .000) with a RCFI = 0.661 and a RMSEA = 0.138.

For the second model, a direct pathway from the latent variable Early Life Experience onto paranoia was added to the two mediating variables ('hybrid model' as cognitive and direct pathway; Figure 2). Reflecting the gender differences for EQ, gender was added to contribute to the latent variable Empathy. This model also had a relatively poor fit: S-B χ^2 = 715.34 (p = .000) with a RCFI = 0.696 and a RMSEA = 0.132.

A third 'developmental affect regulation' model (Figure 3) was tested. Based on the high predictive value the I-PANAS-SF had in both regression analyses a further latent variable, Affect (with PA and NA from I-PANAS-SF loading on it), was added to the previous model. The path between Affect and Empathy was included in this model, as was the path between Early Life Experience and Affect. This model had excellent fit: S-B χ^2 = 175.92 (p = .000) with a RCFI = 0.934 and a RMSEA = 0.073. Attachment anxiety and Affect revealed a strong negative relationship (see Figure 3), whereas attachment avoidance had a less strong, and positive relationship.

Early Life Experience, through the mediating variable of attachment anxiety/avoidance, and moderated by the latent variable Affect, had a strong predictive value towards paranoia. The addition of Affect as latent variable changed the connection between Early Life Experience and Empathy, as it became non-significant. Further, Affect was positively related to Empathy. As opposed to the connection between Empathy and paranoia in the cognitive model, Empathy now was related to paranoia negatively.

INSERT FIGURE 1 ABOUT HERE

INSERT FIGURE 2 ABOUT HERE

INSERT FIGURE 3 ABOUT HERE

Discussion

This study set out to investigate the predictive role of early life experience, attachment style and ability to empathise for paranoia in a non-clinical sample. The results demonstrated that about half (51.7 %) of the sample endorsed a response that indicated agreement with paranoid statements to some extent. These results are similar to those reported by Feiningstein et al. (1992) in a student sample.

Our hypothesis that attachment anxiety/avoidance would be related to paranoia was partly confirmed in the regression analysis. However, the contribution in explaining the total variance in paranoia was rather small for both hierarchical and stepwise regressions. The same was also true for empathy, with the results of the stepwise regression indicating emotional reactivity (e. g. items "I usually stay emotionally

detached when watching a film", "Feel that other people crying doesn't upset me", "Tend to get emotionally involved with friends' problems") explaining a considerable amount of variance in paranoia. This supports the hypothesis that lack of ability to empathise with others may contribute to paranoid thinking, and also contribute to the maintenance of paranoid thinking.

Early life experience, as measured by ELES (Gilbert et al., 2003), proved to have a substantial predictive value towards paranoia in both types of regression analysis. Interestingly, it was predominantly the factor submissiveness on the ELES that explained a large variance in paranoia. However, as this result is from the stepwise regression, the limitations of this analysis have to be noted. Models identified by stepwise methods have an inflated risk of building on chance features of the data (Judd & McClelland, 1989). Finally, Judd et al. (1989) also highlighted how stepwise methods will not necessarily produce the best model if there are redundant predictors. This is of course why SEM was a valuable method to choose next, as it allows specifying latent variables (i. e. variables that can explain the overlap in predictors).

The SEM results from this analogue study tested three models, each focusing on a different pathway that has been suggested to contribute to paranoia (cognitive effects of attachment style, direct effect of early life experience, developmental effects of affect regulation). A 'cognitive' model, with attachment anxiety/avoidance and empathy as mediating variables between early life experience and paranoia, did not reveal a good model fit. A 'hybrid' model, which expanded the 'cognitive' model by addition of a direct pathway from early life experience to paranoia, did not reveal good model fit either. However, a final 'developmental affect regulation' model revealed good model fit. This model included affect as

latent variable. The results support an account for mediated relationship between early life experience and paranoia. The first mediation is between an interaction of attachment and affect. The second mediation is between an interaction of attachment and empathy. These results are consistent with a developmental model where early attachment experiences provide the context for the development of affect regulation and mentalisation. In the early caregiver-infant interactions, with the help of contingent marked mirroring of actions by the caregiver, a symbolic representational system of affective states emerges and assists the development of affect regulation (Fonagy & Target, 1997). Similarly, a regulatory function is also mirrored in the negative relationship between empathy and paranoia. A relatively lower empathy score (EQ) increases the likelihood to misinterpret others' behaviour as threatening or persecutory. The positive relationship between the latent variables Affect and Empathy in the SEM further highlights how affect can impact on the ability to mentalise. That is, while experiencing high levels of negative affect, the ability to mentalise (i.e. hold other peoples states-of-mind in mind, Fonagy et al., 2004) may be reduced, and paranoid thinking is more likely.

The results further highlight how early life experience does not only impact on cognitive styles, but how it influences the development of self-regulatory processes (affect regulation, as well as ability to mentalise). Interestingly, early life experience did not directly impact on empathy. It is only via attachment anxiety/avoidance and in the relationship with Affect that Empathy has a negative relationship with paranoia. This is congruent with the theoretical framework that infants are only able to develop internal working models, which allow an understanding of psychological characteristics of other people, in the presence of a caregiver (Fonagy et al., 2004). This is supported by evidence that suggested direct links between caregivers'

interaction with their infants and their children's later understanding of mind (e. g. mind-mindedness in mothers, Meins et al., 2002; use of mental state language, Taumeopeau & Ruffman, 2008).

It is important to keep in mind that the tool used for measuring early life experience (ELES, Gilbert et al., 2003) in the current study is a self-report measure, focused on recall of personal feelings of <u>perceived</u> threat and subordination in childhood in the family context. This precludes parental behaviour, such as abuse or neglect directly, and also does not include traumatic experiences a person may have had outside the family context. Early life experience impacted on current attachment anxiety/avoidance, but attachment anxiety/avoidance did not impact on paranoia at all (non significant path in 'developmental affect regulation' model, Figure 3). This is at odds with Berry et al.'s (2006) proposal of specific associations between positive psychotic phenomena and anxiety in attachment relationships. The data of the current analogue study do not confirm this pathway, unless affect is included as a latent variable.

The observation that early life experience was predictive of attachment anxiety/avoidance is somewhat different from Berry et al. (2006) observation in an analogue study. Berry et al. (2006) found no strong or consistent relationships between attachment and parental relationships, nor between attachment and experiences of trauma. The positive findings in the current study may highlight how the recall of <u>personal feelings</u> of <u>perceived</u> threat and subordination in childhood are far more important than direct recall of events.

It is further important to note that this study employed a cross-sectional design, using participant report of past experience and current state. It is therefore not possible to deduce a causal developmental pathway from the current data. However,

this study may be a stepping stone for future research, highlighting how a longitudinal approach may be promising. For example, a cohort of students could be invited to take part in a similar study as reported here, with data points sampled at the beginning and end of their time at university. This would allow for data that would be more powerful with regard to making developmental claims.

The results from this analogue sample cannot directly inform clinical practice for the obvious reasons of not studying a clinical population. Further, the self-report attachment style measure employed only gives information about the level of anxiety and avoidance in an attachment context, not overall attachment style. In addition self-report measures are less robust than an interview-based measurement of attachment (e.g. the AAI). However, this analogue study has implications for clinical practice. The role of multiple routes of predicting paranoia highlight that a multilevel approach in formulating paranoia is likely to be important. Early life experience, subsequent attachment anxiety and avoidance are important to consider, especially in relation to estimating what emotional self-regulatory ability a person can draw on. Assessing and formulating a person's interpersonal developmental history will inform the clinician on the available resources a person has for self-regulation, both stemming from affect regulatory processes, but also from mentalisation-based processes.

Further research is needed to investigate whether the role of mentalising in paranoia is applicable in clinical populations. Further, it remains to be investigated whether the role of early life experience on the development of attachment style, affect and their interaction is similar in a clinical population.

Limitations: The current study has a number of limitations. Firstly, the sample consisted of students who were self-selected, as recruitment was by e-mail,

and contained a majority of female participants. It is possible that people who self-select for such studies may be more prone to psychological problems (Freeman et al., 2005). The use of questionnaires to measure attachment style leads to the possibility of self-reporting biases (e.g. social desirability). However, the anonymity of internet research may reduce, but not completely abolish, the effect of social desirability (Freeman et al., 2005).

A relatively lower relationship was observed between attachment avoidance and affect (.254, compared to -.653 between attachment anxiety and affect). This may be due to individuals with dismissing attachment under-reporting distress (Dozier & Lee, 1995). Which ties in with the more general limitation of research on attachment and psychopathology. The very nature of attachment style being not necessarily accessible to conscious and self-reflective processes makes the study of attachment by means of self-report measures difficult (Crowell et al., 1999). However, it is likely that especially for individuals with an attachment avoidant stance this may play out as them reporting more security in attachment context, as their dominant sense of self as secure precludes an awareness of attachment insecurities.

Conclusion: The results from this analogue study highlight how common paranoid thinking is in the general population (albeit this was a student sample), and how it is more helpful to see this paranoia as part of the mainstream developmental psychology. The results highlight a developmental pathway to paranoia. Early life experiences impact on two self-regulatory pathways: the ability to affect regulate and the ability to mentalise. Both affect regulation and mentalising were shown to be related to paranoia. Attachment anxiety/avoidance per se was not a significant predictor of paranoia. However, taking affect into account, it was possible to strongly predict paranoia. This highlights how affect regulation emerges in the

attachment context. Overall the data fit a developmental approach to paranoia.

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Captions

Table 1. Descriptive data for all measures.

Table 2. Frequency with which items endorsed*

Table 3. Pearson Correlations between all measures.

Table 4. Multiple regression analyses (hierarchical and stepwise), predicting paranoid thinking.

Figure 1. Path model 'cognitive' for relationship of early life experience on paranoia, via attachment style and empathy.

Figure 2. Path model 'hybrid', for cognitive pathways and direct effect of early life experience on paranoia.

Figure 3. Path model 'developmental affect regulation', for relationship of early life experience on paranoia.

	Mean	SD	Median	IQR	Skew-ness	Kurtosis	Previously published data	
							M	SD
PS	40.44	14.32	38	21	.69	-.12	42.7	10.2 [1]
PAM Attachment anxiety	1.02	.61	.88	1	.63	-.15	1.20	.65 [2]
PAM Attachment avoidance	1.31	.58	1.38	1	.08	-.44	1.44	.58 [2]
ELES	36.39	8.4	34	11	.98	.63	32.53	12.02 [3]
Threat	11.02	5.55	9	7	1.43	1.61	11.26	5.67 [3]
Submissiveness	13.78	5.41	13	7	.72	.04	14.21	5.24 [3]
Autonomy	11.58	2.96	12	4	-.77	-.30	7.06	2.91 [3]
EQ	44.45	11.94	45	0	-.18	-.45	42.53	10.84 [4]
EQ-28	31.46	9.52	32	13	-.18	-.44		
Short EQ Cognitive	5.51	2.38	5	3	-.008	-.42		
Short EQ Affective	5.75	2.21	6	3	-.23	-.57		
Short EQ Social skills	5.90	2.43	6	4	-.12	-.73		
SCS	36.01	8.10	37	11	-.48	-.12		
Rank	22.92	5.54	23	7	-.46	-.007		
Social fit	13.08	3.59	13	5	-.33	-.38		
I-PANAS-SF	28.84	3.28	29	4	.13	.78		
PA	17.85	3.28	18	4	-.36	.43	19.48	2.89 [5]
NA	10.99	2.81	11	4	.56	.45	11.21	2.04 [5]

Note: $N = 722$. *IQR* – Interquartile Range. PS – Paranoia Scale, PAM – Psychosis Attachment Measure (Anxious/Avoidant – anxious/avoidant attachment style), ELES – Early Life Experiences Scale, EQ – Empathy Quotient, EQ-28 – Empathy Quotient over subset of 28 items (Lawrence et al., 2004), Short EQ (Muncer et al., 2006), SCS – Social Comparison Scale, I-PANAS-SF – The International Positive and Negative Affect Schedule, short-form; PA – positive affect, NA – negative affect. 1) Feiningstein et al. (1992): Sample across several studies, $N = 581$; 2) Pers. communic. K. Berry: $N = 323$; 3); Gilbert et al. (2003): $N = 220$; 4) Muncer et al. (2006): $N = 348$; 5) Thompson (2007), UK sample, $N = 29$.

	%
I sometimes feel as if I'm being followed.	5
I am sure I get a raw deal from life.	6
No one really cares much what happens to you.	8
Most people make friends because friends are likely to be useful to them.	8
Someone has been trying to influence my mind.	8
Someone has it in for me.	9
I believe that I have often been punished without cause.	9
I have often found people jealous of my good ideas just because they had not thought of them first.	9
Most people inwardly dislike putting themselves out to help other people.	11
I am bothered by people outside, in cars, in stores, etc. watching me.	11
My parents and family find more fault with me than they should.	11
It is safer to trust no one.	12
Some people have tried to steal my ideas and taken credit for them.	13
Most people will use somewhat unfair means to gain profit or an advantage, rather than lose it.	20
I often wonder what hidden reason another person may have for doing something nice for you.	20
I have often felt that strangers were looking at me critically.	22
People often disappoint me.	22
I tend to be on my guard with people who are somewhat more friendly than I expect.	25
People have said insulting and unkind things about me.	35
I am sure I have been talked about behind my back.	45

*Note: Percentages are for each item having been endorsed by participants as 4 or 5 on the 5-point Likert scale (with 1 = not at all applicable to me, and 5 = extremely applicable to me).

	4	5	6	7	8	9	10	11	12	13	14	15	16	NA
3) PS	.446**	.373**	.481**	.319**	.355**	.492**	-.288**	-.064	-.201**	-.376**	-.238**	-.394**	-.241**	.463**
4) PAM-Anx		.166**	.869**	.862**	.202**	.366**	-.215**	-.01	.09*	-.348**	-.424**	-.388**	-.320**	.542**
5) PAM-Avoid			.380**	-.006	.159**	.267**	-.279**	-.172**	-.299**	-.363**	-.236**	-.444**	-.188**	.263**
6) ELES-threat						.695**	-.569**	.014	-.104**	-.154**	-.101**	-.173**	-.108**	.193**
7) ELES-subm							-.645**	-.019	-.058	-.258**	-.299**	-.332**	-.174**	.357**
8) ELES-auto								.123**	.117**	.232**	.258**	.338**	.154**	-.267**
9) EQ-cog									.320**	.381**	.148**	.212**	.215**	-.058
10) EQ-emo										.191**	-.103**	.126**	.118**	.007
11) EQ-soc											.318**	.505**	.273**	-.395**
12) SCS-rank												.55**	.426**	-.45**
13) SCS-fit													.346**	-.463**
14) PA														-.285**

Note: *N* = 722. PS – Paranoia Scale, PAM – Psychosis Attachment Measure (Anxious/Avoidant –attachment anxiety/avoidance), ELES – Early Life Experiences Scale: threat, submissiveness, autonomy subscales, EQ-28 – Empathy Quotient over subset of 28 items (Lawrence et al., 2004): cognitive empathy, emotional reactivity, social skills subscale, SCS – Social Comparison Scale: social group fit and rank subscale, I-PANAS-SF – The International Positive and Negative Affect Schedule, short-form; PA – positive affect, NA – negative affect. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

	R	R^2	Adjusted R^2	F	Sig. of F	Beta*
HIERIERCHIC AL MODEL						
Gender	.261	0.068	0.066	4.082	.000	- .093
Age						- .120
PA	.541	.292	.288	113.56	.000	-.040
NA						.192
ELES-threat	.645	.416	.410	50.14	.000	.076
ELES-subm						.302
ELES-auto						.096
PAM-anx	.680	.462	.455	30.56	.000	.179
PAM-avoid						.128
EQ-cog	.696	.485	.476	10.51	.000	.101
EQ-emo						-.157
EQ-soc						-.081
SCS-rank	.698	.487	.477	1.76	.172	.062
SCS-fit						-.054
STEPWISE MODEL						
ELES-subm	.492	.242	.241	230.28	.000	.296
NA	.580	.337	.335	182.56	.000	.192
EQ-emo	.625	.390	.388	153.28	.000	-.171
PAM-anx	.651	.423	.420	131.53	.000	.184
PAM-avoid	.663	.440	.436	112.60	.000	.136
Age	.676	.457	.452	100.16	.000	-.120
Gender	.683	.467	.462	89.27	.000	-.099
EQ-cog	.688	.473	.467	79.90	.000	.102
EQ-soc	.691	.478	.471	72.35	.000	-.089
ELES-auto	.693	.481	.474	65.85	.000	.094
ELES-threat	.696	.484	.476	60.51	.000	.080

* The standardised regression coefficient or beta and the partial correlation are shown, which indicated the importance of the independent contribution of each variable at the final stage of analysis to the prediction of paranoid thinking when all other predictors are held constant).
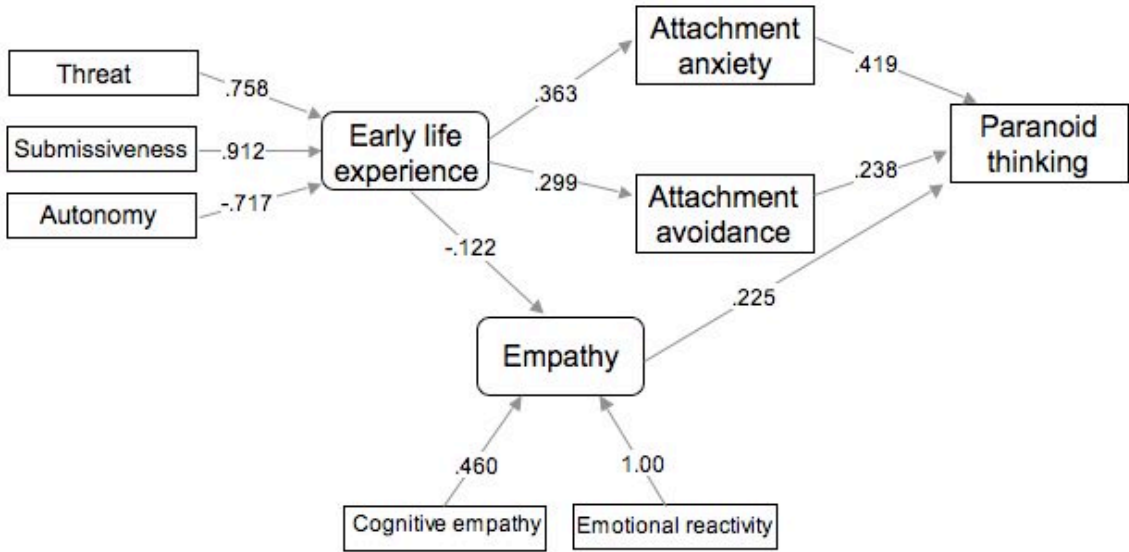
Model fit: S-B X^2 = 792.79 (p = .000); RCFI = 0.661; RMSEA = 0.138.
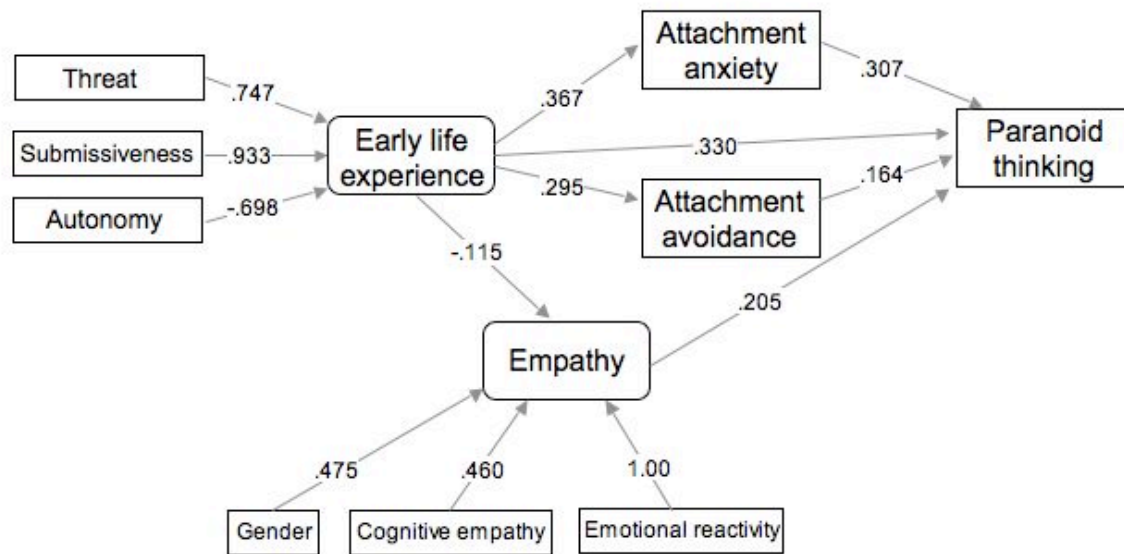
Model fit: S-B X^2 = 715.34 (p = .000); RCFI = 0.696; RMSEA = 0.132.

Model fit: S-B X^2 = 175.92 (p = .000); RCFI = 0.934; RMSEA = 0.073.

<u>Appendix A.</u> Requirements for submission to Psychology and Psychotherapy: Theory Research and Practice.

Psychology and Psychotherapy (PAPTRAP)

Notes for Contributors

Psychology and Psychotherapy: Theory Research and Practice (formerly The British Journal of Medical Psychology) is an international scientific journal with a focus on the psychological aspects of mental health difficulties and well-being; and psychological problems and their psychological treatments. We welcome submissions from mental health professionals and researchers from all relevant professional backgrounds. The Journal welcomes submissions of original high quality empirical research and rigorous theoretical papers of any theoretical provenance provided they have a bearing upon vulnerability to, adjustment to, assessment of, and recovery (assisted or otherwise) from psychological disorders. Submission of systematic reviews and other research reports which support evidence-based practice are also welcomed, as are relevant high quality analogue studies. The Journal thus aims to promote theoretical and research developments in the understanding of cognitive and emotional factors in psychological disorders, interpersonal attitudes, behaviour and relationships, and psychological therapies (including both process and outcome research) where mental health is concerned. Clinical or case studies will not normally be considered except where they illustrate particularly unusual forms of psychopathology or innovative forms of therapy and meet scientific criteria through appropriate use of single case experimental designs.

1. Circulation

The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

2. Length

Papers should normally be no more than 5000 words (excluding the abstract, reference list, tables and figures), although the Editor retains discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length.

3. Submission and reviewing

All manuscripts must be submitted via our online peer review system. The Journal operates a policy of anonymous peer review.

4. Manuscript requirements

▸ Contributions must be typed in double spacing with wide margins. All sheets must be numbered.

▸ Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript with their approximate locations indicated in the text.

▸ Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate sheet. The resolution of digital images must be at least 300 dpi.

▸ For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, results, Conclusions. Review articles should use these headings: Purpose, Methods, Results, Conclusions. For further details please see the document below:

> 📄 Psychology and Psychotherapy: Theory, Research and Practice - Structured Abstract Information

▸ For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full.

▸ SI units must be used for all measurements, rounded off to practical values if appropriate, with the imperial equivalent in parentheses.

▸ In normal circumstances, effect size should be incorporated.

▸ Authors are requested to avoid the use of sexist language.

▸ Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations, etc. for which they do not own copyright.

For guidelines on editorial style, please consult the APA Publication Manual published by the American Psychological Association.

5. Brief reports

These should be limited to 1000 words and may include research studies and theoretical, critical or review comments whose essential contribution can be made briefly. A summary of not more than 50 words should be provided.

6. Publication ethics

All submissions should follow the ethical submission guidelines outlined the the documents below:

📄 Ethical Publishing Principles – A Guideline for Authors

📄 Code of Ethics and Conduct (2006)

7. Supplementary data

Supplementary data too extensive for publication may be deposited with the British Library Document Supply Centre. Such material includes numerical data, computer programs, fuller details of case studies and experimental techniques. The material should be submitted to the Editor together with the article, for simultaneous refereeing.

8. Copyright

On acceptance of a paper submitted to a journal, authors will be requested to sign an appropriate assignment of copyright form. To find out more, please see our Copyright Information for Authors.

Appendix B. Paranoia Scale (PS, Fenigstein et al., 1992).

1.   Someone has it in for me.

2.   I sometimes feel as if I'm being followed

3.   I believe that I have often been punished without cause.

4.   Some people have tried to steel my ideas and taken credit for them

5.   My parents and family find more fault with me than they should

6.   No one really cares much what happens to you.

7.   I am sure I get a raw deal from life

8.   Most people will use somewhat unfair means to gain profit or an advantage, rather than lose it.

9.   I often wonder what hidden reason another person may have for doing something nice for you.

10. It is safer to trust no one.

11. I have often felt that strangers were looking at me critically.

12. Most people make friends because friends are likely to be useful to them.

13. Someone has been trying to influence my mind.

14. I am sure I have been talked about behind my back.

15. Most people inwardly dislike putting themselves out to help other people.

16. I tend to be on my guard with people who are somewhat more friendly than I expect.

17. People have said insulting and unkind things about me.

18. People often disappoint me.

19. I am bothered by people outside, in cars, in stores, etc. watching me.

20. I have often found people jealous of my good ideas just because they had not thought of them first.

Appendix C. Empathy Quotient (EQ, Baron-Cohen et al., 2004).

Note, filler items (20) have been removed.

1. I can easily tell if someone else wants to enter a conversation.
2. I find it difficult to explain to others things that I understand easily, when they don't understand it first time.
3. I really enjoy caring for other people.
4. I find it hard to know what to do in a social situation.
5. People often tell me that I went too far in driving my point home in a discussion.
6. It doesn't bother me too much if I am late meeting a friend.
7. Friendships and relationships are just too difficult, so I tend not to bother with them.
8. I often find it difficult to judge if something is rude or polite.
9. In a conversation, I tend to focus on my own thoughts rather than on what my listener might be thinking.
10. When I was a child, I enjoyed cutting up worms to see what would happen.
11. I can pick up quickly if someone says one thing but means another.
12. It is hard for me to see why some things upset people so much.
13. I find it easy to put myself in somebody else's shoes.
14. I am good at predicting how someone will feel.
15. I am quick to spot when someone in a group is feeling awkward or uncomfortable.
16. If I say something that someone else is offended by, I think that that's their problem, not mine.
17. If anyone asked me if I liked their haircut, I would reply truthfully, even if I didn't like it.
18. I can't always see why someone should have felt offended by a remark.
19. Seeing people cry doesn't really upset me.
20. I am very blunt, which some people take to be rudeness, even though this is unintentional.
21. I don't tend to find social situations confusing.
22. Other people tell me I am good at understanding how they are feeling and what they are thinking.
23. When I talk to people, I tend to talk about their experiences rather than my own.

24. It upsets me to see an animal in pain.

25. I am able to make decisions without being influenced by people's feelings.

26. I can easily tell if someone else is interested or bored with what I am saying.

27. I get upset if I see people suffering on news programs.

28. Friends usually talk to me about their problems as they say that I am very understanding.

29. I can sense if I am intruding, even if the other person doesn't tell me.

30. People sometimes tell me that I have gone too far with teasing.

31. Other people often say that I am insensitive, though I don't always see why.

32. If I see a stranger in a group, I think that it is up to them to make an effort to join in.

33. I usually stay emotionally detached when watching a film.

34. I can tune into how someone else feels rapidly and intuitively.

35. I can easily work out what another person might want to talk about.

36. I can tell if someone is masking their true emotion.

37. I don't consciously work out the rules of social situations.

38. I am good at predicting what someone will do.

39. I tend to get emotionally involved with a friend's problems.

40. I can usually appreciate the other person's viewpoint, even if I don't agree with it.

Appendix D. Psychosis Attachment Measure (PAM, Berry 2006).

1. I prefer not to let other people know my 'true' thoughts and feelings.

2. I find it easy to depend on other people for support with problems or difficult.

3. I tend to get upset, anxious or angry if other people are not there when I need them.

4. I usually discuss my problems and concerns with other people. (reverse item)

5. I worry that key people in my life won't be around in the future.
    situations. (reverse item)

6. I frequently ask other people to reassure me that they care about me.

7. If other people disapprove of something I do, I get very upset.

8. I find it hard to accept help from other people when I have problems or difficulties.

9. I frequently wonder whether I can trust other people.

10. I find it hard to believe that other people will be there for me if I need them.

11. I worry that if other people get to know me better, they won't like who I really am.

12. When I'm feeling stressed, I prefer being on my own to being in the company of other people.

13. I try to cope with stressful situations on my own.

14. I believe that other people will never be concerned about me.

15. I worry that if I displease other people, they won't want to know me anymore.

Appendix E. The International Positive and Negative Affect Schedule Short Form

(I-PANS-SF, Thompson, 2007).

Question: Thinking about yourself and how you normally feel, to what extent do you generally feel:

Upset

Hostile

Alert

Ashamed

Inspired

Nervous

Determined

Attentive

Afraid

Active

Appendix F. Early Life Experiences Scale (ELES, Gilbert et al., 2003).

1. I often had to give in to others at home

2. I felt on edge because I was unsure if my parents might get angry with me

3. I rarely felt my opinions mattered much

4. There was little I could do to control my parents anger once they became angry

5. If I didn't do what others wanted I felt I would be rejected

6. I felt able to assert myself in my family

7. I felt very comfortable and relaxed around my parents

8. My parents could hurt me if I did not behave in the way they wanted

9. I felt an equal member of my family

10. I often felt subordinate in my family

11. My parents exerted control by threats and punishments

12. I often had to go along with others even when I did not want to

13. In order to avoid getting hurt I used to try to avoid my parents

14. The atmosphere at home could suddenly become threatening for no obvious reason

15. I experienced my parents as powerful and overwhelming

Appendix G. Social Comparison Scale (SCS, Allan and Gilbert,1995).

In relation to others, I generally feel:

Inferior	1	2	3	4	5	Superior
Incompetent	1	2	3	4	5	Competent
Unlikable	1	2	3	4	5	Likeable
Left out	1	2	3	4	5	Accepted
Different	1	2	3	4	5	Same
Untalented	1	2	3	4	5	More talented
Weaker	1	2	3	4	5	Stronger
Unconfident	1	2	3	4	5	More confident
Undesirable	1	2	3	4	5	More desirable
Unattractive	1	2	3	4	5	More attractive
Outsider	1	2	3	4	5	Insider

APPENDIX H: MAJOR RESEARCH PROJECT PROPOSAL

Title: What are they up to? Empathy and Paranoid Thinking.

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Abstract

Background: Attachment styles are formed early in childhood and guide perception and behaviour in adulthood. They guide attention, interpretation, memory and predictions about future interpersonal interactions and influence psychosocial functioning in adulthood. Aims: This study wishes to investigate whether a consistent bias towards judging others' intentions as threatening to the self, is related to and maintained by a lack of a specific social cognitive function, such as empathy. This study seeks to investigate the relationship between parenting experience and adult attachment style and their previously unexplored relationship to empathy. Methods: This study will use a range of self-report tools to assess parenting experience, current attachment style, paranoid thinking and level of empathy. A large data sample (N=250) for this analogue study will allow an exploration of the relationship of several variables with the help of structural equation modeling. Several specific models are proposed and will be tested. Applications: The findings of this study will shed light on the interaction of empathy, a social cognitive function, and paranoid thinking. This previously not directly explored relationship may shed light on how level of empathy impacts on paranoid thinking and its maintenance. This may indicate future therapeutic avenues to explore. However, the results will also shed more theoretical insight on how early parenting experience impacts on empathy and the propensity to paranoid thinking in later life.

Introduction

<u>Attachment and the development of internal working models</u>

Attachment theory, following the work of John Bowlby (1969, 1973, 1980), explores the way in which early attachment relationships shape styles of relating to others. Attachment styles are <u>internal working models</u> of the self in relations to others that, once formed early in childhood, guide perception and behaviour in adulthood (Bowlby, 1980).

Initially the availability and responsiveness of an infant's primary carer to its needs, and in particular their role in emotion-regulation for the infant, shapes how the child comes to view the primary carer: as an available and responsive <u>secure base</u>, or not. The child is able to predict the availability of their primary carer. This expectation is the foundation to the internal working model of the self in relation to others in general. Thereby the view of others can be positive (benevolent) or negative (unavailable or even threatening), and the view of self can equally be positive (able, worthy and desirable) or negative (not able or worthy of care, and not desirable).

The development of internal working models, results from an interplay of a) the 'attachment behavioural system', which governs people's, especially infants', emotional attachment to their caregivers, and b) 'caregiving behavioural system', an innate behavioural system in parents and other caregivers that responds to the needs of dependent others (esp. to children, but also others).

These working models are hypothesised to guide attention, interpretation, memory and predictions about future interpersonal interactions (Cassidy, 1999), and influence psychosocial functioning in adulthood. Aversive early childhood experience, such as abuse (Alexander, 1993), has been shown to be associated with insecure attachment style.

Attachment styles are hypothesised to be stable over time because working models direct attention to information that is consistent with representations, influence interpretations consistent with those representations, and also lead to the person to behave in a way that will elicit responses from others that are again consistent with their expectation. However, there is some recognition that working models can be revised as a result of significant interpersonal experiences, especially if there is a high inconsistency between the model and experience (see Berry, 2007).

Attachment styles in adulthood, and ways of measuring these

Two main approaches for the assessment of adult attachment styles have been developed. Main et al. (1985) developed the Adult Attachment Interview (AAI) that measures attachment states of minds on the basis of the coherence of the individual's narrative in describing parental-child relationships. This approach is very time consuming and requires fully trained interviewers and coders for transcript analysis.

The more readily available tool for a wider research community are a number of self-report tools. Based on work in the area of mother-infant dyads by Ainsworth et al., Hazan and Shaver (1987) developed a self-report measure. They propose that three attachment styles capture the individual differences in the internal working models that adults use to organise their close relationships: securely attached, anxiously attached or avoidantly attached.

Others have proposed four styles of attachment: secure, anxious, dismissive and fearful (Bartholomew and Horowitz, 1991). The self-report measure by these researchers simply requests participants to choose on of four descriptions that they think best describes their way of being in close relationships.

However, a recent review of attachment style questionnaires by Kurdek (2002) has

led to a questioning of the factor structure of attachment styles. Avoidance and anxiety emerged as reliable factors. This two-factor structure has recently been further substantiated by the results of an analogue study by MacBeth et al. (2008).

Based on Kurdek's (2002) study, which set out to test the psychometric properties of several self-report measures of adult attachment, the Relationship Scales Questinnaire (Griffin & Bartholomew, 1994) currently poses the best self-report tool for the purpose of assessing adult attachment style.

Attachment style and psychotic phenomenology

Research has recently has been driven more by a developmental achievement approach (e.g. Fonagy et al., 2004). This assumes that there are developmental histories (e.g. experience of primary caregivers in early life) that leave a person with more or less of an awareness of other people's intentions, motivators and how these allow insight into their current and future actions.

Gilbert (e.g. 2005) coined the term social mentalities, which is the interplay in social situations between emotional, motivational, cognitive, and behavioural processes as reflection of underlying neurobiological systems that have been shaped by evolution, which shape the relationship between self and others. These social mentalities are implicated in caregiving, care-eliciting, formation of interpersonal alliances, social rank and sexual behaviour. They also play a role in appraising threat, enhancing safeness and affect regulation. Secure attachment is associated with safeness and therefore deactivates threat-based mentalities. If however parental caregiving was such that no secure attachment style has been achieved, threat social mentalities (safety strategies, including vigilance for threat, paranoia) remain active. High levels of attachment insecurity lead to increased sensitivity to threat, which in turn has an effect on interpersonal functioning (Gerhardt, 2004): increased

emotional distress, impaired reflective functioning and mind-mindedness.

Links between attachment style and psychosis have been demonstrated (Dozier et al., 1999), however, the research is still limited. In a recent review Berry (2007) highlighted evidence for an association between higher levels of attachment insecurity and dismissive-avoidant attachment in individuals with a diagnosis of psychosis.

In an analogue study MacBeth et al. (2008) showed that both attachment and a strategy of interpersonal distancing predicted paranoia. This overlaps with Gilbert's (2001) argument that social mentalities are crucial in the development and maintenance of persecutory ideation and delusions. It is evolutionarily adaptive to show heightened sensitivity to social threat cues. This can be understood as a safety strategy. However, if this occurs to excess then a person will be described as paranoid, and this threat-based social mentality dominates interpersonal relationships. In other words, paranoid thinking is an unintended consequence of an adaptive safety strategy.

Attachment style and capacity for empathy

The term empathy is a fairly modern translation of the German word Einfühlung (Titchener, 1909), which literally means "feeling into". A well known phrase that expresses empathy by means of a vivid image is "To put yourself into somebody's shoes". Empathy allows us to tune into what somebody might be feeling, and what they might be thinking. It also allows us to predict what their intentions might be, and what they might do next. It allows us to feel an emotion, triggered by the emotion that the other person is expressing. Empathy is an important ability contributing to our functioning as social beings and has been widely studied in human and non-human primates (Preston and de Waal, 2002). Nevertheless, it has

proven somewhat difficult to define. Some have focussed more on the affective aspects of empathy (feeling an emotion, triggered by perceiving the expression of an emotion in another). Others have highlighted more cognitive aspects of empathy (understanding that another person might have a different perspective on the same situation).

The 'caregiving behavioural system' is more likely to achieve its aims, if a person is securely attached and this allows them to focus on needs of someone else (Gillath, Shaver and Mikulincer, 2005). This is similar to Ainsworth et al.'s (1978) observation of children ceasing to explore the laboratory environment when their attachment figure left the room in the Strange Situation. If a person experiences attachment insecurity, this interferes with other non-attachment activities, including caregiving behaviours. Caregiving behaviours such as empathy and compassion will be inhibited if a person is currently preoccupied with their own proximity seeking to a secure base. This has been backed up with experimental studies, which used contextual priming of a sense of attachment security (by asking participants to recollect personal memories, read a story, or look at a picture of supportive others, or by subliminally exposing them to proximity-related words). Some of these experimental results suggest that attachment style is related to a person's ability to empathise with others and subsequent helping behavior (Mikulincer, Gillath, Halevy, Avihou, Avidan, & Eshkoli, 2001; Westmaas & Silver, 2001).

<u>Paranoid thinking</u>

As our early attachment experience is the foundation to the internal working model of our self in relation to others in general, it is of particular interest to investigate the case when the view of others is markedly negative. This if of course highlighted in paranoid persons, who predominantly view others as threatening and negative. By

definition, when a person's thinking is paranoid, they do not accurately judge other people's intentions, motivations and thoughts towards them, but tend to hold a threat based appraisal of social and interpersonal situations. This study will focus on paranoid thinking as a window into investigating the relationship of early childhood experience (parenting and possible trauma) on attachment.

Many have argued that psychotic symptoms such as delusions might be better understood on a continuum with normal experience (e.g. van Os & Verdoux, 2003). In line with this assumption, paranoid thinking has been proposed to be present in the normal population along a continuum. Paranoid delusions are held by 10-15% of the general population, according to a conservative estimate by Freeman (2007), and even subtypes of paranoia have been identified in a non-clinical sample (Combs et al., 2007). A number of theoretical approaches have been used to shed light on the origins, function and maintenance of paranoid thinking, which to review is beyond the scope of this proposal.

Current study

As outlined above, a person's early care receiving experience shapes their internal working model of how they relate to others. If parental caregiving was such that no secure attachment style has been achieved, threat social mentalities remain active and safety strategies, including vigilance for threat and paranoia are adopted by the person.

It is so far however unclear what the pathway between early childhood experience , attachment and paranoid thinking is. This study wishes to differentiate between two models, which will be elaborated on in the next section of this proposal.

Aims and hypotheses

<u>Aims</u>

This study sets out to explore the way in which recall of early childhood experience and adult attachment style relates to a person's ability to empathise, their propensity to paranoid thinking and degree of positive affect. This study wishes to test two specific hypotheses by a comparative analysis of fit of two specific path models exploring the role of early childhood experience, attachment style, paranoid thinking, empathy and positive affect.

This study involves a non-clinical sample, as the aim is to investigate more general mechanisms that hold for the continuum of paranoid thinking.

<u>Hypotheses</u>

<u>Model 1:</u> Parenting experience effects attachment style, which in turn is predictive of paranoid thinking.

This model reflects Berry's (2007) evidence for an association between higher levels of attachment insecurity and dismissive-avoidant attachment in individuals with a diagnosis of psychosis.

—————————————————

INSERT FIGURE 1 ABOUT HERE

—————————————————

<u>Model 2:</u> Attachment and paranoid thinking are a consequence of early childhood experience. They are safety strategies adopted by a person. Rather than paranoia being a consequence of attachment style, these are both factors that stand parallel to each other. However, an interaction between attachment style and paranoia is in addition part of this model.

—————————————————

INSERT FIGURE 2 ABOUT HERE

—————————————————

Reduced positive affect and ability to empathise are unintended consequences of attachment avoidance and paranoia in this model. More specifically, if negative parenting have shaped a threat-based appraisal of others, empathic understanding of others is reduced, and less positive affect is experienced.

Plan of investigation

Participants

A group of non-clinical volunteers will be recruited for this study. Participants will be recruited from a university setting, including staff and students.

Inclusion and exclusion criteria

Male and female participants, with an age range between 16 and 75, will be invited to take part in this research. This study aims to investigate paranoia in a non-clinical sample. However, truly sampling a non-clinical group would require conducting clinical interviews with each participant, in order to rule out psychological problems at a clinical level. Therefore a simple question as to current or past mental health problems will be included.

Recruitment procedures

Potential participants will be contacted via Email and asked to take part in the study by following a link embedded in the Email. This link will take them to a site hosting the self-report measures used in this study. Currently the plan is to contact the majority of student and staff of the University of Glasgow as well as University of Edinburgh via centrally held Email address lists.

Measures

Paranoia Scale (PS): In order to assess trait paranoia, participants will be asked to complete the PS (Fenigstein & Vanable, 1992). The PS was designed specifically

to measure the incidence of paranoia in a college population. The scale consists of 20 items, measuring paranoid experience (e.g., 'I sometimes feel as if I am being followed') and paranoid beliefs (e.g., 'It is safe to trust no-one'). Items are answered on a 5-point Likert scale, ranging from 1 (not at all applicable to me) to 5 (extremely applicable to me). Responses are summed to produce a score, which ranges from 20 to 100; higher scores reflect higher levels of subclinical paranoia. In a factor analysis of non-clinical groups, Fenigstein and Vanable (1992) found the scale to comprise of a single factor with Cronbach's alpha of 0.81 to 0.87. See appendix for items of the PS.

Psychosis Attachment Measure (PAM): This is a 16-item measure developed by Berry (2006), and validated with a large analogue sample. Participants are asked to rate the extend to which each item is characteristic of them using a four-point Likert scale (1 = 'not at all' to 4 = 'very much'). A factor analysis revealed that, after the exclusion of one item, a two-factor solution was most fitting. One of the factors represents attachment anxiety and the other avoidance. The internal consistency of each dimension is acceptable. Cronbach's alpha (Berry, 2006) for the anxiety and avoidance dimension is 0.82 and 0.75 respectively. Anxiety and avoidance subscale scores are derived by averaging scores for the 9 anxiety and 6 avoidance items. See appendix for the 15 items of the PAM.

The Early Life Experiences Scale (ELES): This scale was developed by Gilbert et al. (2003) to measure recall of personal feelings of perceived threat and subordination in childhood. The scale is made up of 15 items, that are best described by a three factor model. The first factor relates mostly to perceived threat (e.g. 'In order to avoid getting hurt I used to try to avoid my parents'). The second factor includes six items that related to submissive behaviour, such as, 'I often had to go

along with others even when I did not want to' and 'I often had to give in to others at home'. A third factor loads on the three items, 'feeling equal, feeling relaxed, and able to assert self in the family', and are referred to as (un)valued. Subsequent reliability analysis of the three subscales revealed a Cronbach alpha of 0.89 for threat, 0.85 for submissiveness and 0.71 for (un)valued. This measure presents a departure from traditional measures which investigate recall of parental behaviour. The authors argue that different people can recall parental behaviour in a certain way, but have very different feelings associated with these memories. In a study evaluating the ELES ability to predict psychopathology, the measure proved to correlate positively with a measure of depression in a student population. However, a regression analysis into which both the ELES and a recall of parenting behaviour measure were entered, only the submissive factor of the ELES predicted depression. The ELES proves high correlation with recall of parental behaviour measure (short form of EMBU, Swedish acronym for my memories of upbringing; Arrindell et al., 1999), and we therefore will not use a separate measure.

Empathy quotient (EQ): The EQ (Baron-Cohen et al., 2004) will be used to assess empathy. The EQ is a self-report questionnaire, containing 40 empathy items and 20 filler items. On each empathy item a person can score 2, 1, or 0, so the EQ has a maximum score of 80 and a minimum score of zero. The EQ has a high test–retest reliability (r = 0.835; Lawrence et al., 2004). It has further been shown to be associated with performance on the Eyes Task (Baron-Cohen et al., 2001), a non-verbal mental state inference test. The EQ also has a moderate association with the Interpersonal Reactivity Scale (Davis, 1980), another tool measuring empathy. These results indicate concurrent validity. Lawrence et al. (2004) report, that only three EQ items correlated with the Social Desirability Scale (Crowne & Marlowe,

1960), indicating that the EQ has a satisfactory construct validity. The EQ can be reduced to several factors (Lawrence et al., 2004) which overlap with traditional ideas of empathy: <u>cognitive empathy</u> (includes items that measure the appreciation of others' affective states), <u>emotional reactivity</u> (includes items of emotional reaction in response to others' mental states) and <u>social skills</u> (includes items that explore the spontaneous use of social skills and/or a lack of intuitive social understanding). A recent confirmatory factor analytic study by Muncer and Ling (2006) further allow an additional analysis of the EQ items, providing a separate score for affective and cognitive empathy. See appendix for EQ.

<u>Social Comparison Scalre (SCS):</u> The SCS was developed by Allan and Gilbert (1995) and dimensions of social comparison are measured, focusing on judgments of social rank, relative attractiveness and group fit. Cronbach alpha for the 11 item scale was 0.91 for a student sample (Allan et al., 1995). The 11 items load on a two factor structure solution, with Factor 1 mainly related to rank constructs (inferior-superior, incompetent-competent, untalented-more talented, weaker-stronger and unconfident-more confident) and Factor 2 to social group fit (outsider-insider, left out-insider, and different-same.). Items measuring social attractiveness were found to load on both factors. See appendix for items of the SCS.

<u>The International Positive and Negative Affect Schedule, short-form (I-PANAS-SF):</u> The PANAS is self-report measure of positive and negative affect developed by Watson, Clark, and Tellegen (1988b). NA and PA reflect dispositional dimensions, with high-NA being marked by subjective distress and unpleasurable engagement, and low NA by the absence of these feelings. By contrast, PA represents the extent to which an individual experiences pleasurable engagement

with the environment. PANAS NA and PA scales index two distinct, but moderately negatively correlated, factors (Crawford et al., 2004). Thompson (2007) developed a 10-item international short-form, which will be used in this study. PA and NA subscales had Cronbach's alphas of, respectively, 0.78 and 0.76, indicating adequate reliability. The test-retest coefficient of reliability for both the PA and NA subscales is 0.84, suggesting acceptable medium temporal stability. Participants are asked to 'Thinking about yourself and how you normally feel, to what extent do you generally feel;' and then are presented with 10 different words (e.g. hostile, inspired). Items are answered on a 5-point Likert scale, ranging from 1 (always feel like this) to 5 (never feel like this). See appendix for items of the I-PANAS-SF.

Design

This study will use an analogue cross-sectional cohort design. A range of variables will be measured (paranoid thinking score, cognitive and affective empathy scores, recall of parental caring and attachment style).

Research procedures

Participants will complete questionnaire based measurements online.

Justification of sample size

As this study does not involve a clear comparison of two or more groups, effect size and power calculation are not readily possible. There are no agreed conventions for estimating effect size and thus the sample size requirements in covariance modeling. However, there are two studies with non-clinical samples that guide my decision. Firstly, Henry et al. (2008) investigated the relationship between schizotypy and empathy, both purely questionnaire based tools, with a sample size of N = 223. Secondly, MacBeth et al. (2008) recruited 213 participants in their analogue study investigating attachment style and psychotic phenomenology. I therefore aim to

recruit up to 250 participants.

<u>Settings and equipment</u>

Data collection for this research will involve participants completing self-report questionnaires. These will be hosted online on a commercially available survey tool (www.surveymonkey.com). Participants will be contacted via email and asked to volunteer in participation. Participants can then choose to follow the link embedded in the email to take part in the study.

<u>Data analysis</u>

Data will be screened for normality. In a non-clinical populations, the main dependent variable of paranoia is expected to be positive skewed, and therefore correction for non-normal distribution will be applied were required. The primary analytic method for this study will be structural equation modeling. SEM permits simultaneous assessment and prediction of several dependent variables within a single model. SEM is a hypotheses testing or confirmatory approach to data analysis where a theoretical model of the relationship of dependent and predictor variables is hypothesised and subsequently tested how well a model fits the data.

<u>Health and safety issues</u>

    <u>Researcher safety issues:</u> No safety issues arise for the researcher.

    <u>Participant safety issues:</u> Some of the measurements of psychological constructs (e. g. PS, EQ, RQ, s-EMBU) may give rise to distressing thinking processes in some participants. In order to provide for this situation, participants will receive some information on the information and consent form prior to testing (i. e. names and contact numbers for organisations they can contact, as well as contact email of the investigator and her supervisor).

<u>Ethical issues (including where submission will be made)</u>

Application for ethical approval will be made to the University of Glasgow Faculty of Medicine Ethics Committee. As none of the participants will be selected because of their links with the NHS (for example, through GP surgeries), no separate application to any further body will be made. Participants will have to give informed consent. After receiving an information page they will be asked to tick a box to indicate consenting to participation before starting any part of the study. This study will not involve any form of deception of participants as to the true nature of the investigation. Participants will be informed that they are free to withdraw form the investigation at any point. Should participants contact the investigators regarding a mental health query, a standardised response will be sent to the participant, informing them of pathways to access mental health and other support services (e.g. contacting their GP, Breathing space Scotland). In order to protect participants' confidentiality, no personal data will be stored.

Financial issues

Equipment costs, travel etc.: The only cost for data collection will be for maintenance of an online survey software and hosting space (www.surveymonkey.com). This will be covered by a monthly fee of £ 13.20 GBP (current equivalent of $ 19.95 USD), and over three months will accumulate to a total of £ 39.60 GBP. No travel costs will be incurred.

Time table

Preparation of test material: September to November 2009. Data collection: December 2009 to end of February 2010. Data analysis: March/April 2010. Report writing: May/June 2010.

Practical applications

This study will involve a non-clinical sample, and therefore clinical implications might seem limited. However as there is growing evidence for a symptomatic continuum between paranoid thinking in subjects from the general population, and clinical cases of paranoid delusions, there results might inform future therapeutic developments. In addition, non-clinical symptoms have been known to be associated with an increased likelihood of being diagnosed with a psychotic disorder (Van Os et al., 2000). Therefore, further study of paranoid thinking in a non-clinical population will potentially shed light on clinically relevant questions, as well as inform on factors that increase the likelihood of becoming unwell. We hypothesise that higher levels of paranoid thinking might be related to lower levels of empathy, with might contribute to the maintenance of paranoid thinking. Should this be the case, then this might indicate a therapeutic focus on enhancing the ability to empathise with others. We will be able to observe whether the rates of paranoid thinking reported in the literature (10-15% in general population), are reflected in a Scottish student sample.

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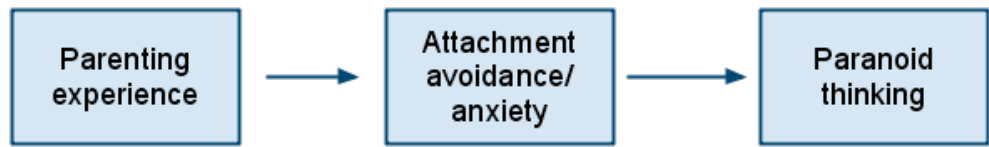
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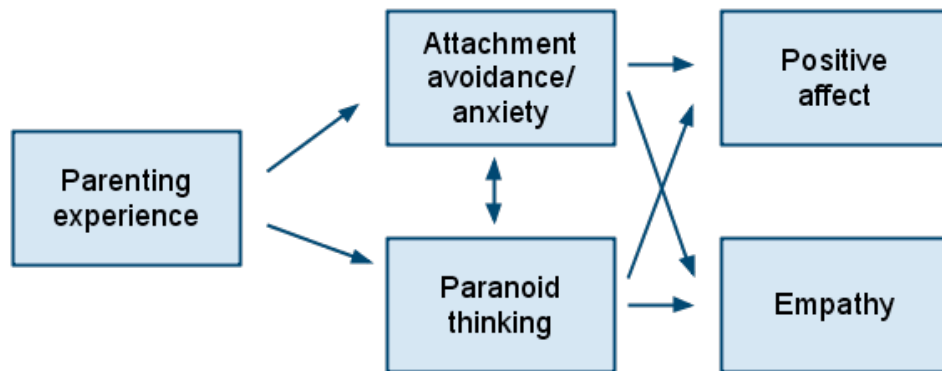
Captions

Figure 1. Model 1.

Figure 2. Model 2.

Appendix

Please see appendices for Major Research Project, as equivalent.

Ethical Approval

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University of Glasgow | Faculty of Medicine

Dr Katja Osswald
2/1 16 Dryburgh Gardens
Glasgow
G20 6BT

25 July 2010

Dear Dr Osswald

Medical Faculty Ethics Committee

Project Title: What are they up to? Empathy and paranoid thinking.

Project No.: FM00809

The Faculty Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study now that the requested revisions have been incorporated. They are happy therefore to approve the project, subject to the following conditions:

- The research should be carried out only on the sites, and/or with the groups defined in the application.

- Any proposed changes in the protocol should be submitted for reassessment, except when it is necessary to change the protocol to eliminate hazard to the subjects or where the change involves only the administrative aspects of the project. The Ethics Committee should be informed of any such changes.

- If the study does not start within three years of the date of this letter, the project should be resubmitted.

- You should submit a short end of study report to the Ethics Committee within 3 months of completion.

Yours sincerely

Dr Una MacLeod
Faculty Ethics Officer

Dr U MacLeod
Clinical Senior Lecturer

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ADVANCED CLINICAL PRACTICE I:

REFLECTIVE CRITICAL ACCOUNT (Abstract only)

Title: Reflection on the effects of working with traumatised children

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Abstract

This is a personal account of my experience and reflection on working in a team for looked after and accommodated children, and more specifically the effect working with traumatised children. With the help of an adapted version of Gibbs' (1988) model of reflection, I reflected on a number of situations and intrapersonal experiences. In this reflective account I document this process and in addition tie my personal experience and reflection in with relevant literature on this topic.

Overall the reflective process on working with traumatised children has allowed me to develop an increased understanding of my needs and functioning as a clinical psychologist on a personal level. It however also allowed me to gain greater insight into other professionals that are even more exposed to direct work with traumatised children. This increased understanding has helped me be more able to empathise with other professionals in consultations. More specifically it allowed me to gain insight into why some of the care pathways for looked after children seem so blocked.

ADVANCED CLINICAL PRACTICE II:

REFLECTIVE CRITICAL ACCOUNT (Abstract only)

Title: Reflection on accessibility of mental health services to refugees.

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Abstract

This is a personal account of my experience and reflection on working with a refugee in an adult mental health setting. Boud et al.'s (1996) model of reflection aided me in revisiting experiences and feelings, and relating them to what I already know and new material I discovered in my reflective work. It helped me consider options and choices for future action. My reflective account focuses on three main areas: language, culture and systemic issues, and how they impact on the accessibility of mental health services to refugees. With respect to language I reflect mainly on the difficulties of working through an interpreter. Language however is also a barrier when it comes to communicating about the psychological world of clients. This is very much embedded in the culture of a person, reflecting their concepts of the mental world, and mental wellbeing. Culture in the more wider sense is yet another barrier, as we are so embedded in our own culture that this might get in the way of being able to formulate a client's need (or psychological pain) with full regard of their own context (i.e. culture). Finally, on a service level I reflected on possibly incorrect preconceptions of what needs refugees have. I have found the reflection on work with refugees as very stimulating to think about how embedded I am personally and professionally in my context and culture.