

Doctoral thesis

The Role of Affective Theory of Mind in the Association between Trauma and Psychotic-Like
Experiences



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Abstract

While it has been established that childhood trauma is associated with experiencing psychosis, the dynamics of this relationship are far from being understood. Social cognition is thought to be an important factor for understanding this association as it has been found that social difficulties predict functional outcome in psychosis better than non-social cognitive difficulties. This thesis set out to explore these variables, specifically the role that affective theory of mind has on the association between childhood trauma and psychotic-like experiences. Following PRISMA guidelines, the association between the reading the eyes in the mind test, a measure of affective theory of mind, and paranoia, a psychosis-like experience, were evaluated through a systematic literature review and meta-analysis of the studies. Deficits on the tests have been found to be associated with the experience of paranoia with a small magnitude effect size. In the research paper, the reading the eyes in the mind test was used to explore the effect of affective theory of mind on the association between childhood trauma and psychotic-like experiences, through an online survey. Affective theory of mind was not a mediator of this association and did not predict psychotic-like experiences. This suggests that the affective component of theory of mind is not related to psychotic-like experiences in the general population. The characteristics of the sample and the nature of the questionnaires implemented may have played an important role in obtaining these results. These confounders have been fully explored and discussed within the context of future research.

Declaration

I declare that this thesis, which is submitted in fulfilment of the Doctorate in Clinical Psychology at Lancaster University, was composed by myself. The work contained herein is my own except where explicitly stated otherwise in the text and it has not been presented for the award of a degree elsewhere.

Signature:  

Date: 26 September 2018

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Literature Review

Title: The Association between Affective Theory of Mind and Paranoia: A Systematic Literature
Review and Meta-Analysis

Short Title: Affective ToM, CT and PLE



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Abstract

Introduction: While deficits in Theory of Mind (ToM) are common in psychosis, there remains controversies on the role that ToM has on paranoia. Affective ToM may be involved in the experience of paranoia and this effect may be more prominent when paranoia is measured as an individual complaint and not estimated from a few items of a general scale. This review and meta-analysis of relevant papers explores this issue. **Method:** Following PRISMA guidelines, Embase, Medline, PsycINFO, Pubmed and Web of Science were searched from January 1980 until March 2018 for studies in which analyses of the association between the Reading the Eyes in the Mind Test (RMET) and paranoia were performed. **Results:** Twelve studies were included and their overall quality was acceptable. Of these, nine studies (776 participants) yielded a pooled Fisher's z of small magnitude regarding the association between deficits in the RMET and the experience of paranoia. Studies that implemented a specific scale for paranoia had higher effect sizes than studies that used limited items from a general scale. **Conclusion:** Affective ToM is impaired in individuals experiencing paranoia and this effect is more prominent when paranoia is measured by means of a specific scale.

Keywords: Affective theory of mind, paranoia, reading the mind in the eyes test, review, meta-analysis

The role of social cognition in psychotic-like experiences, in particular the relationship between Theory of Mind (ToM) and paranoia, has been investigated extensively. Results regarding this association are controversial (Freeman, 2007). It is likely that this is due to the approaches researchers have used which do not allow for a clear understanding of the multifaceted nature of psychological constructs such as ToM and paranoia. It has been proposed that poorer functional outcomes are better predicted by difficulties in the domains of social cognition (ToM, emotional processing, social perception and knowledge, attributional bias) than by poor neurocognition (including domains such as processing speed and working memory) in psychosis (Fett, Viechtbauer, Penn, van Os, & Krabbendam, 2011). As such, a comprehensive understanding of the relationship between ToM and paranoia is important for clinical practice. This meta-analysis intends to examine this complex relationship in order to shed light on the topic.

ToM and Paranoia

The psychological constructs ToM and paranoia are regularly used in the literature. ToM refers to the ability to attribute causal mental states, such as beliefs, intentions and knowledge, to oneself and to others. ToM allows us to understand other people's behaviour based on their perspective and not on the actual reality of circumstance. ToM is an aspect of social cognition, which broadly refers to the mental operations which underlie social interactions, such as thinking and drawing inferences about people (Green et al., 2008). A deficit in ToM ('under-mentalising') would make it difficult for an individual to take the perspective of another, meaning that they would be unlikely to accurately infer intentions based on the actual state of the world. An excessive reliance on ToM ('over-mentalising'), when individuals generate detailed mental representations of others with little or no evidence to support these models (Fonagy et al., 2016),

would prevent an individual from inferring intentions in agreement with contextual information. A clear distinction between ToM and other aspects of social cognition is difficult to draw (Mitchell & Phillips, 2015). ToM is closely related to the concept of attributional style, the tendency of a person to infer the causes of an event as either internal or external to someone else (Taylor & Kinderman, 2002). Similarly, it is difficult to differentiate between an intention and the emotion behind it, which illustrates how ToM overlaps with the concept of emotion recognition. Thus, ToM as a concept is multi-faceted and is not yet clearly defined.

Paranoia is a term whose meaning differs depending on the context in which it is used. In the psychiatric literature, it can refer to a diagnosis or to the experience of delusions not otherwise specified, be this persecutory, grandeur, jealousy, etc. In this review and in the psychological literature, it is usually described as the experience of thoughts and beliefs characterised by the suspicion of others persecuting, threatening, wanting to harm, or conspiring against oneself. High levels of paranoia are usually associated with psychological difficulties (Freeman et al., 2005). Paranoid ideation is experienced by between 2% and 30% of the general population (Bebbington et al., 2013). One of the reasons that this range is so broad is the way that paranoia is defined in the literature, and measured, making identification of the experience difficult to establish. Although individuals are more likely to think that others are very critical of them than to think that the entire world is plotting to cause them serious harm, both experiences could be classified as paranoia. Depending on the nature of this experience, ToM may play a different role in it. This lack of specificity in the definition of ToM and paranoia may fuel the controversy regarding their relationship.

Social cognition is thought to have a role in the experience of paranoia, as paranoia has been found to be associated with social anxiety and avoidance (Martin & Penn, 2002). Social

behavioural difficulties are likely to be found in people experiencing psychotic-like experiences and are significant predictors of receipt of a diagnosis (Brune, 2005). However, the specifics of this relationship remain unclear. It has been suggested that a deficit in ToM is related to paranoia (C. D. Frith, 1994) but Walston, Blennerhassett and Charlton (2000) argue that ToM is necessary in order to experience paranoia as it would be more difficult to attribute hostile mental states to others if one's ToM was compromised. In contrast, C. D. Frith (2004) suggested that a tendency to over-mentalise would explain why individuals attribute malevolent intentions to others, rather than accounting for contextual information. As a result, when a negative event is experienced, individuals will be more likely to make external personal attributions (Bentall & Fernyhough, 2008). Similarly, an impairment in emotion recognition, specifically a tendency to identify neutral emotion as negative, has been found to be related to paranoia (Combs, Michael, & Penn, 2006), and would explain the malevolent nature of intentional attributions. Controversy still exists on whether there is a specific role for ToM (Montag et al., 2011), attributional style (Martin & Penn, 2001), or emotion recognition (Bratton, O'Rourke, Tansey, & Hutton, 2017) in paranoia. The role of social cognition in paranoia, specifically whether impaired ToM causes paranoid ideation (Freeman, 2007), and how this process works, is far from being understood.

Affective ToM and Paranoia as a Complaint

A series of reasons have been identified to explain this controversy. First, ToM presents both with a cognitive and an affective component (Shamay-Tsoory et al., 2007) and the degree to which different ToM tests rely on either component varies (Darrell-Berry et al., 2017). Second, paranoia has been defined either as part of a wider diagnosis (e.g. paranoid schizophrenia), or as a specific complaint (Bentall, 2004), the latter being found on a continuum between non-clinical and clinical populations (van Os & Verdoux, 2003; van Os, Linscott, Myin-Germeys, Delespaul,

& Krabbendam, 2009). Given this, it is likely that differences in the conceptualisation of ToM and paranoia have an impact on their observed relationship. While the present meta-analysis focusses on the two reasons aforementioned, other possible explanations have also been suggested. First, different tests measure different degrees of complexity within ToM (Corcoran et al., 2011) and therefore they relate differently to paranoia. Second, ToM deficits might become relevant but only in specific contexts, such as in real world situations (Mehl et al., 2010) or under time pressure (Pickup & Frith, 2001). Finally, the relationship between ToM and paranoia cannot be understood unless other variables, namely executive function and attributional style, are considered (Bentall et al., 2009). It is likely that all these reasons contribute, to some degree, to the difficulties involved in developing a comprehensive theory.

Deficits in the affective or cognitive component of ToM, might be differently related to experiences of paranoia. Bentall et al. (2009) concluded that emotion-related processes were more related to paranoia than cognitive performance. It has also been suggested that a comprehensive model of ToM should include the parallel processing of first and second order beliefs (cognitive state) and of an emotional belief of intention (affective state) (Scherzer, Achim, Leveille, Boisseau, & Stip, 2015). Results indicate that cognitive and emotional mental state attributions present with deficits that are at least partly independent (Montag et al., 2011). The cognitive aspect of ToM refers to the ability to conceptualise a mental state of mind in an appropriate cognitive representation, be this a thought, belief or an intention (Corcoran et al., 2011). In contrast, the affective component of ToM refers to the ability to infer and share causal emotional states of mind, a concept closely related to empathy (Baron-Cohen & Wheelwright, 2004). A deficit in the affective area would prevent an individual from correctly inferring intentions based on emotions. This emotional component of ToM is likely to be associated with

paranoia, as this may relate to the cognitive conceptualisation of others' intentions (e.g. "they want to hurt me") as much as its emotional connotations (e.g. "they feel like hurting me, as they are hateful, jealous, hostile"). However, studies that differentiate between cognitive and affective dimensions draw conclusions from tests which did not distinguish between these two dimensions or they explore this within the wider diagnosis of schizophrenia (Montag et al., 2011). This has unsurprisingly resulted in equivocal results.

The way in which paranoia has been measured may have influenced how it relates to other psychological constructs. Its association with ToM has been explored in a range of subclinical and clinical populations, the methodologies used vary considerably. For example, inferences about paranoia-related mechanisms have been drawn by reviewing studies which analysed the relationship between ToM and people diagnosed with paranoid schizophrenia (Freeman, 2007). However, such a diagnosis does not require the experience of persecutory delusions as symptom (DSM, 2013). In order to avoid this problem, certain authors have divided people experiencing schizophrenia in two groups; those with paranoia and those without. However, the criteria used to make such differentiations depended upon either a few items from a wider scale of mental health not specific to paranoia, such as The Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opfer, 1987), for example in Couture et al., (2010), or the judgement of an experienced psychiatrist without specifying the process used to categorise the symptoms (e.g., Murphy, 2006). Arguably, neither of these methods, are reliable or valid within the context of scientific research. Comparatively other researchers have used validated measures of paranoia in order to make an inference on the presence of such a complaint and through this provided a degree of persecutory experience (Bratton et al., 2017; Prevost, Brodeur, Onishi, Lepage, & Gold, 2015). The results, however, are still controversial. Exploring paranoia

when using a few items of a generic scale reflects a theoretical framework in which persecutory delusions are considered as part of a wider diagnosis. However, implementing a specific scale for it ensures that persecutory delusions are seen as a complaint in their own right. Possibly, distinguishing between these contrasting constructs would illuminate the reasons behind the controversy. Currently there are no reviews have looked specifically at the affective component of ToM in relation to paranoia.

This Review

While several reviews have explored the relationship between ToM and psychosis, the literature that specifically explores ToM and paranoia is scant. The only review which specifically analyses the relationship between ToM and paranoia is that of Chan and Chen (2011). However, this was not a systematic literature review (methodology and results were not reported) and used a game theoretical framework, therefore having different aims to that of the present review. Freeman (2007) explored the relationship between paranoia and other psychological constructs, including ToM. He suggested that while there may be a relationship between ToM and paranoia, ToM difficulties are not necessarily specific to the experience of paranoia. He did not consider the nature of ToM (affective vs cognitive) as a key factor to use when distinguishing between his results nor did he comment on the use of a sample with paranoid schizophrenia or with the specific complaint of paranoia. This review will focus on these areas.

The controversy around the relationship between ToM and paranoia may be partly explained by exploring how an impairment in the affective component of ToM relates to paranoia and whether this depends on how paranoia is measured. Individuals with paranoia may tend to perceive an affective state of mind as malevolent. This effect may be clearer when

paranoia is measured with sensitive scales designed specifically for this purpose. In order to test this premise, a ToM test with a strong affective component was identified. The test chosen as the object of this analysis was the Reading the Mind in the Eyes Test (RMET; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). This test examines a person's ability to identify an emotional state by looking at a photograph of the eyes of a person expressing the emotion. The participant has to choose one of four words, which express mental states, where only one is congruent with the expression. The RMET has good psychometric properties, Vellante et al's. (2013) validation study indicated an internal consistency (Cronbach's α) of .61 and maximal weighted internal consistency reliability of .72. Test-retest reliability resulted to be .83 (95% *C.I.* = .75 to .90).

Other ToM measures have not been included as they rely mainly, or exclusively, on the cognitive component, therefore overlooking affect (e.g., Montag et al., 2011). Furthermore, this test has been chosen over classic emotion recognition tests, such as the Bell-Lysaker emotion recognition task (Bell, Bryson, & Lysaker, 1997), which explore basic emotions (e.g. happiness and sadness) because they overlook the intentionality behind these emotions, therefore not representing ToM. While the RMET has been criticised by Oakley, Brewer, Bird and Catmur (2016) for reflecting emotion recognition rather than ToM, this argument presupposes that different aspects of social cognition are entirely distinct. However, it was proposed that while ToM and emotion recognition are underpinned by different dedicated brain systems, these partly overlap (U. Frith & Frith, 2001). In the RMET, some of the words from which the person could choose, are rather emotional (e.g. worried), others are intentional (e.g. insisting) and the distinction between some is more difficult (e.g. apologetic). In order to perform correctly in this test, both emotional recognition and the ability to draw inference of intentionality are necessary.

Furthermore, functional neuroimaging studies confirmed test-related activation in brain areas related to ToM (Csukly, Polgár, Tombor, Benkovits, & Réthelyi, 2014) and performance correlates better with other ToM tests than emotion recognition tasks (Baron-Cohen et al., 2001). As such, the RMET is the best candidate to represent the affective side of ToM.

Understanding which ToM components play a role in the distressing events that someone with persecutory delusions might experience would provide a narrower target for psychological interventions. This meta-analysis will review those papers in which authors have drawn inferences, through statistical analysis, on the relationship between RMET performance and paranoia.

Therefore, the aims of this review are to:

Determine whether the affective component of ToM, as analysed by the RMET, is associated with paranoia.

Determine whether this relationship is more likely to be observed when paranoia is measured by means of a scale specifically designed for measuring this, as opposed to using a few relevant items drawn from more global scales of mental health.

Method

This review was informed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) and the Meta-Analysis of Observational Studies in Epidemiology (MOOSE; Stroup et al., 2000).

Study Selection and Eligibility Criteria

The literature search included articles published between 1997, the year in which the RMET was published, and 2018. The databases searched were Embase, Medline, PsycINFO,

Pubmed and Web of Science on the 22/03/2018. An initial scoping search and a meeting with the University librarian informed the choice of search terms and Boolean operators, the final terms were the same across all databases. The terms were “social cognition” OR “theory of mind” OR “emotion* recognition” OR “mentali*” OR “Mental state attribution” OR “intention* stance” OR “reflexive awareness” OR “mind perception” OR “infer* intention*” OR "reading the mind in the eyes" OR “eyes” OR RMET OR RME) AND (paranoi* OR persecut*. All titles and abstracts were screened to identify articles that described a relationship, or lack thereof, between the concepts of paranoia and ToM as measured by the RMET. Subsequently, reference lists of these studies were scanned to find additional potential studies. Full-text papers of any titles and abstracts that were considered relevant, were obtained. The relevance of each of the studies were assessed according to the inclusion criteria stated below.

The search yielded a total of 1134 records, amounting to 548 when duplicates were excluded. After abstract screening, 130 studies were retained and full text was accessed. Of these, 16 studies were retained. As four of these studies analysed the same sample, 12 studies were finally included (see flowchart in Figure 1). In cases where studies had been based on the same data set, the articles with the most complete statistical information for effect size computation were selected (please consult Table 1 for details on this procedure). A backward reference search did not provide any new results, suggesting that the search was thorough and exhaustive. The list of studies excluded after full-text access is provided in Appendix B. Studies were excluded for the following reasons: their research design was descriptive in nature, they did not implement the RMET, they were not peer-reviewed articles, they did not implement a measure for paranoia, they were written in a language which was not English, Spanish or Italian,

they were written before the RMET was published, they were a review or they implemented diagnostic labels without providing specific paranoia measures.

INSERT FIGURE 1

This review only included full text articles published in peer-reviewed journals written in, or translated to, English, Spanish and Italian. Only studies involving human participants which explored ToM using the RMET were considered. Studies that statistically analysed a relationship between RMET performance and paranoia were included. If studies provided a dataset from which relevant statistical coefficients could be readily calculated, these were included. If the research used scales which included items related to paranoia, these were included if they isolated these items and therefore reported a specific measure for paranoia. Therefore, studies which divided participants between control and individuals experiencing paranoid schizophrenia were not included unless they provided a specific measure of paranoia. Lastly, only studies which examined relationships between ToM and paranoia through statistical analysis, were included.

Quality Assessment and Data Extraction

Given that this review included a mixture of designs, specifically case controlled and cross-sectional studies, two Newcastle-Ottawa quality assessment scales, one designed for control cases (Wells et al., 2000) and one adapted for cross sectional studies (Modesti et al., 2016), were applied. These scales are recommended by the Health Technology Assessment report (Deeks et al., 2003) and used a star system to evaluate selection, comparability and outcome. Selection measured the quality in which the sample was selected, comparability looked at whether other variables besides the analysed ones were controlled for, while outcome established the quality of the analysis performed on the data. The scales were modified in order

to have the same number of stars as the original scales to allow comparisons. The wording in both scales was adapted to fit the aims of the study. Scales and relevant changes are available in Appendix C. Three independent blind-raters randomly selected four of the 12 articles and provided a score using the same scales, allowing the calculation of an inter-rater reliability score. The document they were asked to complete is provided in Appendix D. Studies were coded on a dataset with the following variables: authors and year of publication, sample characteristics, selection criteria, study design, paranoia measure used and data provided.

Data Analysis

One of the goals was to allow a subgroup analysis based on the kind of measure for paranoia the studies used, either a specific measure for paranoia or a few paranoia-related items from a more generic scale. Two subgroups coded as “specific measure” and “generic measures” were created. The data were analysed using Review Manager 5.3 (Cochrane, 2008). This application uses a random effects model which accounts for inter-study variation (common in psychological studies) and provides a more conservative effect in comparison to a fixed model. Fisher’s z was used as the metric of choice and calculated from mean differences or correlations, depending on the data provided by the studies, and introduced alongside its standard error ($SE_{zr} = \frac{1}{\sqrt{N-3}}$). When the means were reported for more than two groups, only the means of the group presenting with paranoia and their relative control groups were included. A summary effect size with a 95% confidence interval was estimated by using a generic inverse variance method. When papers did not provide sufficient data for estimating an effect sizes, the main authors of these articles were contacted via email and additional data was requested.

Results

Study Characteristics

Table 1 shows the details of the 12 included studies (Couture et al., 2010; Craig, Hatton, Craig, & Bentall, 2004; Darrell-Berry et al., 2017; Gavilan & Haro, 2017; Hengartner et al., 2014; Jänsch & Hare, 2014; Lysaker et al., 2010; Murphy, 2006; Pinkham, Harvey, & Penn, 2016; Prevost et al., 2015; Sachse et al., 2014; Scherzer et al., 2015) and of the four studies analysing the same sample (Buck, Pinkham, Harvey, & Penn, 2016; Palmier-Claus et al., 2016; Phalen, Dimaggio, Popolo, & Lysaker, 2017; Scherzer, Leveille, Achim, Boisseau, & Stip, 2012). Overall, the review included 1099 participants, with 415 presenting with complaints of psychosis or paranoia, 131 with other complaints (e.g. autism or personality disorders), the remaining 553 were non-clinical participants. While the mean overall age for the control groups ($M = 25.05$ years, $SD = 5.03$ years) and for the groups with other complaints ($M = 26.71$ years, $SD = 7.02$ years) were comparable, the mean overall age for the groups experiencing psychosis was considerably higher ($M = 36.69$ years, $SD = 8.16$ years). As some studies did not provide information about gender or education level, overall means were not calculated for these variables.

Individuals experiencing psychosis were considerably older than other participants in a few papers (Couture et al., 2010; Darrell-Berry et al., 2017; Scherzer et al., 2015). While normally considered a clear confounder, education levels were not reported in several studies (Craig et al., 2004; Murphy, 2006; Jänsch & Hare, 2014; Sachse et al., 2014) or the non-clinical group had significantly higher education levels (Darrell-Berry et al., 2017; Prevost et al., 2015; Scherzer et al., 2015). Except Gavilán and Haro (2017) and Darrel-Berry et al., (2017), which used a disproportionate number of females in their study, most studies had a majority of males or

similar levels of gender. Scherzer et al., (2015) did not report the gender for their non-clinical group.

Seven studies used case control designs. The five remaining studies did not include a control group; they comprised only patients or a general sample and were cross-sectional in nature. Four studies used a specific measure for paranoia while the rest evaluated paranoid persecution from a wider battery of measures. Studies used a variety of selection criteria and verified diagnosis through validated scales. Studies which did not use a specific scale to measure paranoia, divided their sample into paranoid and non-paranoid groups based on a score above four on the suspiciousness item of the PANSS; Kay et al., 1987) (or other generic questionnaires). However, in one case all the items related to delusions (i.e. not exclusively suspiciousness) (Scherzer et al., 2015) were taken into consideration. In one case, the criteria for inclusion was lower (i.e. suspiciousness higher than three) (Sachse et al., 2014). In one case, paranoia was evaluated exclusively thorough clinical judgement (Murphy, 2006).

INSERT TABLE 1

Methodological Quality

For the methodological quality ratings, please refer to Table 2. A visual interpretation of the results shows an acceptable level of quality and no quality difference between cross sectional and the case control studies. The median of star scores resulted to be 5.5 out of eight stars, therefore studies with six stars or above were considered of good quality, while studies that were scored below were considered of acceptable quality, there were considerable flaws. Stars should be interpreted as an indicator of quality rather than as a quantitative score of quality. No studies reported information about individuals who did not complete the questionnaires or attrition rates.

INSERT TABLE 2

In general, the studies showed an acceptable quality level as evaluated by an adapted version of the Newcastle – Ottawa quality assessment scale. One of Couture et al. (2010) (six stars) strengths was comparability, as all variables were either matched between groups or controlled for in the analysis. However, they did not apply the same measures in different groups, in this way they were unable to control for paranoia levels in the non-paranoid groups. Craig et al. (2004) (five stars) did not control for age and their samples did not match for this variable, however they implemented the same measures along groups. Darrell-Berry et al. (2017) (five stars) did not control for education or IQ and did not implement the same measures across different studies, however they did score highly on selection, which was well detailed and justified. Gavilan and Haro, (2017) (four stars) did not perform outcome analysis but provided their entire dataset, hence the low score. Hengartner et al., (2014) (seven stars) was found to be of very high quality, with the only flaw of not implementing specific measures for the traits investigated. However, this fitted with their theoretical framework as they investigated personality disorders and having specific measures for each would have hindered comparability between results. Jansch & Hare, (2014) and Prevost et al. (2015) (both seven stars) only weakness was not commenting on non-respondents or missing data, however they had very detailed selection procedures and implemented strict statistical analysis. Lysaker et al., (2010) and Pinkham et al. (2016) (both six stars) scored highly on comparability and outcome, however they did not comment on non-respondents or implemented specific measures. Murphy (2006) (four stars) main weakness was in selection; paranoia was established in the groups based on clinician's judgements, however validated measures were not implemented. This was considered a significant flaw in the study design. Additionally, Sachse et al. (2014) and Scherzer et al.,

(2015) (five stars) scored lower than the average because did not implement specific measures and they did not use the same measures across groups.

A comparison of findings and methodological quality has been provided in Table 3. A significant relationship between RMET and paranoia was reported by four studies; six other studies reported that the RMET was not associated with paranoia; in one study they did not comment on this association specifically and did not provide enough data to verify (while percentages of correct answers were provided, standard deviations were not) (Murphy, 2006); in the one remaining study outcome was not provided, however an analysis of the dataset revealed a non-significant correlation (Gavilán & Haro, 2017). From a visual inspection, it does not seem that the quality of the paper was related to the other variables. Three independent raters assessed four randomly selected articles with the adapted checklist tools and the intraclass correlation coefficient was .72, suggesting good inter-rater reliability (Cicchetti, 1994). This means that while there were some discrepancies between different raters, they were mostly consistent in their observations. When discrepancies between raters presented, an average score was included for calculating the final score. Individual scores of the three raters can be found in Appendix E.

INSERT TABLE 3

Meta-Analysis

The meta-analysis included nine studies as the data provided by three studies were not sufficient to estimate an effect size. Two of the authors did not respond to the request for additional data, while one author stated that they did not have access to the data. The studies included an overall pooled sample of 776. According to the cumulative analysis performed using a random effects model (Figure 2) RMET performance and paranoia were inversely correlated with a small pooled effect size of $-.22$ ($SE = .05$; 95% $CI [-0.31; -0.13]$; $z = 4.69$; $P <$

.001), with a non-significant amount of heterogeneity ($Q[8] = 10.6; P = .23; I^2 = 25\%$). A forest plot (Figure 2) illustrates that all the studies exhibited a negative association between paranoia and RMET performance, however only studies which implemented a specific measure for paranoia showed a significant relationship (i.e. the confidence interval does not cross 0). This effect was not significant for all the studies which implemented a few items from a more generic scale.

INSERT FIGURE 2

Using different approaches to the evaluation of paranoia affected the results. When a specific measure for paranoia was used, RMET performance and paranoia were inversely correlated with a small pooled effect size of $-.34 (SE = .10; 95\% CI [-.53; -.16]; z = 3.57; P < .001)$ however with a significant amount of heterogeneity ($Q[3] = 6.48; P = .09; I^2 = 54\%$). This means that there was a high variation in outcomes between studies and 54% of the variation was due to heterogeneity rather than chance. Due to this, these studies may not be suitable to be combined and this result needs to be taken with caution. When a generic scale was used, the pooled effect size diminished to $-.14 (SE = .05; 95\% CI [-.25; -.04]; z = 2.75; P < .001)$, in this case with a non-significant amount of heterogeneity ($Q[4] = 1.03; P = .91; I^2 = 0\%$). A test for subgroup differences indicated that the effect size between these two groups is not significantly different ($Q[1] = 3.35; P = .07; I^2 = 70.2$). A scatter plot showing this difference can be found in Figure 3. A visual inspection of the scatter plot did not indicate publication bias. However, the fact that most of the studies falls outside the triangle drawn, shows that the studies which included more participants (Darrell-Berry et al., 2017; Gavilan & Haro, 2017; Pinkham et al., 2016) have considerably lower levels of variance than the others. This may be an indicator that overall quality is questionable.

INSERT FIGURE 3

Discussion

The objective of this review was to determine whether the affective component of ToM is associated with paranoia. Specifically, it aimed to analyse the magnitude of this relationship if any. Furthermore, it analysed if this association changed when paranoia was measured as a specific complaint or as part of a wider diagnosis. In order to do this, it analysed whether an effect was more likely to be observed when paranoia is measured by means of a scale specifically designed for it or calculated from a few items from a more generic scale. The overall pooled effect size of the studies, whilst being small in magnitude, supported the hypothesis that higher levels of paranoia correspond with lower performance on the RMET. Furthermore, significance and higher effect sizes were more likely to be found when a specific measure for paranoia was implemented.

In regard to the meta-analysis, three of the 12 studies included in this review did not provide enough data for us to determine effect sizes and could not be included in the analysis. Two of them (Lysaker et al., 2010; Hengartner et al., 2014) reported that the RMET was not related to paranoia experience; while in Murphy (2016) it is unclear if an association is present. Based on the remaining nine studies, this review shows a clear, although small, association between affective ToM and paranoia, as suggested by the negative correlation between RMET performance and paranoia. Non-significant heterogeneity confirmed this result. The small magnitude of this effect indicates that affective ToM only explains a limited amount of variability and other variables need to be taken into consideration when exploring the association between ToM and paranoia. Nonetheless, this meta-analysis confirmed that individuals experiencing paranoia may have a deficit when identifying emotional states of mind. As

suggested by Prevost et al. (2015), who in this meta-analysis demonstrated the highest effect size and methodological quality, individuals with paranoia might tend to judge ambiguous facial expressions as negative, in line with their paranoid view of the world.

Furthermore, studies that used a specific measure for paranoia found a statistically significant negative correlation between RMET and paranoia (Table 3). These studies used scales such as the Paranoia scale (Fenigstein & Venable, 1992) or the Green et al. Paranoid Thought Scales (GPTS; C. Green et al., 2008). In contrast, results for the studies that considered paranoia as part of a larger scale and used this as a criterion to distinguish between a paranoid and a non-paranoid group are mixed. It is likely that this may be due to limitations in the sensitivity of scales based on very few items, from the PANSS (Kay et al., 1987) or the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q; Fonseca-Pedrero, Paino, Lemos-Giráldez, Vallina-Fernández, & Muñiz, 2010). However, when comparative analyses were run, no significant difference was found between the effect size of these two kinds of papers. This is likely to be due to the small number of studies included. These results have a series of implications for the controversies highlighted by this review.

Explaining the Controversy

First, this review suggested that one of the explanations for the unclear effect of ToM in Paranoia may be that ToM presents with both a cognitive and an affective component (Shamay-Tsoory et al., 2007). Additionally, the degree to which different ToM tests rely on only one of those components might differ (Darrell-Berry et al., 2017). This meta-analysis shows that using a questionnaire that relies mostly on the affective component of ToM leads to a small, but consistent association with paranoia. The fact that results for other questionnaires (which were not considered in this review) were not as consistent, might be due to their reliance on different

components (i.e. cognitive). In order to explore this, a meta-analysis which investigates the association of other questionnaires with paranoia needs to be undertaken and sub-group comparisons run.

Second, this review suggested that another possible explanation could be that the conceptualisation of paranoia, either as part of a wider diagnosis or as a specific complaint (Bentall, 2004), may have an impact on its association with ToM. It is argued that measuring paranoia through a general scale, developed to detect the presence of a wider mental health difficulty, such as the PANSS, reflect a diagnosis-bound framework of research versus a more complaint-based approach, which would suggest the use of specific scales. Studies which saw paranoia as part of a continuum (i.e. not a criterion based symptom which someone either has or not) were more likely to find higher effect sizes than studies which divided their samples into groups with or without paranoia. In most of these studies, paranoia was not analysed in the control group. This suggests that an effect of ToM on Paranoia is more likely to be found when paranoia is seen as a complaint and therefore assessed in all participants, as it is not a diagnosis-bound experience. By not assessing paranoia in the non-clinical group, relevant information has been overlooked. The current categorical/diagnostic methodology has been criticised in favour of a more dimensional approach (van Os et al., 1999), as a considerable percentage of the non-clinical population experience psychotic-like experiences (Verdoux & van Os, 2002). While the results of this review provide do not provide further support to the argument that paranoia lies on a continuum across non-clinical and clinical groups (Shevlin, McElroy, Bentall, Reininghaus, & Murphy, 2016), research implementing this perspective may provide more comprehensive results.

Despite this, as Bentall et al., (2009) pointed out, the majority of studies analysing the relationship between ToM and psychotic-like experiences, investigating only individuals presenting with established psychiatric disorders, seldom consider paranoia as a complaint per se. As mentioned above, this was also the case for this review. Arguably, using samples identified through diagnostic systems whose reliability, validity and predictability have been found to be questionable (Bentall, 2004), possibly causes the presence of the specific dimension “paranoia” as unreliable. Besides in individuals with schizophrenia, the RMET resulted to be equally sensitive to the dimension of paranoia when this effect was explored in other samples. The studies which included those individuals diagnosed with autism conditions (Craig et al., 2004; Jansch & Hare, 2014), found that the RMET was associated with paranoia in both the schizophrenic and autistic population. This is further confirmation that when paranoia is considered as an independent psychological construct and not as part of wider diagnostics, similar results are found in different populations. Therefore, controversial results may have been caused by implementing diagnostic criteria in order to infer the presence of the psychological constructs. ToM and paranoia are unlikely to be found associated when the mere presence of paranoia is assumed in a paranoid schizophrenic sample, considering that persecutory delusions are not a necessary symptom for this diagnosis.

Another point highlighted in this review was, as proposed by Corcoran et al. (2011), that different ToM tests measure different degrees of complexity of ToM therefore they relate differently to paranoia. The RMET is considered an advanced test of theory of mind (Couture et al., 2010) as it is found to be less likely to produce ceiling effects by the general population. Arguably, the RMET may measure a highly complex ToM emotional component which is not represented by other tests. Davis and Gibson (2000) found that paranoid individuals were

relatively good at recognising basic emotions, however it has been shown that performance on the RMET is reduced. Possibly, the association between ToM and paranoia is significant when the test implemented is demanding enough. However, this is not the case for less advanced tests, such as basic emotion recognition tests or first degree cognitive ToM tests. This possibility is further supported by the small effect size found in this analysis.

Furthermore, in this review it was suggested that the context in which ToM and paranoia are measured, specifically in terms of ecological validity and pressure (Mehl et al., 2010; Pickup & Frith, 2001), might affect their relationship. Possibly, the RMET performance is reflected in pressurised and complex social environments. Indeed, it is a lengthy and complex questionnaire and so might put more pressure on people completing it in comparison to other tests. However, stress does not seem to influence basic emotion perception (Köther, Lincoln, & Moritz, 2018). Further research is needed to see if this is also the case with affective ToM. Moreover, by using real pictures it can be more ecologically valid for people who struggle with perceiving other people's behaviours as hostile and may reflect a more ecologically valid social situation. Arguably, the most relevant information for individuals experiencing paranoia is inferring the intentions of others when they are relevant to them. This process might be better activated when people look directly at them rather than when they interact in a different situation (e.g. in the hinting task) – or at least that interactions are personalised in some way. Unfortunately, as this review did not include papers using less ecologically valid measures, it is impossible to draw any meaningful conclusions.

The last argument presented in this review was that the interplay of factors in the association between ToM and paranoia is complex (i.e. impossible to infer unless taking further variables into consideration). Bentall et al. (2009) argued that the relationship between different

psychological constructs was not properly explored in the literature, as participants have not undertaken a comprehensive battery of tests. The studies analysed here which controlled for other measures, found controversial results. While Prevost et al. (2015) and Craig et al. (2004) found that controlling for IQ did not change the differences observed, Couture et al. (2010) found no significant group effects after controlling for IQ. Nevertheless, the small magnitude of the association found indicates that further variables need to be taken into consideration in order to fully describe this complex relationship.

Limitations, Considerations and Further Research

This review included a modest number of studies ($n=12$) which may have limited the detection of significant effect sizes. When comparative analyses were run, the sub-group including studies which used a specific measure for paranoia consisted of few studies (and therefore few participants) and presented with significant heterogeneity. Possibly because of this, a significant difference between the effect sizes of the two groups was not found. Furthermore, while the use of Hedge's 'g' as a standardised measure is usually recommended for small sample sizes (Ialongo, 2016), Fisher z's was chosen as some papers reported correlations instead of mean differences. Arguably, comparing mean differences and correlations is a theoretically flawed process, as it is unclear what a final pooled effect size represents. Further investigation in the area is needed in order to extract clearly definable results. Furthermore, most of the studies did not provide a direct correlation factor between the RMET and paranoia complaints, instead dividing the samples into people who met a specific criterion. In this way, this review had to utilise group means which reduced the variability of scores and probably limited power. Control groups often were not tested regarding symptoms of paranoia, this further limiting the ability of

this review to explore the experience of paranoia as part continuum and to find significant effect sizes.

Eligibility criteria were also considered as a limitation. This is because including exclusively English, Spanish and Italian articles may have biased the results showing an exclusively western perspective. Furthermore, papers, which were not peer-reviewed, may have included important information. While the choice of not including these has been made in order to ensure quality, this may have negatively impacted on comprehensiveness. Further investigations may include articles from different languages, non peer-reviewed papers and documents from the grey literature. Finally, inter-reliability was not at its highest level, indicating that distinct observers may have provided different scores in the quality assessment. Further research may implement other methods to ensure inter-reliability or employing more raters.

A selection bias, based on the use of diagnosis might have further contributed to the inability to explore paranoia as a complaint. None of the studies explored the relationship between RMET and paranoia directly in the general population. While Gavilán and Haro (2017) were alone in implementing exclusively a non-clinical sample, they did not use a specific measure for paranoia. Further research which provides results on the association of the RMET and paranoia as a complaint in the non-clinical population should be conducted. While this review indicates that the affective component of ToM (RMET scores), is related to paranoia, it is not possible to ascertain that this is a more general effect, for example of ToM in its entirety, unless a wider meta-analysis including other measures is conducted. A more comprehensive meta-analysis which compare papers focussing on cognitive components and papers focussing on affective components, would be useful. Further discussion on the limitations, considerations

and potential research of this literature review can be found in the critical appraisal section of this thesis.

Potential clinical implications include confirmation that the emotional component of ToM plays a role in the distressing events that someone with persecutory delusion might experience. This provides a potential target for psychological intervention. Instead of focussing on the beliefs a person holds about other people's intentions and challenging these, it might be more useful to understand which emotions are identified in other people's intentionality. This may provide a framework to better formulate clients and improve awareness. Furthermore, understanding that ToM deficits in the area of paranoia might be relevant only in complex contexts and when different variables need to be taken into consideration, would help develop specific targets for psychological interventions.

Conclusion

A clear, albeit small, association has been found between the RMET and paranoia. This has been demonstrated by conducting a review of papers with acceptable methodological quality and with a small pooled effect size, as demonstrated by the meta-analysis. The hypothesis that the affective component of ToM might be associated with paranoia has been confirmed. With reference to research methods, this effect is clearer when paranoia is measured using specific measures as opposed to considering it as part of a wider diagnosis and therefore measuring it from a few items of a more generic scale. In clinical practice, it may be useful to take into consideration the impact of social cognition on paranoia and to explore this as a complaint in its own right and on a continuum of experience.

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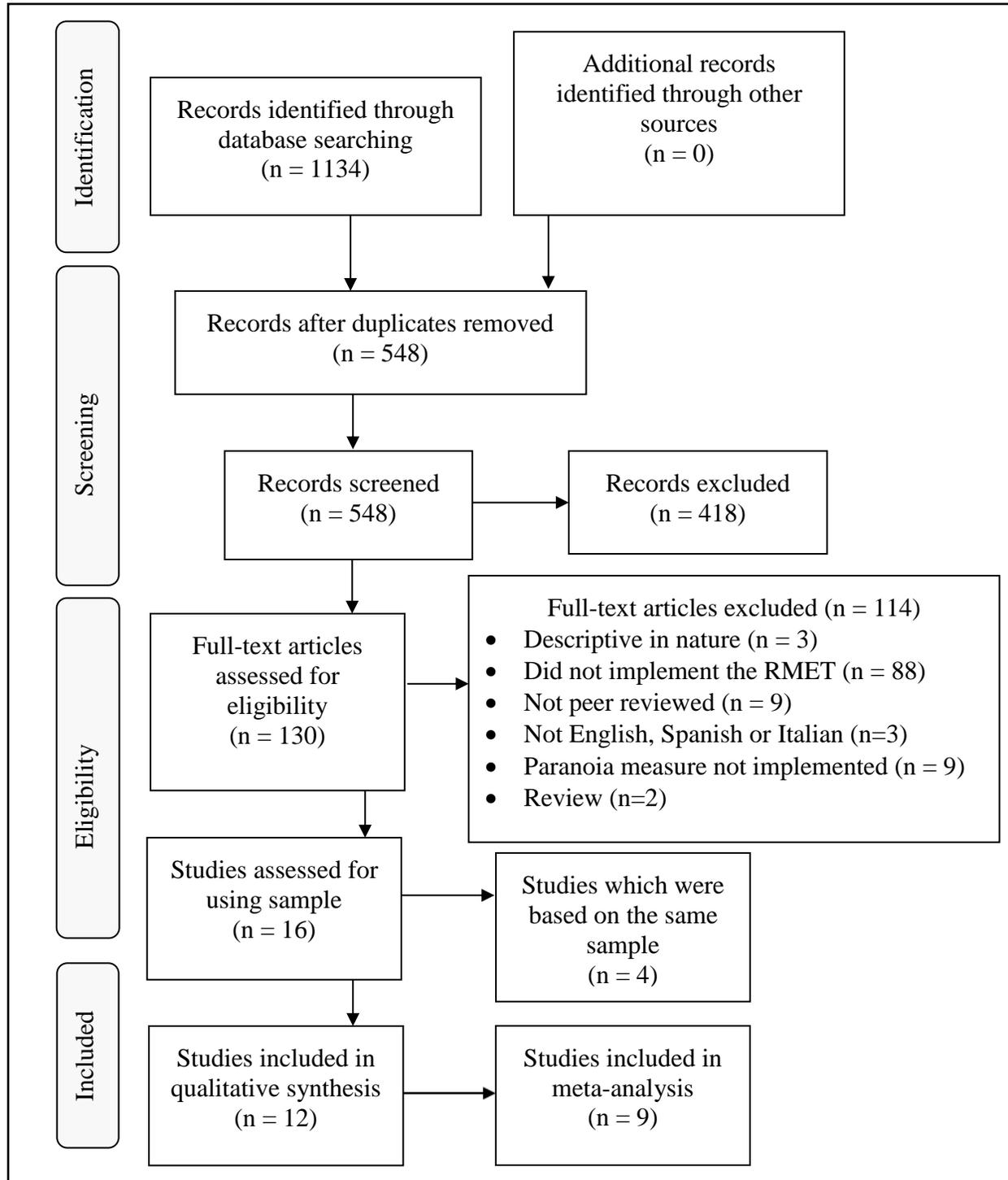
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Figures and Tables

Figure 1

Identification of included studies



Study selection figure adapted from Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group (2009).

Table 1

Characteristics of the studies included in the review

Study (Nationality) (Reasons for inclusion)	Sample – Mean Age ± SD	Selection criteria	Study design	Paranoia measure	Data included in meta-analysis
Couture et al., 2010 (U.S.A)	36 autism (20.9±5.7) 44 schizophrenia (13 with negative symptoms, 8 paranoid) (27.5±6.3) 41 non-clinical controls (22.9±5.6)	Autism: autism diagnostic interview revised schizophrenia: structured clinical interview for dsm-iv axis i diagnosis – patient version see paranoia measure for selection of paranoid participants	Case- control	The Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987) - >=4 on the suspiciousness item	Mean differences (scores on a scale of 100). Paranoia group (P) = (61.5±8.96) (n=8) Control group (C) = (69.5±11.9) (n=41)
Craig et al., 2004 (U.K.)	16 psychiatric inpatients with paranoid schizophrenia or delusional disorder (31.69±9.85) 17 asperger syndrome (24.12±6.72) 16 non-clinical controls (29.44±8.41)	Paranoid: psychiatric ICD-10 criteria. Diagnosis confirmed by the present state examination. Aspergers: ICD-10 criteria.	Case- control	The Paranoia Scale (Fenigstein & Venable, 1992)	Correlation between the RMET (scores) and the paranoia measure. R=-.37 (n=41)
Darrell-Berry et al., 2017 (U.K.)	14 individuals at ultra-high risk of developing psychosis	Ultra-high risk: not fully meeting DSM IV criteria of non-affective psychosis and operationally defined as ultra-high risk	Case- control	32-item self-report GPTS (C. Green et al., 2008)	Correlation between the RMET (scores) and the paranoia

Study (Nationality) (Reasons for inclusion)	Sample – Mean Age ± SD	Selection criteria	Study design	Paranoia measure	Data included in meta-analysis
(more complete data for meta- analysis) Not selected: Palmier- Claus et al., 2016	20 first-episode psychosis 20 established psychosis (29.64±6.57 - for the three groups) 120 non-clinical control (20.1±2.5)	First episode: receiving treatment from an early intervention service Established psychosis: meeting DSM IV criteria and experiencing psychosis for more than two years			measure. R=-.16 (n=174)
Gavilán & Haro, 2017 (Spain)	96 undergraduate students (20.75±3.02)		Cross- sectional	Five items of Paranoid ideation on the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q) (Fonseca-Pedrero et al., 2010)	Correlation between the RMET (n. of errors) and the paranoia measure. R=.14 (n=96)
Hengartner et al., 2014 (Switzerland)	196 participants, some of which representing high scores of personality disorder (29.3±6.5)		Cross- sectional	The paranoid PD items of the DSM-IV Personality Disorders questionnaire (ADP-IV) (Schotte et al., 2004)	General linear model β (insufficient for meta-analysis as RMET was not included in the model, therefore the b value is unknown)

Study (Nationality) (Reasons for inclusion)	Sample – Mean Age ± SD	Selection criteria	Study design	Paranoia measure	Data included in meta-analysis
Jansch & Hare, 2014 (U.K.)	30 Asperger's syndrome (32.23±9.43) 30 non-clinical control (31.63±10.35)	Diagnosed and verified with the Autism Spectrum Quotient (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) and the Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999)	Case control	GPTS	Correlation between the RMET (scores) and the paranoia measure. R=-.04 (n=60)
Lysaker et al., 2010 (U.S.A.) (original study)	88 adults with schizophrenia spectrum disorders in a non-acute phase (49.72±3.38)	Structured Clinical Interview for DSM-IV (SCID) diagnoses of schizophrenia (n= 51) or schizoaffective disorder (n= 37)	Cross- sectional	PANSS suspiciousness item	Mean difference of pre-selected groups (insufficient for meta-analysis as data are provided for mixed groups, while data specific for RMET or paranoia are not provided)
Not selected: Phalen et al., 2017					
Murphy, 2006 (U.K.)	13 Asperger's syndrome 13 personality disorder without any history of a psychotic disorder (35±7.5 for the two groups) 13 Schizophrenia (SC) (11 with paranoid delusions	Diagnosed by experienced clinicians using ICD-10 criteria	Cross- sectional	Clinician's judgement of paranoia as main complaint.	Percentage of correct answers (insufficient for meta-analysis as standard deviations are not provided)

Study (Nationality) (Reasons for inclusion)	Sample – Mean Age ± SD	Selection criteria	Study design	Paranoia measure	Data included in meta-analysis
	as predominant symptom*) (30.9±6.4)				
Pinkham et al., 2016 (U.S.A.) (original study)	147 individual with schizophrenia or schizoaffective disorder (81 Paranoid, 66 non-paranoid) (38.57±12.99)	Mini international neuropsychiatric interview and structured clinical interview for DSM disorders psychosis module	Cross- sectional	PANSS ≥ 4 on the suspiciousness item	Mean differences. (scores on a scale of 36) P = (20.31±5.56) (n=81) C = (21.38±5.24) (n=66)
Not selected: Buck et al., 2016					
Prevost et al., 2015 (Canada)	13 patients with Clinical paranoia (33.6±9.1) 14 non-clinical control (34.8±7.5)	Primary diagnosis was paranoid schizophrenia or their score on the persecutory delusion subscale of the scale for assessment of positive symptoms was three or more.	Case- control	Paranoia Scale	Mean differences (scores on a scale of 36). P = (20.3±5.3) (n=13) C = (26±3.6) (n=14)
Sachse et al., 2014 (Germany)	19 paranoid schizophrenia (25.5±4.9) 22 Asperger's syndrome (20.9±5.6) 20 non-clinical control (20.1±3.8)	ICD 10 and PANSS interview in which paranoid symptom ratings had to be rated maximum on a scale of 0–3 for study inclusion	Case- control	PANSS ≥ 4 on the suspiciousness item	Mean differences (scores on a scale of 36). P = (20.5±2.4) (n=19) C = (21.1±2.6) (n=20)

Study (Nationality) (Reasons for inclusion)	Sample – Mean Age ± SD	Selection criteria	Study design	Paranoia measure	Data included in meta-analysis
Scherzer et al., 2015 (Canada) (more complete data for meta- analysis)	21 paranoid schizophrenia (suspiciousness main symptom) (25.71±4.44) 29 non-clinical control (23.07±3.2)	Diagnosis confirmed by attending psychiatrists.	Case- control	PANSS ≥ 4 overall in positive symptoms, ≥4 in delusions, or grandiose delusion, or suspiciousness items.	Mean differences (scores on a scale of 100). P = (56.2±8) (n=21) C = (60.2±11) (n=29)
Not selected: Scherzer et al., 2012					

Table 2

Methodological quality

Study	Selection	Comparability	Outcome
Couture et al., 2010++	***	**	*
Craig et al., 2004++	**	*	**
Darrell-Berry et al., 2017++	***	*	*
Gavilan & Haro, 2017+	**	**	
Hengartner et al., 2014+	***	**	**
Jansch & Hare, 2014++	***	**	**
Lysaker et al., 2010+	**	**	**
Murphy, 2006+	*	*	**
Pinkham et al., 2016+	**	**	**
Prevost et al., 2015++	***	**	**
Sachse et al., 2014++	***	**	
Scherzer et al., 2015++	***	**	

+Cross sectional studies. Maximum stars: three for selection, two for comparability, three for outcome

++Case control studies. Maximum stars: four for selection, two for comparability, two for outcome

Table 3

Comparison between presence of a relationship, effect size and methodological quality

Study	Relationship present	Effect size	Kind of scale used	Total stars
Gavilan & Haro, 2017	No outcome	-0.14 [-0.34, 0.06]	Generic	****
Murphy, 2006	Unclear	Insufficient data	Generic	****
Sachse et al., 2014	No	-0.12 [-0.45, 0.21]	Generic	*****
Craig et al., 2004	Yes	-0.39 [-0.68, -0.10]	Specific	*****
Darrell-Berry et al., 2017	Yes	-0.16 [-0.31, -0.01]	Specific	*****
Scherzer et al., 2015	No	-0.20 [-0.48, 0.09]	Generic	*****
Lysaker et al., 2010	No	Insufficient data	Generic	*****
Couture et al., 2010	No	-0.25 [-0.54, 0.03]	Generic	*****
Pinkham et al., 2016	No	-0.10 [-0.26, 0.07]	Generic	*****
Jansch & Hare, 2014	Yes	-0.42 [-0.68, -0.16]	Specific	*****
Prevost et al., 2015	Yes	-0.60 [-1.00, -0.20]	Specific	*****
Hengartner et al., 2014	No	Insufficient data	Generic	*****

Figure 2

Forest plot of the cumulative meta-analysis

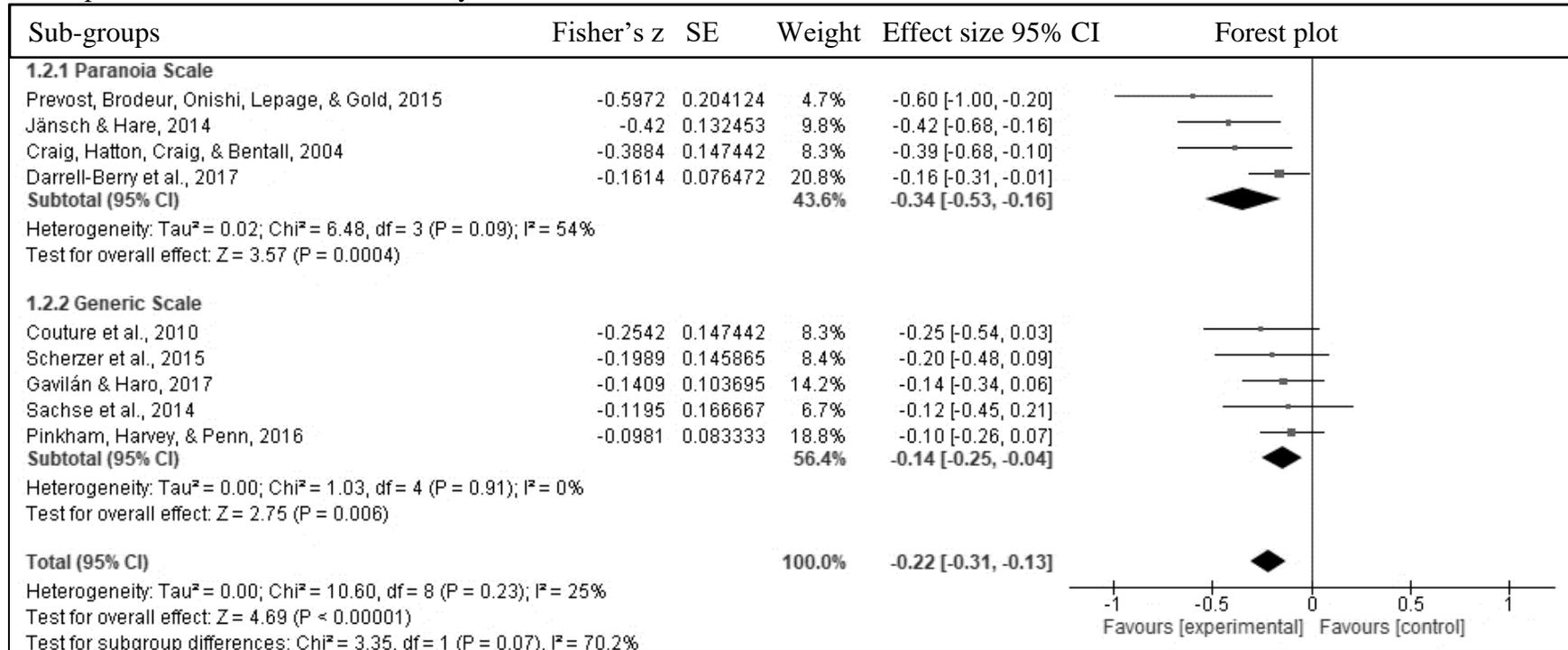
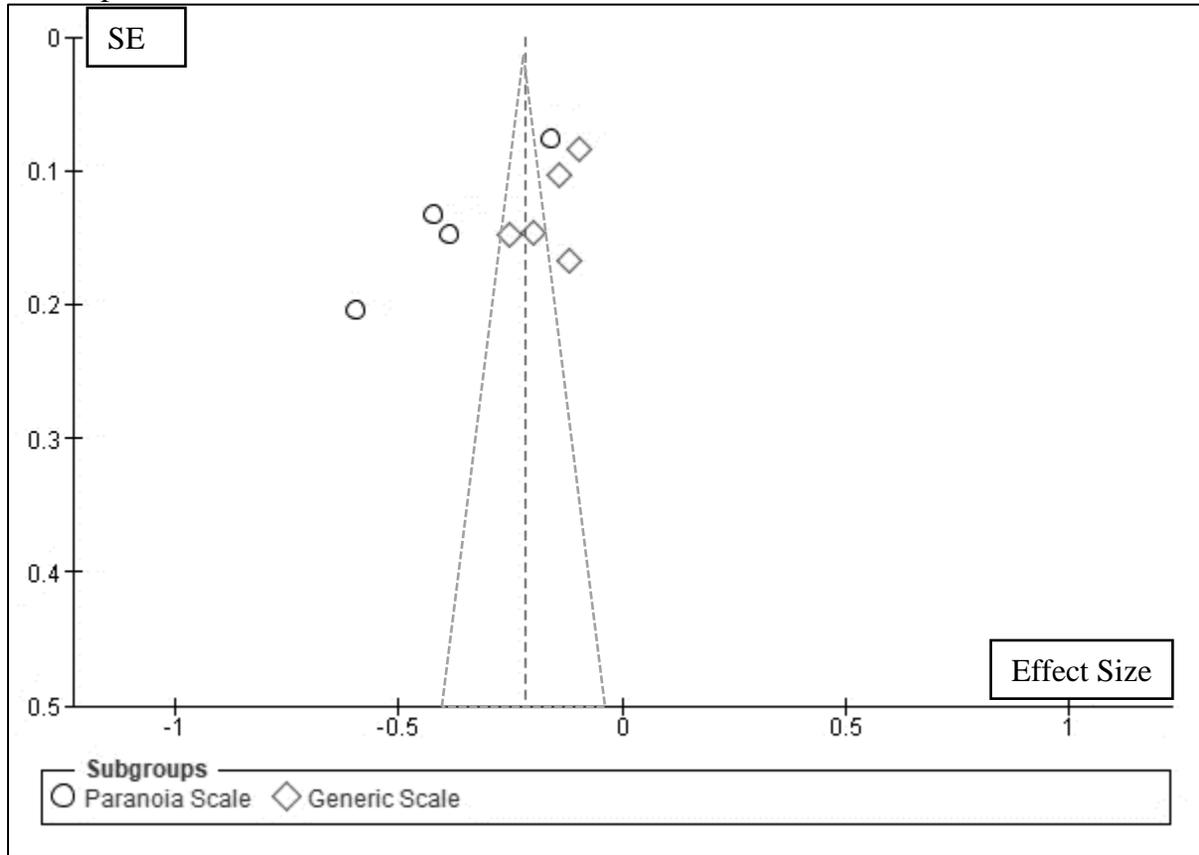


Figure 3

Funnel plot



Appendices

Appendix A

Notes for contributors

Author Guidelines

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- (b) critical reviews of the literature
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Appendix B

Articles excluded after accessing full-text with reasons

Year	Authors	Title	Reason for exclusion
2009	Aakre, Jennifer M; Seghers, James P; St-Hilaire, Annie; Docherty, Nancy	Attributional Style in Delusional Patients: A Comparison of Remitted Paranoid, Remitted Nonparanoid, and Current Paranoid Patients With Nonpsychiatric Controls	This article does not implement the RMET
2005	Abell, F; Hare, D J	An experimental investigation of the phenomenology of delusional beliefs in people with Asperger syndrome	This article does not implement the RMET
2011	An, S K; Kim, K R; Lee, S Y; Kang, J I; Lee, E	Paranoid ideation: Its relations with attribution style, neuro-cognition, and theory of mind	This record is not peer-reviewed article
2010	An, Suk Kyoon; Kang, Jee In; Park, Jin Young; Kim, Kyung Ran; Lee, Su Young; Lee, Eun	Attribution bias in ultra-high risk for psychosis and first-episode schizophrenia	This article does not implement the RMET
2015	Balibey, C, Basoglu, A, Ates, A, Algul, R, Tutuncu, A, Ayata, Y, Yilan, M, Cetin	Eyes tell the psychopathology: Preliminary findings	This article does not implement the RMET
2017	Balzan, Ryan P; Moritz, Steffen	Introduction to the special issue on cognition and delusions: What do we know, what do we guess, and what do we perhaps falsely believe?	The research design is descriptive in nature

Year	Authors	Title	Reason for exclusion
2009	Bentall, Richard P; Rowse, Georgina; Shryane, Nick; Kinderman, Peter; Howard, Robert; Blackwood, Nigel; Moore, Rosie; Corcoran, Rhiannon	The cognitive and affective structure of paranoid delusions: a transdiagnostic investigation of patients with schizophrenia spectrum disorders and depression	This article does not implement the RMET
2001	Blackshaw, A J; Kinderman, P; Hare, D J; Hatton, C	Theory of mind, causal attribution and paranoia in Asperger syndrome	This article does not implement the RMET
2013	Brosnan, Mark; Ashwin, Chris; Gamble, Tim	Greater Empathizing and reduced Systemizing in people who show a jumping to conclusions bias in the general population: Implications for psychosis	This article does not implement the RMET
2010	Brosnan, Mark; Ashwin, Chris; Walker, Ian; Donaghue, Joseph	Can an 'Extreme Female Brain' be characterised in terms of psychosis?	This article does not implement the RMET
2012	Bucca	The shared ideation of the paranoid delusion Implications of empathy, theory of mind and language	This article does not implement the RMET
2017	Buck, Benjamin; Hester, Neil; Penn, David L; Gray, Kurt	Differential patterns in mind perception in subclinical paranoia: relationships to self-reported empathy	This article does not implement the RMET
2010	Cabral-Calderin, Yuranny;	Effect of quetiapine treatment on facial emotion recognition deficits in schizophrenia patients	This record is not peer-reviewed article

Year	Authors	Title	Reason for exclusion
	Mendoza-Quinones, Raul; Garcia, Alexander; Caballero, Antonio; Dominguez, Mayelin; Reyes, Migdyrai Martin		
2014	Cameron, Clare; Kaplan, Ryan A; Rossell, Susan L	An investigation of a novel transdiagnostic model of delusions in a group with positive schizotypal symptoms	This article does not implement the RMET
2017	Castilho, Paula; Pinto, Ana Margarida; Viegas, Ricardo; Carvalho, Sérgio; Madeira, Nuno; Martins, Maria João	External shame as a mediator between paranoia and social safeness in psychosis	This article does not implement the RMET
2007	Coltheart, Max	Cognitive neuropsychiatry and delusional belief	This record is not peer-reviewed article
2006	Combs, D R; Michael, C O; Penn, D L	Paranoia and emotion perception across the continuum	This article does not implement the RMET
2004	Combs, D R; Penn, D L	The role of subclinical paranoia on social perception and behavior	This article does not implement the RMET
2003	Combs, D R; Penn, D L; Mathews, R C	Implicit learning and non-clinical paranoia: does content matter?	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2013	Combs, Dennis R; Finn, Jacob A; Wohlfahrt, Whitney; Penn, David L; Basso, Michael R	Social cognition and social functioning in nonclinical paranoia	This article does not implement the RMET
2000	Davis, P J; Gibson, M G	Recognition of posed and genuine facial expressions of emotion in paranoid and nonparanoid schizophrenia	This article does not implement the RMET
2001	Davis, P J; Stewart, K D	Interpretation of congruent and incongruent affective communications in paranoid schizophrenia	This article does not implement the RMET
2009	Fornells-Ambrojo, M; Garety, P A	Understanding attributional biases, emotions and self-esteem in 'poor me' paranoia: Findings from an early psychosis sample	This article does not implement the RMET
1998	Franck, N; Daprati, E; Michel, F; Saoud, M; Dalery, J; Marie-Cardine, M; Georgieff, N	Basic cognitive-perceptive module in schizophrenics]	This article does not implement the RMET
2015	Gilleen, S; Satkunanathan	High schizotypes show selectively reduced trust of malevolent but not benevolent opponents during social interaction compared to low schizotypes	This record is not peer-reviewed article
2013	Giurgi-Oncu, C; Bredicean	Implications of paranoid ideation on the social cognition of the depressive-delusional spectrum	This article does not implement the RMET
2013	Giusti, Laura; Mazza, Monica; Pollice, Rocco; Casacchia, Massimo; Roncone, Rita	Relationship between self-reflectivity, Theory of Mind, neurocognition, and global functioning: An investigation of schizophrenic disorder	This article implements diagnostic labels without providing specific paranoia measures

Year	Authors	Title	Reason for exclusion
2004	Greig, T C; Bryson, G J; Bell, M D	Theory of mind performance in schizophrenia: Diagnostic, symptom, and neuropsychological correlates	This article does not implement the RMET
2012	Hargreaves; Dw, Morris; R, Emma; M, Gill; A, Corvin; G, Donohoe	ZNF804A and social cognition in patients with schizophrenia and healthy participants	This article does not implement the RMET
2010	Haut, Kristen M; MacDonald, Angus W	Persecutory delusions and the perception of trustworthiness in unfamiliar faces in schizophrenia	This article does not implement the RMET
2013	Healey, Kristin M; Penn, David L; Perkins, Diana; Woods, Scott W; Addington, Jean	Theory of mind and social judgments in people at clinical high risk of psychosis	Paranoia measure not implemented
2006	Herrmann, M J; Reif, A; Jabs, B E; Jacob, C; Fallgatter, A J	Facial affect decoding in schizophrenic disorders: A study using event-related potentials	This article does not implement the RMET
2005	Hesse, W	Theory of mind and tendency to self-reference in schizophrenic patients	This article is written in a language which is not English, Spanish or Italian
2009	Hofer, Alex; Benecke, Cord; Edlinger, Monika; Huber, Regina; Kemmler, Georg; Rettenbacher,	Facial emotion recognition and its relationship to symptomatic, subjective, and functional outcomes in outpatients with chronic schizophrenia	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
	Maria A; Schleich, Gerald; Wolfgang Fleischhacker, W		
2011	Holt, Daphne J; Lakshmanan, Balaji; Freudenreich, Oliver; Goff, Donald C; Rauch, Scott L; Kuperberg, Gina R	Dysfunction of a Cortical Midline Network During Emotional Appraisals in Schizophrenia	This article does not implement the RMET
2017	Homan, Philipp; Reddan, Marianne C; Brosch, Tobias; Koenigsberg, Harold W; Schiller, Daniela	Aberrant link between empathy and social attribution style in borderline personality disorder	This article does not implement the RMET
2014	Hooker, Christine I; Benson, Taylor L; Gyurak, Anett; Yin, Hong; Tully, Laura M; Lincoln, Sarah Hope	Neural Activity to Positive Expressions Predicts Daily Experience of Schizophrenia-Spectrum Symptoms in Adults With High Social Anhedonia	This article does not implement the RMET
2013	Huang, Charles Lung-Cheng; Hsiao, Sigmund; Hwu, Hai-Gwo;	Are there differential deficits in facial emotion recognition between paranoid and non-paranoid schizophrenia? A signal detection analysis	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2017	Howng, Shen-Long Huang; S, Hsiao	The functional significance of affect recognition, neurocognition, and clinical symptoms in schizophrenia	This article does not implement the RMET
2011	Ignacio Jauregui, Oscar; Costanzo, Elsa Y; de Achaval, Delfina; Villarreal, Mirta F; Chu, Elvina; Mora, Martina C; Vigo, Daniel E; Castro, Mariana N; Leiguarda, Ramon C; Baer, Karl-Juergen; Guinjoan, Salvador M	Autonomic Nervous System Activation During Social Cognition Tasks in Patients With Schizophrenia and Their Unaffected Relatives	This article does not implement the RMET
2015	Kazemian; M, Baniasadi; G, Hosseini; Mr, Fayyazi Bordbar	Investigation of theory of mind in schizophrenia based on positive and negative symptoms, gender, type of delusions and episodes	This record is not peer-reviewed article
2005	Kelemen, Oguz; Erdelyi, Rita; Pataki, Ilona; Benedek, Gyorgy; Janka, Zoltan; Keri, Szabolcs	Theory of mind and motion perception in schizophrenia	This article implements diagnostic labels without providing specific paranoia measures
2009	Kim, Eosu; Ku, Jeonghun; Kim,	Nonverbal Social Behaviors of Patients With Bipolar Mania During Interactions With Virtual Humans	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
	Jae-Jin; Lee, Hyeongrae; Han, Kiwon; Kim, Sun I; Cho, Hyun- Sang		
2013	Kirk, Hannah; Gilmour, Andrea; Dudley, Robert; Riby, Deborah M	Paranoid ideation and assessments of trust	This article does not implement the RMET
2017	Klein; S, Kelsven; A, Pinkham	Increased social cognitive bias in subclinical paranoia	This record is not peer-reviewed article
2014	Lam, Bess Y H; Raine, Adrian; Lee, Tatia M C	The relationship between neurocognition and symptomatology in people with schizophrenia: social cognition as the mediator	This article implements diagnostic labels without providing specific paranoia measures
2010	Langdon, Robyn; Ward, Philip B; Coltheart, Max	Reasoning Anomalies Associated With Delusions in Schizophrenia	This article does not implement the RMET
2001	Langdon; M, Coltheart; Pb, Ward; Sv, Catts	Mentalising, executive planning and disengagement in schizophrenia	This article does not implement the RMET
2014	Langdon; M, Still; Mh, Connors; Pb, Ward; Sv, Catts	Theory of mind in early psychosis	This article does not implement the RMET
2015	Lo, Panmi; Siu, Andrew M H	Social cognition and work performance of persons with schizophrenia in a Chinese population	This article does not implement the RMET
2006	López-Herrero, Paz; Lara, Elvira Mendoza;	Influencia de los signos y síntomas de esquizofrenia en la teoría de la mente = The influence of the signs and the symptoms of schizophrenia on theory of mind	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2002	Martínez, José A Muela; Shergill, Sukhi S Lough; Jr, Hodges	Measuring and modifying abnormal social cognition in frontal variant frontotemporal dementia	The research design is descriptive in nature
2002	Loughland, C M; Williams, L M; Gordon, E	Visual scanpaths to positive and negative facial emotions in an outpatient schizophrenia sample	This article does not implement the RMET
2015	Lu; Z, Song; D, Liu	Emotion recognition, theory of mind, perceptions of hostility and attributional style in first episode psychosis: Relationship with symptomatology	This record is not peer-reviewed article
2005	Lysaker, P H; Carcione, A; Dimaggio, G; Johannesen, J K; Nicolo, G; Procacci, M; Semerari, A	Metacognition amidst narratives of self and illness in schizophrenia: associations with neurocognition, symptoms, insight and quality of life	This article does not implement the RMET
2009	Lysaker, Paul Henry; Davis, Louanne Whitman; Tsai, Jack	Suspiciousness and low self-esteem as predictors of misattributions of anger in schizophrenia spectrum disorders	This article does not implement the RMET
2008	MacBeth, Angus; Schwannauer, Matthias; Gumley, Andrew	The association between attachment style, social mentalities, and paranoid ideation: An analogue study	This article does not implement the RMET
2015	Mannarini, Terri; Boffi, Marco; Brondi, Sonia; Sarrica, Mauro	Collective action as response to unresponsive institutions: A psychological insight into the theory of counter-democracy	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2017	Martinez, Gilles; Alexandre, Charlotte; Mam-Lam-Fook, Celia; Bendjemaa, Narjes; Gaillard, Raphael; Garel, Patricia; Dziobek, Isabel; Amado, Isabelle; Krebs, Marie-Odile	Phenotypic continuum between autism and schizophrenia: Evidence from the Movie for the Assessment of Social Cognition (MASC)	This article does not implement the RMET
2014	McIntosh, L G; Park, S	Social trait judgment and affect recognition from static faces and video vignettes in schizophrenia	This article does not implement the RMET
2010	Mehl, Stephanie; Rief, Winfried; Luellmann, Eva; Ziegler, Michael; Kesting, Marie-Luise; Lincoln, Tania Marie	Are Theory of Mind Deficits in Understanding Intentions of Others Associated With Persecutory Delusions?	This article does not implement the RMET
2014	Mehta; Hd, Bhagyavathi; J, Thirthalli; Kj, Kumar; Bn, Gangadhar	Neurocognitive predictors of social cognition in remitted schizophrenia	This article does not implement the RMET
2014	Mehta; J, Thirthalli; Hd, Bhagyavathi; J, Keshav Kumar; Dk, Subbakrishna;	Similar and contrasting dimensions of social cognition in schizophrenia and healthy subjects	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2016	Bn, Gangadhar; Sm, Eack; Ms, Keshavan Mohnke, Sebastian; Erk, Susanne; Schnell, Knut; Romanczuk- Seiferth, Nina; Schmierer, Phoebe; Romund, Lydia; Garbusow, Maria; Wackerhagen, Carolin; Ripke, Stephan; Grimm, Oliver; Haller, Leila; Witt, Stephanie H; Degenhardt, Franziska; Tost, Heike; Heinz, Andreas; Meyer- Lindenberg, Andreas; Walter, Henrik	Theory of mind network activity is altered in subjects with familial liability for schizophrenia	This article does not implement the RMET
2014	Moritz; N, Ramdani; H, Klass; C, Andreou; D, Jungclaussen; S,	Overconfidence in incorrect perceptual judgments in patients with schizophrenia	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
	Eifler; S, Englisch; F, Schirmbeck; M, Zink		
2014	Morrison, Sean C; Cohen, Alex S	The moderating effects of perceived intentionality: Exploring the relationships between ideas of reference, paranoia and social anxiety in schizotypy	This article does not implement the RMET
1998	Murphy	Theory of mind in a sample of men with schizophrenia detained in a special hospital: Its relationship to symptom profiles and neuropsychological tests	This article does not implement the RMET
2007	Nelson, Amelia L; Combs, Dennis R; Penn, David L; Basso, Michael R	Subtypes of social perception deficits in schizophrenia	This article does not implement the RMET
2017	Okruszek, Lukasz; Bala, Aleksandra; Wordecha, Malgorzata; Jarkiewicz, Michal; Wysokinski, Adam; Szczepocka, Ewa; Piejka, Aleksandra; Zaborowska, Oliwia; Szantoch, Marta;	Social cognition in neuropsychiatric populations: a comparison of theory of mind in schizophrenia and mesial temporal lobe epilepsy	This article implements diagnostic labels without providing specific paranoia measures

Year	Authors	Title	Reason for exclusion
2015	Rysz, Andrzej; Marchel, Andrzej Okruszek, Lukasz; Haman, Maciej; Kalinowski, Kasper; Talarowska, Monika; Becchio, Cristina; Manera, Valeria	Impaired Recognition of Communicative Interactions from Biological Motion in Schizophrenia	This article implements diagnostic labels without providing specific paranoia measures
2011	Pedersen, Cort A; Gibson, Clare M; Rau, Shane W; Salimi, Kayvon; Smedley, Kelly L; Casey, Robin L; Leserman, Jane; Jarskog, L Fredrik; Penn, David L	Intranasal oxytocin reduces psychotic symptoms and improves theory of mind and social perception in schizophrenia	This article does not implement the RMET
2012	Pedersen; S, Rau; K, Salimi; C, Gibson; J, Leserman; D, Penn	Oxytocin treatment in schizophrenia reduces psychotic symptoms and improves theory of mind and social perception	This article does not implement the RMET
2014	Pinkham	Social cognition in schizophrenia	This record is not peer-reviewed article
2012	Pinkham, Amy E; Hopfinger,	Context influences social cognitive judgments in paranoid individuals with schizophrenia	This record is not peer-reviewed article

Year	Authors	Title	Reason for exclusion
2015	Joseph; Penn, David L Pinkham, Amy E; Liu, Peiying; Lu, Hanzhang; Kriegsman, Michael; Simpson, Claire; Tamminga, Carol	Amygdala Hyperactivity at Rest in Paranoid Individuals With Schizophrenia	This article does not implement the RMET
2014	Pinkham, Amy E; Sasson, Noah J; Kelsven, Skylar; Simpson, Claire E; Healey, Kristin; Kohler, Christian	An Intact Threat Superiority Effect for Nonsocial but not Social Stimuli in Schizophrenia	This article does not implement the RMET
2014	Popova; Tg, Popov; C, Wienbruch; Am, Carolus; Ga, Miller; Bs, Rockstroh	Changing facial affect recognition in schizophrenia: Effects of training on brain dynamics	This article does not implement the RMET
2008	Pousa, Esther; Duno, Roso; Brebion, Gildas; David, Anthony S; Ruiz, Ada I; Obiols, Jordi E	Theory of mind deficits in chronic schizophrenia: Evidence for state dependence	This article does not implement the RMET
2011	Quee; L, Van Der Meer; R, Bruggeman; L,	Insight in psychosis: Relationship with neurocognition, social cognition and clinical symptoms depends on phase of illness	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
	De Haan; L, Krabbendam; W, Cahn; Ncl, Mulder; D, Wiersma; A, Aleman		
2016	Raman	Adverse childhood experiences and theory of mind	The research design is descriptive in nature
2003	Randall; R, Corcoran; Jc, Day; Rp, Bentall	Attention, theory of mind, and causal attributions in people with persecutory delusions: A preliminary investigation	This article does not implement the RMET
2015	Regat, Soraya; Etienne, Eleonore; Braha, Sonia; Bouaziz, Noomane; Moulier, Virginie; Benadhira, Rene; Januel, Dominique	Schizophrenic patient's comprehension evaluation and their appreciation of humor compared to a controlled population: A pilot study	This article is written in a language which is not English, Spanish or Italian
2014	Ringer, Jamie M; Lysaker, Paul H	Anger Expression Styles in Schizophrenia Spectrum Disorders Associations With Anxiety, Paranoia, Emotion Recognition, and Trauma History	This article does not implement the RMET
2013	Rodriguez Sosa, Juana Teresa; Gil Santiago, Hiurma; Trujillo Cubas, Angel; Winter Navarro, Marta; Leon	Social cognition in patients with schizophrenia, their unaffected first degree relatives and healthy controls Comparison between groups and analysis of associated clinical and sociodemographic variables	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2016	Perez, Petra; Guerra Cazorla, Luz Marina; Martin Jimenez, Jose Maria Rominger; A, Bleier; W, Fitz; J, Marksteiner; A, Fink; I, Papousek; Em, Weiss	Auditory top-down control and affective theory of mind in schizophrenia with and without hallucinations	This article implements diagnostic labels without providing specific paranoia measures
2014	Rossell, Susan L; Labuschagne, Izelle; Dunai, Judy; Kyrios, Michael; Castle, David J	Using theories of delusion formation to explain abnormal beliefs in Body Dysmorphic Disorder (BDD)	This article does not implement the RMET
2013	Rowse, Georgina; McCarthy-Jones, Simon; Knowles, Rebecca; Corcoran, Rhiannon; Bentall, Richard P	Attributional Style and Theory of Mind in People with Alzheimer Disease and Persecutory Delusions	This article does not implement the RMET
2008	Roy, M; Roy, M- A; Grondin, S	Perturbed consciousness in schizophrenia: An evaluation of CD Frith's model	This article is a review
2002	Santuzzi, A M; Ruscher, J B	Stigma salience and paranoid social cognition: Understanding variability in metaperceptions among individuals with recently-acquired stigma	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2015	Savulich, George; Freeman, Daniel; Shergill, Sukhi; Yiend, Jenny	Interpretation Biases in Paranoia	This article does not implement the RMET
2010	Schimansky, J; David, N; Rossler, W; Haker, H	Sense of agency and mentalizing: Dissociation of subdomains of social cognition in patients with schizophrenia	This article implements diagnostic labels without providing specific paranoia measures
2008	Stewart, Suzanne L K; Corcoran, Rhiannon; Drake, Richard J	Alignment and theory of mind in schizophrenia	This article does not implement the RMET
2002	Taylor, J L; Kinderman, P	An analogue study of attributional complexity, theory of mind deficits and paranoia	This article does not implement the RMET
2011	Thewissen, Viviane; Bentall, Richard P; Oorschot, Margreet; à Campo, Joost; van Lierop, Thom; van Os, Jim; Myin?Germeys, Inez	Emotions, self?esteem, and paranoid episodes: An experience sampling study	This article does not implement the RMET
2012	Tone, Erin B; Davis, Jennifer S	Paranoid thinking, suspicion, and risk for aggression: A neurodevelopmental perspective	This article does not implement the RMET
2017	Torres-Marin, Jorge; Carretero- Dios, Hugo;	Eye Contact and Fear of Being Laughed at in a Gaze Discrimination Task	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2016	Acosta, Alberto; Lupianez, Juan Tremeau, Fabien; Antonius, Daniel; Todorov, Alexander; Rebani, Yasmina; Ferrari, Kelsey; Lee, Sang Han; Calderone, Daniel; Nolan, Karen A; Butler, Pamela; Malaspina, Dolores; Javitt, Daniel C	What can the study of first impressions tell us about attitudinal ambivalence and paranoia in schizophrenia?	This article does not implement the RMET
2011	Tse, Wai S; Lu, Yan; Bond, Alyson J; Chan, Raymond C K; Tam, Danny W H	Facial emotion linked cooperation in patients with paranoid schizophrenia: A test on the Interpersonal Communication Model	This article does not implement the RMET
2016	Tseng, Huai- Hsuan; Roiser, Jonathan P; Modinos, Gemma; Falkenberg, Irina; Samson, Carly; McGuire, Philip; Allen, Paul	Corticolimbic dysfunction during facial and prosodic emotional recognition in first-episode psychosis patients and individuals at ultra-high risk	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
2015	Tso, Ivy F; Calwas, Anita M; Chun, Jinsoo; Mueller, Savanna A; Taylor, Stephan F; Deldin, Patricia J	Altered Attentional and Perceptual Processes as Indexed by N170 During Gaze Perception in Schizophrenia: Relationship With Perceived Threat and Paranoid Delusions	This article does not implement the RMET
2010	Tylecu, Aneta; Kucharska- Pietura, Katarzyna; Jeleniewicz, Witold; Czernikiewicz, Andrzej; Stryjecka- Zimmer, Marta	Functional polymorphism of genes inactivating catecholamines and emotional deficits in paranoid schizophrenia	This article is written in a language which is not English, Spanish or Italian
2012	V, Villalta-Gil; I, Melendez; J, Radua; C, Stephan-Otto; Ma, Fullana; I, Ruiz-Ripoll; S, Surguladze	Neurofunctional basis of social cognition in subclinical paranoid ideation and social anxiety	This article does not implement the RMET
2013	van der Gaag, Mark; Schutz, Chantal; ten Napel, Angela; Landa, Yulia; Delespaul, Philippe; Bak,	Development of the Davos Assessment of Cognitive Biases Scale (DACOBS)	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
	Maarten; Tschacher, Wolfgang; de Hert, Marc		
2008	van Hooren, S; Versmissen, D; Janssen, I; Myin- Germeys, I; Campo, J a; Mengelers, R; van Os, J; Krabbendam, L	Social cognition and neurocognition as independent domains in psychosis	This article does not implement the RMET
2014	Veling, Wim; Moritz, Steffen; van der Gaag, Mark	Brave new worlds--review and update on virtual reality assessment and treatment in psychosis	This article is a review
2016	Veronica Romero-Ferreiro, Maria; Aguado, Luis; Rodriguez- Torresano, Javier; Palomo, Tomas; Rodriguez- Jimenez, Roberto; Luis Pedreira- Massa, Jose	Facial affect recognition in early and late-stage schizophrenia patients	This article does not implement the RMET
2008	Versmissen, Dagmar; Janssen, Ilse; Myin- Germeys, Inez; Mengelers, Ron;	Evidence for a relationship between mentalising deficits and paranoia over the psychosis continuum	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
	Campo, Joost A; van Os, Jim; Krabbendam, Lydia		
2013	Walss-Bass, Consuelo; Fernandes, Joao M; Roberts, David L; Service, Helena; Velligan, Dawn	Differential correlations between plasma oxytocin and social cognitive capacity and bias in schizophrenia	This article does not implement the RMET
2009	Walter, Henrik; Ciaramidaro, Angela; Adenzato, Mauro; Vasic, Nenad; Ardito, Rita Bianca; Erk, Susanne; Bara, Bruno G	Dysfunction of the social brain in schizophrenia is modulated by intention type: An fMRI study	This article does not implement the RMET
2015	Weisgerber, Anne; Vermeulen, Nicolas; Peretz, Isabelle; Samson, Severine; Philippot, Pierre; Maurage, Pierre; D'Aoust, Catherine De Graeuwe; De	Facial, vocal and musical emotion recognition is altered in paranoid schizophrenic patients	This article does not implement the RMET

Year	Authors	Title	Reason for exclusion
	Jaegere, Aline; Delatte, Benoit; Gillain, Benoit; De Longueville, Xavier; Constant, Eric		
2014	Yalcin- Siedentopf, Nursen; Hoertnagl, Christine M; Biedermann, Falko; Baumgartner, Susanne; Deisenhammer, Eberhard A; Hausmann, Armand; Kaufmann, Alexandra; Kemmler, Georg; Muhlbacher, Moritz; Rauch, Anna-Sophia; Fleischhacker, W Wolfgang; Hofer, Alex	Facial affect recognition in symptomatically remitted patients with schizophrenia and bipolar disorder	This article does not implement the RMET
2015	Zegarra-Valdivia, Jonathan A	Executive function, theory of mind and decision making in patients with paranoid schizophrenia stabilized from Peru	This article implements diagnostic labels without

Year	Authors	Title	Reason for exclusion
			providing specific paranoia measures
2011	Zeppegno, P; Gogliani, A; Antona, M; Gili, S; Ponzetti, D; Torre, E	Analysis of correlations among theory of mind, symptoms and personologic traits in university students	This article does not implement the RMET
2009	Zeppegno, P; Probo, M; Antona, M; Gogliani, A; Torre, E	Study of the correlations between theory of mind, symptoms and personality characteristics of a non-psychiatric population	This article does not implement the RMET
2009	Aakre, Jennifer M; Seghers, James P; St- Hilaire, Annie; Docherty, Nancy	Attributional Style in Delusional Patients: A Comparison of Remitted Paranoid, Remitted Nonparanoid, and Current Paranoid Patients With Nonpsychiatric Controls	This article does not implement the RMET
2005	Abell, F; Hare, D J	An experimental investigation of the phenomenology of delusional beliefs in people with Asperger syndrome	This article does not implement the RMET
2011	An, S K; Kim, K R; Lee, S Y; Kang, J I; Lee, E	Paranoid ideation: Its relations with attribution style, neuro-cognition, and theory of mind	This record is not peer-reviewed article
2010	An, Suk Kyoon; Kang, Jee In; Park, Jin Young; Kim, Kyung Ran; Lee, Su Young; Lee, Eun	Attribution bias in ultra-high risk for psychosis and first-episode schizophrenia	This article does not implement the RMET

Appendix C

Newcastle - Ottawa Quality Assessment Scale

Note: Changes from the original scales were bolded. Selection can be rated with a maximum of four stars, two for comparability and three for outcome.

Case Control Studies**Selection (Max 3 stars)**

- 1) Is the case definition adequate?
 - a. yes, with independent validation *
 - b. yes, e.g. record linkage or based on self reports
 - c. no description
- 2) Representativeness of the cases
 - a. consecutive or obviously representative series of cases *
 - b. potential for selection biases or not stated
- 3) Selection of Controls
 - a. community controls and no history of disease *
 - b. hospital controls
 - c. no description

Comparability (Max 2 stars)

Comparability of cases and controls on the basis of the design or analysis

- a. study controls for **IQ and education** *
- b. study controls for **any others** *

Outcome (Max 3 stars)

- 1) Ascertainment of exposure
 - a. **specific measure ***
 - b. **general measure**
 - c. **no description**
- 2) Same method of ascertainment for cases and controls
 - a. yes *
 - b. no
- 3) Non-Response rate
 - a. same rate for both groups *
 - b. non-respondents described
 - c. rate different and no designation

Newcastle - Ottawa Quality Assessment Scale

adapted for cross sectional studies

Selection (Max 4 stars)

- 1) Representativeness of the sample:
 - a. Truly representative of the average in the target population * (all subjects or random sampling).
 - b. Somewhat representative of the average in the target population * (non-random sampling).
 - c. Selected group of users.
 - d. No description of the sampling strategy.
- 2) **Same method of ascertainment for different groups**

- a. **yes ***
 - b. **no**
- 3) Non-respondents:
- a. Comparability between respondents and non-respondents' characteristics is established, and the response rate is satisfactory. *
 - b. The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.
 - c. No description of the response rate or the characteristics of the responders and the non-responders.
- 4) Ascertainment of the exposure:
- a. **Specific measure ***
 - b. **General measure**
 - c. **No description of the measurement tool or no measure used**

Comparability (Max 2 stars)

The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled.

- a. **The study controls for IQ or education***
- b. **The study control for other variables ***

Outcome (Max 2 stars)

- 1) Assessment of the outcome:
- a. **Self report. ***
 - b. No description.
- 2) Statistical test:

- a. The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). *
- b. The statistical test is not appropriate, not described or incomplete

Appendix D

Document sent to blind-raters

Quality assessment table – to complete

Name:

Paper	Type	Selection	Comparability	Outcome

Paper list – to pick randomly 4 papers

Paper	Type	Link
(Lysaker et al., 2010)	Cross-sectional	Lysaker, P. H., Salvatore, G., Grant, M. L. A., Procacci, M., Olesek, K. L., Buck, K. D., ... Dimaggio, G. (2010). Deficits in theory of mind and social anxiety as independent paths to paranoid features in schizophrenia. <i>Schizophrenia Research</i> , 124(1–3), 81–85. https://doi.org/10.1016/j.schres.2010.06.019
(Pinkham et al., 2016)	Cross-sectional	Pinkham, A. E., Harvey, P. D., & Penn, D. L. (2016). Paranoid individuals with schizophrenia show greater social cognitive bias and worse social functioning than non-paranoid individuals with schizophrenia. <i>Schizophrenia Research. Cognition</i> , 3, 33–38. https://doi.org/10.1016/j.scog.2015.11.002
(Gavilan & Haro, 2017)	Cross-sectional	Gavilan, J. M., & Haro, J. (2017). Personality traits and theory of mind: Performance data of a Spanish sample of university students. <i>Data in Brief</i> , 14, 612–617. https://doi.org/10.1016/j.dib.2017.08.014
(Hengartner et al., 2014)	Cross-sectional	Hengartner, M. P., Ajdacic-Gross, V., Rodgers, S., Müller, M., Haker, H., & Rössler, W. (2014). Fluid intelligence and empathy in

		association with personality disorder trait-scores: exploring the link. <i>European Archives of Psychiatry and Clinical Neuroscience</i> , 264(5), 441–448. https://doi.org/10.1007/s00406-013-0441-0
(Murphy, 2006)	Cross-sectional	Murphy, D. (2006). Theory of mind in Asperger’s syndrome, schizophrenia and personality disordered forensic patients. <i>Cognitive Neuropsychiatry</i> , 11(2), 99–111. https://doi.org/10.1080/13546800444000182
(Couture et al., 2010)	Case-control	Couture, S. M., Penn, D. L., Losh, M., Adolphs, R., Hurley, R., & Piven, J. (2010). Comparison of social cognitive functioning in schizophrenia and high functioning autism: more convergence than divergence. <i>Psychological Medicine</i> , 40(4), 569–579. https://doi.org/10.1017/S003329170999078X
(Craig et al., 2004)	Case-control	Craig, J. S., Hatton, C., Craig, F. B., & Bentall, R. P. (2004). Persecutory beliefs, attributions and theory of mind: comparison of patients with paranoid delusions, Asperger’s syndrome and healthy controls. <i>Schizophrenia Research</i> , 69(1), 29–33. https://doi.org/10.1016/S0920-9964(03)00154-3
(Darrell-Berry et al., 2017)	Case-control	Darrell-Berry, H., Bucci, S., Palmier-Claus, J., Emsley, R., Drake, R., & Berry, K. (2017). Predictors and mediators of trait anger across the psychosis continuum: The role of attachment style, paranoia and social cognition. <i>Psychiatry Research</i> , 249, 132–138. https://doi.org/10.1016/j.psychres.2017.01.007
(Jänsch & Hare, 2014)	Case-control	Jänsch, C., & Hare, D. J. (2014). An investigation of the “jumping to conclusions” data-gathering bias and paranoid thoughts in Asperger syndrome. <i>Journal of Autism and Developmental Disorders</i> , 44(1), 111–119. https://doi.org/10.1007/s10803-013-1855-2
(Prevost et al., 2015)	Case-control	Prevost, M., Brodeur, M., Onishi, K. H., Lepage, M., & Gold, I. (2015). Judging

		strangers' trustworthiness is associated with theory of mind skills. <i>Frontiers in Psychiatry</i> , 6, 52. https://doi.org/10.3389/fpsyt.2015.00052
(Sachse et al., 2014)	Case-control	Sachse, M., Schlitt, S., Hainz, D., Ciaramidaro, A., Walter, H., Poustka, F., ... Freitag, C. M. (2014). Facial emotion recognition in paranoid schizophrenia and autism spectrum disorder. <i>Schizophrenia Research</i> , 159(2-3), 509-514. https://doi.org/10.1016/j.schres.2014.08.030
(Scherzer et al., 2015)	Case-control	Scherzer, P., Achim, A., Leveille, E., Boisseau, E., & Stip, E. (2015). Evidence from paranoid schizophrenia for more than one component of theory of mind. <i>Frontiers in Psychology</i> , 6, 1643. https://doi.org/10.3389/fpsyg.2015.01643

<The two scales (Appendix C) were included here. >

Appendix E

Quality assessment scores of the three independent raters

Study	Author score	Rater 1	Rater 2	Rater 3	Agreement level
Couture et al., 2010**	6				
Craig et al., 2004**	5		6		0
Darrell-Berry et al., 2017**	5	5			1
Gavilan & Haro, 2017*	4	4		4	1
Hengartner et al., 2014*	7		7	6	0.5
Jansch & Hare, 2014**	7	7			1
Lysaker et al., 2010*	6			6	1
Murphy, 2006*	4				
Pinkham et al., 2016*	6		6	6	1
Prevost et al., 2015**	7				
Sachse et al., 2014**	5	5			1
Scherzer et al., 2015**	5		7		0
Percent of agreement between the raters					72

Research paper

Title: Does Affective Theory of Mind mediate the Association between Trauma and
Psychotic-Like Experiences?

Short Title: Affective ToM, CT and PLE



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Word count: 7322 (excluding abstract, tables, figures and appendices)

Target journal: British Journal of Clinical Psychology (see appendix A for notes for contributors)

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Abstract

Introduction: Childhood Trauma (CT) is associated with psychosis. In people experiencing psychosis, social cognition seems to be a better predictor of functional outcome than non-cognitive components. Theory suggests that aspects of social cognition may affect the association between CT and psychosis. Based on the high ratio of Psychotic-Like Experiences (PLE) in the general population, similar patterns are thought to be found in non-clinical participants. This study explored whether a deficit in the affective component of Theory of Mind (ToM) mediates the association between CT and PLE. **Method:** Online administration of questionnaires through social media to 134 non-clinical participants was used to explore how these variables interact. **Results:** Affective ToM did not mediate the association between CT and PLE. Deficits in the affective component of ToM were not a predictor of PLE. While specific kinds of CT were related to specific types of PLE, affective ToM did not affect these relationships. **Conclusions:** Deficits in affective ToM are not related to the development of PLE as a consequence of CT. Characteristics of the sample and questionnaires used are likely to have played an important role in these results and should be considered for further research. Limitations and implications were discussed.

Keywords: Affective theory of mind, childhood trauma, psychotic-like experience, reading the mind in the eyes test, non-clinical population.

Childhood Trauma (CT) is a central aspect in the development of psychosis (Read, Fink, Rudegeair, Felitti, & Whitfield, 2008). Between 50 and 98% of individuals who experience psychosis have experienced CT (Read, Os, Morrison, & Ross, 2005). Those who experience CT are almost three times more likely, on average, to develop psychosis, making CT a major risk factor (Varese et al., 2012). The more frequent and severe the experience of trauma, the more significant psychosis-related difficulties are likely to be (Bentall, Wickham, Shevlin, & Varese, 2012). Furthermore, different traumatic experiences affect the nature of psychosis in a variety of ways (Heins et al., 2011). For individuals experiencing psychosis, a history of sexual abuse in childhood is related to hallucinations, while neglect is associated with paranoia (Bentall et al., 2014; Sitko, Bentall, Shevlin, & Sellwood, 2014). Considering the overwhelming amount of evidence indicating an association between CT and psychosis, understanding the mechanisms by which these two constructs are linked constitutes an important area of research.

Psychotic-Like Experiences (PLE) are commonly defined as psychotic difficulties in the absence of a formal diagnosis and are found in the general population. PLE can be categorised using specific labels such as paranoid ideas, bizarre thinking, perceptual abnormalities, magical thinking, grandiose ideas amongst others (Nelson & Yung, 2012) but in general are divided into phenotypes of delusions (of which persecutory delusions are the most common) or hallucinations (van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). It has been established that CT increases vulnerability to psychosis-related difficulties (Kilcommons & Morrison, 2005). Furthermore, PLE are more likely to occur to people who experienced CT, such as physical abuse, exposure to domestic violence, bullying (Kelleher et al., 2008) and sexual abuse (Lataster et al., 2006). One possible explanation for this association is that threat in childhood causes neurodevelopmental changes which increase vulnerability to PLE in later life (Cotter & Pariante,

2002), perhaps by affecting the expression of social abilities (Pears & Fisher, 2005). However, the role that CT has in the development of PLE remains controversial, possibly due to methodological limitations inherent within the research (Arseneault et al., 2011). Social cognition seems to impact on the relationship between CT and psychosis (Green et al., 2011), therefore it may help explain the mechanisms which constitute the association between CT and PLE.

The Complex Role of Social Cognition

Social cognition refers to the cognitive and emotional abilities required to understand and interpret other people's mental states and behaviours (Adolphs, 2009). Impairment in social cognition is associated with psychosis (Sprong, Schothorst, Vos, Hox, & Van Engeland, 2007) and there is evidence of an association between social cognition and relapse and impact of psychosis-related difficulties (Brown, Tas, & Brüne, 2012; Pinkham, Penn, Perkins, & Lieberman, 2003). Furthermore, it has been established that abuse during childhood is associated with poorer psychosocial outcomes (Lysaker, Meyer, Evans, Clements, & Marks, 2001). It appears as if social cognitive deficits are likely to have a greater mediating role in social functioning and functional outcome than non-social cognitive deficits (Maat, Fett, & Derks, 2012). It follows that poorer psychosocial outcomes, resulting from CT, might be related to the development of psychosis. Therefore, social cognition deficits may mediate the development of PLE as a consequence of CT.

Different social cognition constructs have discrete neural pathways, for example, in the case of ToM and emotional processing (U. Frith & Frith, 2001). Distinctive neuropsychological deficits may result in different patterns of difficulty with metacognition which can lead an individual to experience a range of mental health difficulties (Lysaker, Dimaggio, Buck,

Carcione, & Nicolò, 2007). Consequently, while conceptually related, the various components of social cognition may impact differently on PLE. However, the boundaries between the different domains which account for social cognition deficits are still unclear (Brown, Tas, Can, Esen-Danaci, & Bruene, 2014; Mitchell & Phillips, 2015). Possibly because of this, evidence does not unequivocally support any of the models which attempt to explain PLE through specific individual social cognition domains (Garety & Freeman, 1999), with the specific role of ToM in PLE possibly being the most debated.

Theory of Mind (ToM) is a fundamental process of social cognition and it refers to the ability to interpret one's own and other people's mental and emotional states (Lewis, Carpendale, Towse, & Maridaki-Kassotaki, 2010). It has been found to be specifically impaired in psychosis (Brune, 2005). Furthermore, ToM deficits are widely considered as a risk factor in the development of this mental health difficulty (Bora & Pantelis, 2013). While PLE share a wide range of risk factors and are indicators of risk for psychosis (Kelleher & Cannon, 2011; Nelson & Yung, 2012), results on the association between ToM and PLE are inconsistent (Freeman, 2007). While it seems that at higher rates, difficulties due to PLE correspond more readily with ToM disruption (C. D. Frith, 2004), the specific mechanisms causing this effect are far from being understood.

The Affective Component of ToM

The lack of understanding regarding the specific role of ToM in psychosis and how it accounts for poor social functioning in individuals with PLE may be attributable to the use of different measures across relevant studies (Harrington, Langdon, Siegert, & McClure, 2005). Moreover, ToM-specific components and their neuropsychological underpinning are still actively debated (Bird, Castelli, Malik, Frith, & Husain, 2004; Shamay-Tsoory et al., 2007). It

follows that different ToM measures may rely differently on diverse ToM components. ToM seems to comprise two components, an affective and a cognitive one (Hynes, Baird, & Grafton, 2006; Shamay-Tsoory et al., 2007). Cognitive ToM refers to the ability of reading other's intentions and beliefs whereas affective ToM is the ability to understand others' emotional states of mind. This theoretical framework allows an understanding of the complex relationship between ToM and emotion recognition (Russell, Schmidt, Doherty, Young, & Tchanturia, 2009), with affective ToM bridging the conceptual gap between these two constructs. In individuals experiencing psychosis, Bora, Eryavuz, Kayahan, Sungu and Veznedaroglu (2006) demonstrated that affective ToM was the best predictor of social functioning. However, different authors demonstrated that a stronger association was found with cognitive components of ToM (Brown et al., 2014; Lysaker et al., 2011). Furthermore, the boundaries between different ToM components are still unclear (Darrell-Berry et al., 2017). Consequently, more work is required to clarify how different domains and subdomains of social cognition are associated with CT and PLE.

The affective component of ToM has been explored using the Reading the Eyes in the Mind Test (RMET; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). The authors posit this test measures the first unconscious stage of mental state attribution by decoding non-verbal information without requiring the use of more cognitive modules to interpret content, which can be considered as an operational definition of affective ToM. It is likely that the affective and the cognitive components have different associations to PLE (Shamay-Tsoory et al., 2007).

Affective ToM, as measured by the RMET, seems to be specifically impaired in people with PLE, particularly in individuals who experience self-disorder (Szily & Kéri, 2009), referential thinking (Gooding & Pflum, 2011) and hold non-realistic beliefs (Meyer & Shean, 2006).

However, when affective ToM was measured against more general PLE scales, results were inconsistent. Henry, Bailey and Rendell (2008) found a significant association between affective ToM and PLE, whilst Hengartner et al. (2014) did not. Clearly, further research is needed in this area in order to clarify the role of affective ToM in PLE. Currently the evidence suggests that an impairment in affective ToM may be associated with PLE.

Furthermore, it is likely that the different components of ToM relate differently to the association between CT and psychosis. CT may be a cause of disruption of psychosocial functioning (Repetti, Taylor, & Seeman, 2002). There is some evidence that ToM deficits can result as a consequence of institutional deprivation (Colvert et al., 2008). Emotion understanding and ToM were found to be specifically impaired in children who have been maltreated (Pears & Fisher, 2005). While there is limited research on the association between CT and affective ToM, there seems to be an interaction. Affective ToM as measured by the RMET appears to be specifically impaired in people who experienced parental maltreatment, parental maladjustment, sexual abuse and institutional care (Germine, Dunn, McLaughlin, & Smoller, 2015). Furthermore, while women who had experienced CT performed equally to controls in the RMET in terms of accuracy, control subjects were able to distinguish positively and negatively valenced mental states more readily and at faster rate than neutral emotional states. This detection speed variance was not found in the women experiencing CT (Nazarov et al., 2014). Therefore, some evidence suggests that affective ToM may be specifically impaired as a consequence of CT.

Specific Associations

The associations between affective ToM, specific kinds of trauma and specific PLE constitute a complex scenario. Affective ToM deficits have been found in individuals presenting with paranoid ideation (unpublished data; see previous section), the most common kind of

delusion, but the role of ToM in paranoia is far from understood (Freeman, 2007). C. D. Frith (2004) suggested that a tendency to over-mentalize, that is to rely excessively on the ability to infer others' states of mind without considering environmental variables, would explain why individuals attribute malevolent intentions to others, rather than in congruence with available contextual information. If affective ToM is impaired, an individual who experiences paranoia is more likely to misinterpret the emotional state of mind of the other person and to interpret neutral emotions as negative (Combs, Michael and Penn, 2006). As a result, when a negative event is experienced, individuals who experience paranoia will be more likely to make external personal attributions (Bentall & Fernyhough, 2008). Such an impairment in this ability may be explained by having experienced neglect. A neglected child may not receive cognitive stimulation, individual attention or emotional affection (Perry, 2002). This may result in neurodevelopmental deficits which could lead to a ToM impairment. It follows that the association between neglect and paranoia, may be mediated by affective ToM.

In contrast to paranoia, apart from third-person auditory hallucinations (C. D. Frith, 2014) which are associated with paranoid ideation, such an association between ToM and hallucinations has not been found (Bentall et al., 2014). The development of hallucinations is more likely to involve sensory components which are not necessarily socially related. Furthermore, having a difficulty in interpreting someone else's emotional state of mind is unlikely to explain the sensorial perception of something not present. It follows that the association between sexual abuse and hallucinations, is unlikely to be mediated by affective ToM.

Using a Non-Clinical Population and Potential Clinical Implications

The median prevalence of PLE in the general population is 5-8% with an interquartile range of 1.9–14.4% as reported by a meta-analysis based on 217 estimates of prevalence (van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). In relation to the variables investigated in this study, Verdoux & van Os (2002) found that 25.5% of a non-clinical sample believed themselves to be persecuted in some way (paranoia) while 9.3% heard their thoughts echoing back to them (hallucinations). It is thought that psychotic symptoms lie on a continuum across non-clinical and clinical groups (Shevlin, McElroy, Bentall, Reininghaus, & Murphy, 2016). Furthermore, subtle impairment of ToM has been found to be associated with positive schizotypal traits in the general population (Pickup, 2006). PLE therefore constitute an appropriate target for research in the association between the psychological constructs analysed by this study. Furthermore, severe maltreatment is experienced by a substantial minority of children, with a prevalence varying from five to 18 percent depending on age in UK (Radford et al., 2011). Gathering this evidence together, it seems that non-clinical participants constitute an appropriate population for the study of the effect of ToM on the relationship between CT and PLE.

Comprehending the interplay of these variables would have clinical implications. A deeper understanding may provide clinicians with a clearer rationale to investigate relevant experiences (Sitko et al., 2014). Mentalisation based treatment (Bateman & Fonagy, 2010) has been found to be an effective ToM intervention, in particular for people with a diagnosis of borderline personality disorder (Bateman & Fonagy, 2009) and it is currently under development for other groups (Bateman & Fonagy, 2013). By better understanding which aspects of mentalisation are involved with specific difficulties, clinicians using mentalisation based

treatment can provide more effective therapeutic interventions. If affective ToM is found to be impaired when individuals experience certain PLE related difficulties, then this would be a new point of access to someone's experience in treatment. Clinicians could use this evidence in order to develop more focused interventions for people who have difficulties related to PLE. On the other hand, the effectiveness of ToM training is inconsistent (Begeer et al., 2011). The understanding of how specific aspects of ToM interact with CT and PLE may help making these treatments more efficient.

This Study

To summarise, while research has examined the influence that different variables have on the relationship between CT and psychosis, there is no model that explores social cognition as a potential mediator. In line with recent research (Mancuso, Horan, Kern, & Green, 2011; Semerari, Carcione, Dimaggio, Nicolò, & Procacci, 2007), social cognition, as a multi-component skill, may be an important mediator in the relationship between CT and psychosis. The evidence indicates that CT may cause an impairment in affective ToM and that difficulties in affective ToM are associated with PLE. However, the role that affective ToM plays in the association between CT and PLE is far from being understood due to inconsistent results. Possibly, by understanding whether affective ToM mediates the relationship between CT and PLE, this controversy would partly resolve. Furthermore, the extent of this mediation might vary across different kinds of trauma, as well as different PLE. A double dissociation between the involvement of affective ToM in paranoia and in hallucinations in relation to the kind of trauma experienced would partly explain the inconsistency of results regarding the role of ToM in PLE.

In the present study, it is proposed that, in the general population, affective ToM mediates the relationship between CT and the occurrence of PLE. Furthermore, this study tries to

ascertain how different sub-components of these variables might interact. In view of the evidence provided, it is proposed that ToM may be related to the relationship between neglect and paranoia, but not to the relationship between sexual abuse and hallucinations (see Bentall et al., 2014; Sitko et al., 2014)

Therefore, this study aimed to test the following hypotheses:

First hypothesis: It was predicted that the affective component of ToM, as analysed by the RMET, mediates the relationship between CT and PLE.

Second hypothesis: it was predicted that the association between neglect (as a kind of CT) and paranoia (as a PLE) is mediated by the affective component of ToM while the relationship between sexual abuse (as a kind of CT) and hallucinations (as a PLE) occurs independently of affective ToM.

Method

Design

The design was a cross-sectional, questionnaire-based, analogue study using regression and mediation analyses.

Participants and Procedure

Participants were aged between 18 and 65 years. These individuals had the capacity to consent to the study and were able to read and write in English. Participants were recruited online through advertising with social media groups. The questionnaire was advertised on groups interested in psychosis, trauma or general psychological research on the platforms Facebook and Reddit. No UK National Health Service based groups were contacted.

Individuals were asked to complete a web-based survey provided through an anonymous link. After being fully informed about the nature of the study, by a participant information sheet,

participants were required to consent to take part in the study, a negative answer would have terminated the interview (see Ethics Proposal Section of this thesis). The survey was hosted by Qualtrics (Qualtrics, 2015) and advertised in line with the terms of Lancaster University Research and Ethics policies. Questionnaires took approximately 25 minutes to complete. In order to encourage participation, the participants were given the opportunity to enter their email address to be included in a prize draw of three Amazon vouchers of different values (15£, 25£ and 50£); the winners were selected through random selection. Resources for participants who may have experienced distress were provided both at the beginning and at the end of the interview. The research was approved by the Lancaster University Faculty of Health and Medicine Research Ethics Committee, documentation of this is provided in full in the Ethics Proposal Section of this thesis.

Measures and Materials

Participants completed questionnaires adapted into online versions which retained the visual characteristics of the original tests. The original questionnaires have been included in the ethics proposal section of this thesis (specifically, in the appendices of the research materials section). The questionnaires were presented in a standardised order (as they are described below).

Demographics. This first questionnaire, designed specifically for this research, gathered information about gender, age, education level, race and ethnicity, marital status, history of mental health, psychiatric disorder and/or brain injury.

CT. The Child Abuse and Trauma Scale (CATS; Sanders & Becker-Lausen, 1995) consists of 38, five-point, Likert rating scale items. It is a self-report questionnaire, which screens for any subjective perception of trauma during childhood or adolescence. The areas

assessed are sexual mistreatment, physical mistreatment and punishment, psychological mistreatment, physical or emotional neglect, and negative home environment. Test-retest reliability coefficients = .89, with .91 for neglect items and .85 for sexual abuse. Internal consistency coefficient = .90, with .86 for neglect items and .76 for sexual abuse. Participants can score a minimum of 0 and a maximum of 152 for the total scale, 56 for the neglect scale, 28 for the sexual abuse scale (Sanders & Becker-Lausen, 1995).

Affective ToM. The RMET (Baron - Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) consists of 36 items (photographs), showing the eye-region of the face of different individuals. The participant is asked to choose which of four words best describes the feelings of the person in the photograph. This is thought to show how well the participant is “in tune” with another person’s emotional and mental state. Participants can score a maximum of 36. Vellante et al’s. (2013) validation study provided a maximal weighted internal consistency of .72. Test–retest reliability was .83 (95% *CI* = .75 to .90). Three subscales were extracted based on Harkness, Sabbagh, Jacobson, Chowdrey and Chen (2005), including positive (eight items), neutral (16 items) and negative (12 items) stimuli.

PLE. A questionnaire including 24, five-point Likert rating scale items of delusional ideation and hallucinatory experiences was created by combining the Peters et al. Delusions Inventory (PDI) (Peters, Joseph, & Garety, 1999) and three hallucinatory experience items (adapted from van Os et al., 1999) (Appendix B). While the validity of self-reported psychotic experience has been questioned (Jablensky, 1995), this tool has been found appropriate to identify hallucinatory and delusional symptoms in non-clinical and clinical, both non-psychotic and psychotic, populations (Verdoux & van Os, 2002). Subjective experiences of distress, preoccupation, and conviction for each item were combined to extract a total score ranging from

0 to 381. While this test explores a variety of PLE, only two subscales, hallucinations and paranoia (range 0-45) identified by Verdoux et al., (1998) implementing factor analysis, were extracted for analysis. Although López-Ilundain, Pérez-Nievas, Otero and Mata, (2006) also identified different subscales, the internal consistency of the paranoia sub-scale they identify ($\alpha = .26$) was lower than the one identified by Verdoux et al. ($\alpha = .50$), therefore this latter was implemented.

Analysis

In order to explain the mechanism that underlies a relationship between an independent variable and a dependent variable, a mediation model was chosen as the main analysis. Based on the work of Fritz and MacKinnon, (2007) for the data analysis outlined below, the sample sizes required (including a Type I error of .05 and power of .8), were between 403 and 427, depending on β path's values. The data were analysed using IBM SPSS Version 22.0 (IBM, 2013) using a downloadable plug-in to run mediation analyses (PROCESS; Hayes, 2016).

The data were screened for accuracy, missing data and outliers. In accordance with the "participant information sheet" (see Ethics Proposal Section of this thesis), all participant data of those who did not complete the questionnaires were deleted. The questionnaires comprised exclusively of forced answers meaning there were no other missing data. Therefore, no missing items were allowed in the analysis. Subsequently, data were checked for outliers, specifically for Mahalanobis, Cook's and Leverage values distances. Then, sample demographics and outcome measures were identified.

Then, in order to analyse the first hypothesis, normality of the residuals' distribution were checked. If data were not normally distributed, transformations were attempted. When transformations were successful, parametric analyses were selected. Correlation analysis were

therefore performed for all variables, except for gender, which was analysed through mean comparisons. Multicollinearity was also checked. Then, a linear hierarchical analysis was run to explore the relationships between variables. Two models were produced, one including demographics and one including relevant variables controlling for demographics. Finally, a mediation analysis, which followed the guidelines provided by Hayes (2017), was run to investigate the hypothesis that ToM mediates the effect of CT on PLE.

The same steps were followed for analysing the second hypothesis, however in this case, the variable considered were neglect and paranoia in one model and sexual abuse and hallucinations in the other. Furthermore, internal consistency reliability analyses were performed on the data in order to justify individuals score interpretation before the analyses were conducted. Moreover, besides introducing performance on the RMET as in the previous model, this was divided in three groups, which were performance on positive, neutral and negative emotions (namely, positive, neutral and negative).

Results

The data of 350 participants were explored. While accuracy should not have been an issue as all the questionnaires were multiple choice, this was checked to confirm there were no errors. Individuals who were below 18 or above 65 years of age were excluded. When incomplete answers were excluded, 253 participants remained in all. The cut off score for Mahalanobis distance was 20.52 ($p = 0.001$), the cut off score for Cook's distance was 0.016 ($x = \frac{4}{n-k-1}$), the cut off score for Leverage values distance was 0.047 ($x = \frac{2k+2}{n}$). Participants who presented with at least two of these measures higher than a cut off score, were considered outliers. Three participants met this condition and were excluded. 250 participants therefore remained. Unfortunately, due to this small sample, the mediation and regression analysis were

not powerful enough to detect a small effect size, however the sample size was more than sufficient to detect both medium and large effect sizes (Fritz & MacKinnon, 2007). An estimated sample, adequate to reach a power of 0.95 with a medium effect size ($f^2 = 0.15$) for linear regression, comprised 107 participants. Sample demographics and outcome measures are detailed below in Table 1.

INSERT TABLE 1

First Hypothesis

Assumptions. A probability-probability plot of a regression of the standardised residuals revealed that the residuals were not normally distributed (appendix C). Positively skewed distributions were anticipated for a non-clinical sample, which is likely to present with fewer difficulties in comparison with a clinical sample, and therefore normality was not assumed. Indeed, PDI and CATS resulted positively skewed and a scatterplot graph of these two variables confirmed that there was a tendency to floor effect. These data were also non-linear and homogeneous for the same reason. The distribution of the RMET scores was normal. Square root transformations changed the skewness levels of the CATS from .56 to .17 ($SE = .15$) while square root transformations changed the skewness levels of the PDI from 1.20 to .26 ($SE = .15$), making the distribution of these variables closer to a normal distribution. The achieved normal distribution of the residuals is presented in appendix D. However, none of the transformations attempted on age made the distribution of this variable closer to normality. Based on this, non-parametric correlations were chosen.

Correlation. Data were checked for multicollinearity (cut off score = 0.9). Table 2 shows the results of a Spearman's correlation (a Pearson's correlation of these variables excluding age showed similar results). While some of the predictors correlated with each other as expected, no

correlation is higher than 0.7. Furthermore, the variance inflation factor was never over .15. Therefore, multicollinearity was not a problem.

INSERT TABLE 2

A significant positive correlation was found between CATS and PDI ($r = .47, p < .01$). As expected, higher CT corresponded with increased PLE. The PDI correlated negatively with age ($r = -.16, p < .05$), which meant that older individuals reported less PLE. Furthermore, the PDI correlated negatively with education, which means that at higher education levels correspond less PLE. The RMET did not correlate with any of the measures explored. While this latter finding made it unlikely for the RMET to be a mediator of the association between CATS and PDI or a predictor of PDI, mediation and regression analysis were run in order to confirm this. A T-test confirmed that female participants were more likely to experience CT ($M = 6.83; SD = 2.06$) than male participants ($M = 6.07; SD = 1.96$), $t(245) = -2.45, p = .02$ (values are reported in square roots of the original scores).

Regression. While Gender was found to explain part of the variance, although minimally ($Gender \beta = .14, t(246) = 2.32, p = .021, pr^2 = .02$), this was not included in the model as controlling for it might cause loss of relevant information. Bootstrapping was set at 5000 considering the not-normal distribution of some of the data.

Model 1 – demographics

$F(2,247) = 5.96, p < .01, R^2 = .05$ – When predicting PLE, five percent of the variance is due to demographics (age and education).

$Age \beta = -.14, t(247) = -2.27, p = .02, pr^2 = .02$ - An increase in age corresponds to a decrease in PLE.

Education $\beta = -.16, t(247) = -2.52, p = .01, pr^2 = .02$ – An increase in the education level corresponds to a decrease in PLE.

Model 2 – Childhood trauma and Theory of Mind (controlling for demographics)

$\Delta F(2,245) = 31.44, p < .001, \Delta R^2 = .20$. This means that 20 percent of the variance is due to CT and ToM. 24 percent of the variance is due to the combination of demographics and variables analysed.

CATS $\beta = .44, t(245) = 7.84, p < .001, pr^2 = .20$ – At higher CT corresponds more PLE.

RMET $\beta = -.051, t(245) = -.92, p = .36$ – ToM is not a significant predictor of PLE when age, education and CT are controlled for.

The conclusion is therefore that ToM, as measured by the RMET, is not associated to the presence of PLE.

Mediation. For the sake of completeness, it was checked whether RMET mediated the effect of CATS on PDI. The results indicated that CT was a significant predictor of PLE $b = .61, t(248) = 7.92, p < .001$, while ToM was not $b = -.04, t(247) = -.99, p = .32$. These results do not support the mediational hypothesis. The indirect effect was tested using a bootstrap estimation approach with 50000 samples (Hayes, 2017). These results confirmed that the indirect coefficient was not significant, ($b = .003, SE = .01, 95\% CI = -.01, .02$). This means that there is no certainty that the indirect effect of CT on PLE via ToM is different from zero. These results do not support the first hypothesis that affective ToM is a mediator of the relationship between CT and PLE. These results are summarised in Figure 1.

INSERT FIGURE 1

Second Hypothesis

Internal consistency reliability. This analysis was run on the subscales of the three questionnaires implemented. For the subscale Neglect of the CATS, Cronbach's α was .92 while Cronbach α for the subscale sexual abuse was .86. In regard to the PDI, the Cronbach α for the subscale Paranoia was .81 while for the subscale Hallucinations was .76. Corrected Item-Total correlations were all acceptable (i.e. $r > .3$). In regard to the RMET, the Cronbach α for the positive subscale was .94, however the first item of the scale did not correlate with the others. While removing this item would improve α it was decided against it given the already high value. For neutral and negative subscales, α was .96. The subscales implemented in the analysis were consistent and reliable for the sample implemented. To summarise, while most scales were found to present with an excellent internal consistency, the sub-scales for paranoia and sexual abuse were found to be of good internal consistency and the sub-scale for hallucinations was found to be of acceptable internal consistency, presenting with the lowest coefficient.

Assumptions. To explore the relationship between specific CT and specific PLE, the same analysis was run including the following variables; sexual abuse and neglect as measured by the CATS, paranoia and hallucinations as measured by the PDI. However, while transformations were found to be effective with neglect and paranoia in making their distributions closer to normality, none of the transformations attempted on sexual abuse and hallucination were successful, therefore the original scores of all sub-scales were used in these analyses. Based on the hypothesis, the effect of ToM on the association between neglect and paranoia and on the association between sexual abuse and hallucinations were explored.

Correlations and regressions. Spearman's correlations of these variables were presented in Table 3.

INSERT TABLE 3

A significant positive correlation was found between neglect and paranoia ($r = .42, p < .01$) and neglect and hallucinations ($r = .23, p < .01$), showing that as higher neglect in childhood corresponded with higher experience of paranoia and hallucinations. Similarly, a significant positive correlation was found between abuse and paranoia ($r = .37, p < .01$) sexual abuse and hallucinations ($r = .23, p < .01$). The RMET, its selected subgroups did not correlate with any of the variables included. Interestingly, education correlated negatively with paranoia ($r = -.17, p < .01$) meaning that participants with higher levels of education were less likely to be experiencing paranoia. Age did not correlate with any of the variables (except with education levels, which is an obvious result) Again, multicollinearity was not a problem as target variables' correlations were under 0.7 and variance inflation factors never above 1.5. Given the lack of significant correlations of the variables associated to the RMET, it can now be concluded that RMET did not mediate the association between neglect and paranoia. For the sake of completeness, RMET was included in a linear hierarchical regression, which confirmed that RMET was not a significant predictor of paranoia ($\beta = -.074, t(244) = -1.30, p = .19$)

Summary

Contrary to what was predicted by the hypothesis, the association between CT and PLE, as well as the association between neglect and paranoia, was not mediated by affective ToM. Furthermore, affective ToM was not a predictor of PLE or paranoia.

Discussion

The aim of this research was to explore the role that the affective component of ToM (a fundamental process of social cognition), has in the association between CT and PLE. Contrary to the first hypothesis, in the non-clinical population, represented by a sample recruited through

social media, the affective component of ToM did not mediate the association between CT, as measured by the CATS, and PLE, as measured by the PDI. Furthermore, affective ToM was not a significant predictor of PLE.

This is consistent with recent studies (Couture et al., 2010; Sachse et al., 2014; Scherzer, Leveille, Achim, Boisseau, & Stip, 2012), which found that the RMET does not distinguish between non-clinical controls and individuals experiencing psychosis. This research was also in line with studies that found ToM not to be associated with PLE in non-clinical samples (e.g., Jahshan & Sergi, 2007). However, several studies have found RMET deficits in individuals experiencing psychosis (Craig, Hatton, Craig, & Bentall, 2004; Irani et al., 2006; Kettle, O'Brien-Simpson, & Allen, 2008). Furthermore, these results contrasted with Combs et al. (2006), where people with paranoia found it more difficult to identify certain emotional states based on their valence. Moreover, it conflicted with previous studies which found that performance on the RMET was associated to PLE (Henry et al., 2008; Meyer & Shean, 2006) in a non-clinical sample. The findings of this research seem to support Fernyhough, Jones, Whittle, Waterhouse and Bentall (2008) who, using a similar sample, concluded that ToM is not associated to PLE in the non-clinical population.

Contrary to the second hypothesis, affective ToM was not associated with the measures implemented. In particular, the association between neglect and paranoia is not mediated by affective ToM. Relating to specific experiences of CT predicting specific symptoms of psychosis as presented by Bentall et al (2014), results from this study demonstrate further support for this argument in a non-clinical sample. That is, childhood neglect was a predictor of paranoia in adulthood. However, childhood sexual abuse and hallucinations were not associated, this being in contrast with other studies (e.g. Sitko et al., 2014). The RMET was not intercorrelated to any

of the variables implemented, confirming that in the non-clinical population affective ToM is not associated to specific pathways in the association between CT and PLE. These results cannot be directly compared to other findings as, to the knowledge of the principal investigator, this study represented the first attempt to explore the role of affective ToM in specific pathways of the association between CT and PLE.

Interpretation of the Findings

In order to explain these results, two important factors had to be taken into consideration, specifically, the characteristics of the sample and of the questionnaires used. While steps were put in place in order to obtain a diverse and representative sample, after exclusions of participants that did not meet criteria, this was not accomplished. That is, a vast majority of white (84.80%), female (77.60%) and never married (74%) participants were not considered as a representative sample. Furthermore, the sample represented an unlikely high number of individuals either with Master's (25.60%) or doctorate level (13.20%) education. Possibly because of the unusual characteristics of the sample, the questionnaire results were not consistent with previous studies.

The level of PLE was found to be lower than previous studies by Jones and Fernyhough (2007) and Peters, Joseph, Day and Garety (2004), which found score means of 49.24 and 58.9, respectively, in comparison to the score of 51.60 of the sample implemented in this study(it is important to consider that the questionnaire implemented had three additional items and therefore the scores were expected to be higher). This may be due to the higher levels of education of the sample implemented, which were found to correlate with lower levels of PLE. On the contrary, the levels of CT were higher than expected. The mean score of the sample included was 48.81 was closer to individuals with remitted hallucinations (46.19) than controls

(23.35) in Varese, Barkus and Bentall (2012), and much higher than the one found in older studies using this measure in non-clinical subjects (Kent & Waller, 1998; Sanders & Becker-Lausen, 1995). Perhaps CT is now more publicised than it used to and therefore more socially unacceptable, so people feel more able to talk about their experiences. Regarding affective ToM performance, the mean of 27.39 was similar to what was found in the control groups of previous studies (Craig et al., 2004; Prevost, Brodeur, Onishi, Lepage, & Gold, 2015). Despite the nature of the sample, expected patterns in terms of relationships between demographics and questionnaires were found. PLE diminished with age, as found by Mata, Mataix-Cols and Peralta (2005). Female participants were more likely to experience CT, which was in accordance to previous studies (Kent & Waller, 1998; Sanders & Becker-Lausen, 1995).

The characteristics of the sample had one main effect on the data. Due to the low scores on PLE, data distribution was significantly positively skewed, hinting at a floor effect. This may have limited statistical power and therefore may be one of the reason for the non-significant findings. This lack of an effect is even more inflated by the high scores on CT found in the sample. However, paranoia and neglect were normally distributed, so the lack of effect cannot be entirely explained by the abnormal distribution of the data. Therefore, the fact that RMET did not mediate the relationship between neglect and paranoia, nor was found to be a predictor of paranoia, suggests that in the non-clinical population (with the characteristics described in the sample implemented), performance on affective ToM is not impacted enough by having experienced CT to have an effect on PLE.

The characteristics of the questionnaires used must also be taken into consideration. While Meyer and Shean, (2006) used a specific scale for determining a PLE, specifically magic-like thinking, in this study a more generic scale was used. PLE could be investigated by

implementing questionnaires designed for specific PLE, such as the paranoia scale (Fenigstein & Vanable, 1992) for the experience of paranoia, or by the means of a more generic scale which provide with an overall score and sub-scores for specific PLE estimated by a few items, such as the PDI. The RMET might be specifically associated to certain PLE and not others, and a generic questionnaire like the PDI may not be sensitive enough to pick up on such associations. As found in a meta-analysis investigating the relationship between RMET and Paranoia (unpublished data; see previous section), a significant association was more likely to be found when a specific measure for paranoia rather than a generic measure for PLE was used.

The PDI is a generic measure and even if internal consistency was found to be adequate, the construct validity of the dimensions analysed may not have been appropriate for this kind of study. Specifically, the sub-scales paranoia and hallucinations were constituted respectively of four and three items, making them less likely to be sensitive to the constructs they were intended to measure. In particular, in the sample implemented the non-normal distribution of the data on hallucinations (which was also found to be the variable with lower internal consistency) and sexual abuse might have caused the lack of relationship between these two variables. Indeed, the PDI was found to be best used with a unidimensional scoring system rather than implementing specific components as the internal reliability of these was at least debatable (Jones & Fernyhough, 2007). However, Henry, Bailey and Rendell (2008) found an association using a generic questionnaire. This lack of replicability seems to be due exclusively to the uncommon scores of the sample. At any rate, the results suggest that performance on affective ToM does not predict the overall level of PLE. That is, when implementing a general measure for PLE or specific PLE are explored by using a few items on a general scale, the RMET does not explain why individuals experience PLE.

Despite this and the fact that all the results seems to indicate that ToM is not involved in the development of PLE as a consequence of CT, at least in the non-clinical population, this would be inaccurate. RMET is widely considered a test of affective ToM, rather than cognitive ToM (e.g., Bodden et al., 2010). ToM deficits in relation to PLE (in this case paranoia) have been found to be related to making external personal attributions for negative events (Taylor & Kinderman, 2002). This tendency may reflect more a cognitive component, in which intentions have to be inferred, rather than relying on affect perception. Based on the literature available and the results of this research, affective ToM, as a more basic form of ToM in comparison to more cognitively loaded mental functions of social cognition, is not affected enough by CT in a non-clinical population for mediating its association with PLE. The non-clinical population level of difficulties might not be extensive enough to be picked up by the RMET.

Limitations, Future Research and Clinical Implications

Besides the characteristics of the sample and the properties of the questionnaires implemented, certain further limitations of the study were considered. First, this study was underpowered with regards to small effect sizes and there was a risk of type two error. Indeed, articles which found a correlation between RMET and PLE in the general population reported small effect sizes. Henry et al. (2008) reported a weak correlation ($r = -.20$) comparing the RMET with a generic PLE scale, while small effect sizes were reported regarding an association between RMET and specific PLE, such as paranoia ($r = -.14$) (Gavilan & Haro, 2017) and non-realistic belief ($r = -.28$) (Meyer & Shean, 2006). Furthermore, in the literature, conclusions on the relationship between hallucinations and sexual abuse were inferred from much larger samples, with Sitko et al. (2014) assessing these variable on 5877 participants. Possibly, implementing a more diverse and larger sample would have resulted in a significant,

albeit small, effect of RMET on PLE. A larger sample may also have helped with non-normal distributions (given that bootstrapping was implemented in order to deal with lack of normality).

Recruiting through social media without further control on participants may have led to the recruitment of an unrepresentative sample. Specifically, there was a considerably high proportion of master and doctorate level students in which likely higher cognitive components may have compensated for PLE. While education was controlled for, the analyses did not control for IQ. It is also of relevance to consider the fact that once a questionnaire is converted to an online format, the parametric properties of the test may change. However, as found by Riva, Teruzzi, & Anolli, (2003), this does not seem to be the case, what do change are the characteristics of the sample which access online questionnaires respect to traditional offline ways of collecting data, as also found by this study. Further discussion on the limitations of this research can be found in the critical appraisal section of this thesis.

Future research could focus on further exploring the role of affective ToM in the association between CT and PLE. It would be interesting to explore whether an effect is present when the sample has experienced higher levels of PLE.. Furthermore, it would be interesting to explore whether performance on the RMET is associated to PLE when measures designed for specific PLE, such as paranoia and hallucinations, are implemented instead of a more general questionnaire like the one used by this study. Lastly, components or sub-components of social cognition are not well defined and their boundaries unclear, so there is uncertainty regarding what the RMET actually measures. This would provide an exciting area of research. Further discussion on potential research can be found in the critical appraisal section of this thesis.

Although the results did not support the hypotheses outlined, clinical implications can still be drawn from this work. Affective ToM may not be a relevant target for psychological

interventions for people who are experiencing PLE. In mentalisation based treatment and ToM training, clinicians may want to focus more on other aspects of ToM, such as the cognitive component.

Conclusion

Affective ToM did not appear to be related to the association between CT and PLE in the general population. Deficits in affective ToM were not confirmed a predictor of PLE. Furthermore, affective ToM does not seem to be relevant to any specific pathways, the association between neglect and paranoia and the one between sexual abuse and hallucinations is not explained by deficits in the affective component of ToM. However, caution needs to be taken when considering these conclusions. The unusual characteristics of the sample and the nature of the questionnaires implemented may have affected these results considerably and this is important information for future research. Further research is necessary to explore the role of social cognition in the association between CT and PLE.

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Figures and Tables

Table 1

Participants Demographics and Clinical Characteristics

	n	%
Gender	250	
male	53	21.20%
female	194	77.60%
other	3	1.20%
Race		
White	212	84.80%
Black	1	0.40%
Asian	6	2.40%
Other	31	12.40%
Education Level		
GCSE	17	6.80%
A levels	19	7.60%
Bachelor's Degree	99	39.60%
Master's Degree	64	25.60%
Doctorate	33	13.20%
N/A	18	7.20%
Marital status		
Married	54	21.60%
Widowed	1	0.40%
Divorced	6	2.40%
Separated	4	1.60%
Never married	185	74.00%
	Mean	SD
Age (years)	30.58	9.04
CATS, of which		
Total	48.81	28.48
Neglect scale	20.07	12.06
Sexual abuse	2.52	3.91
RMET, of which		
Total	27.23	3.57
Positive	6.21	1.38
Neutral	11.91	2.13
Negative	9.11	1.76
PDI, of which		
Total	51.60	40.47
Hallucinations	3.27	6.55
Paranoia	16.96	12.95

Table 2

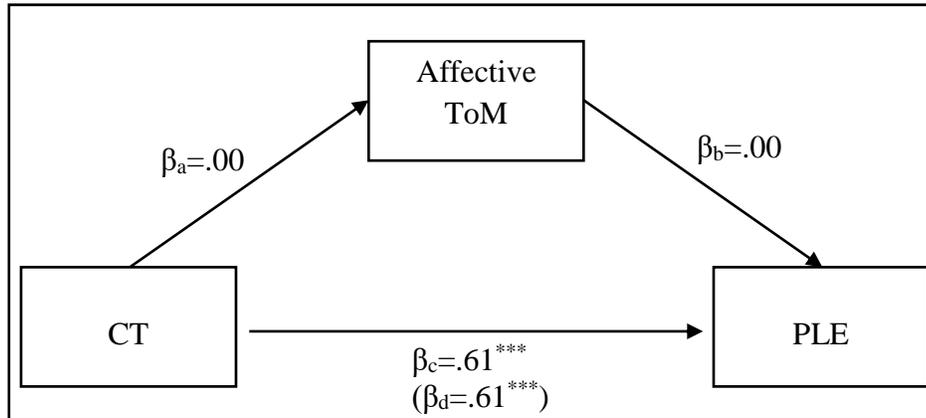
Spearman's correlations of factors entered in the first model

	Age	Education	CATS	RMET
Education	.14*	-		
CATS	0.00	-0.09	-	
RMET	-0.10	0.09	0.03	-
PDI	-.16*	-0.20**	.47**	-0.21

Note. *p<.05 **p<.01

Figure 1

Mediation model.



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

Table 3

Spearman's correlations of factors entered in the second model

	Age	Education	RMET	Positive	Neutral	Negative	Neglect	Sexual abuse	Paranoia
Education	.14*	-							
RMET	-.01	.09	-						
RMET Positive	-.01	.00	.46**	-					
RMET Neutral	-.03	.04	.79**	.19*	-				
RMET Negative	.02	.12	.65**	-.03	.24**	-			
Neglect	-.03	-.08	-.01	-.10	.02	.03	-		
Sexual abuse	.05	-.07	.02	-.10	.11	.02	.59**	-	
Paranoia	-.09	-.17**	-.05	-.12	-.02	-.02	.42**	.37**	-
Hallucinations	-.08	-.11	-.04	-.19	.02	.00	.23**	.23**	.33**

Note. *p<.05 **p<.01

Appendices

Appendix A

Notes for contributors

Author Guidelines

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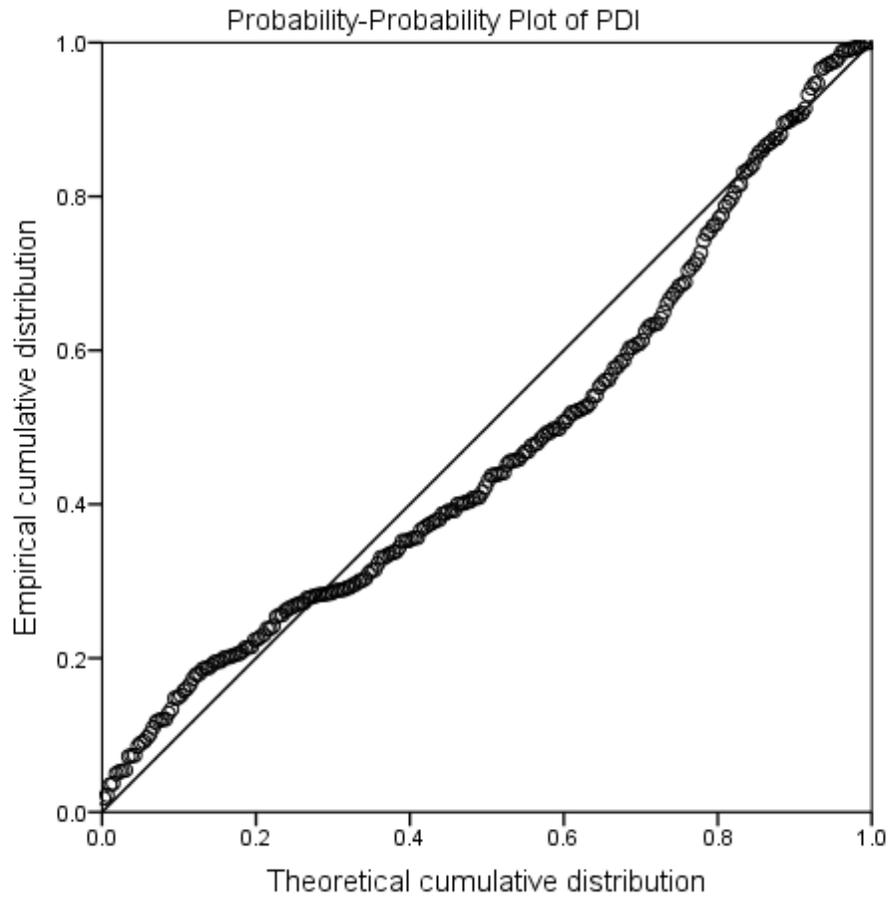
Appendix B

Three hallucinatory items (adapted from van Os et al., 1999)

- Do you ever hear voices in your head?
- Do you ever hear voices giving you commands in your head?
- Do you ever hear voices conversing in your head?

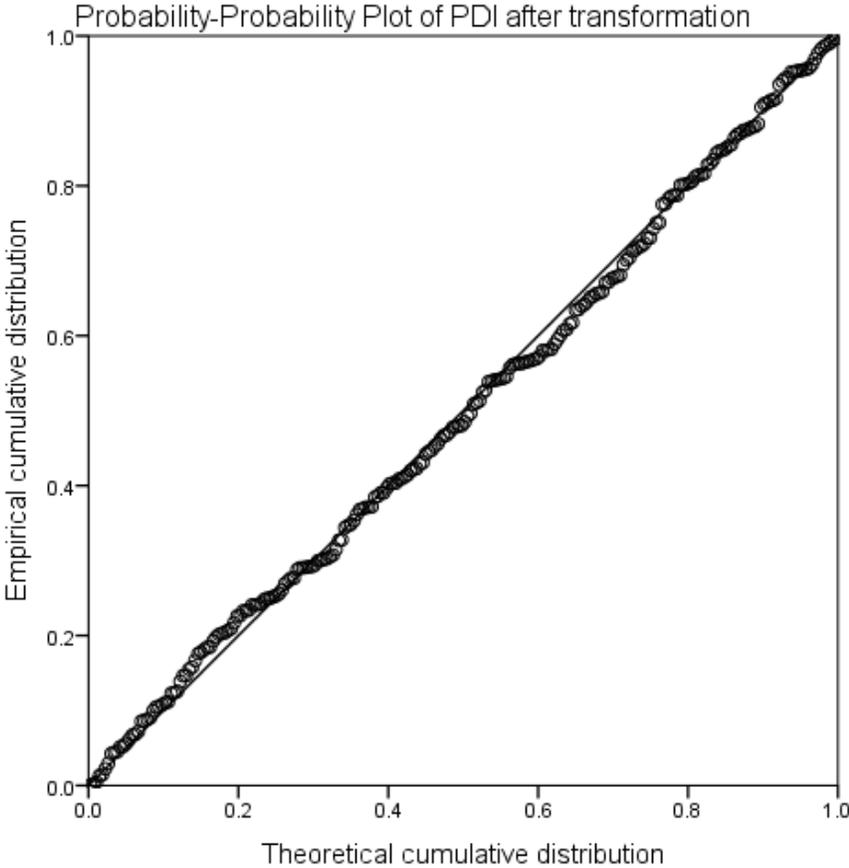
Appendix C

Distribution of the standardised residuals before transformations.



Appendix D

Distribution of the standardised residuals after transformations, the data are suitable for regression and mediation analyses.



Critical Appraisal



Matia Monastra

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Word count: 3600 (excluding tables, figures and appendices)

A systematic literature review and meta-analysis of the studies which implemented the Reading the Mind in the Eyes Test (RMET; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) and analysed its association with the experience of paranoia showed that deficits in RMET are associated with high levels of paranoia. This effect was clear when a specific measure for paranoia, such as the paranoia scale (Fenigstein & Venable, 1992), was implemented. However, in the cases in which paranoia was measured from a few items of a wider scale, such as the Positive And Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opfer, 1987), no association was found between the measures. The quality of the papers analysed was considered acceptable, with some exceptions.

An analogue study exploring the mediation of the affective component of Theory of Mind (ToM), as measured by the RMET, on the association between Childhood Trauma (CT), as measured by the Child Abuse and Trauma Scale (Sanders & Becker-Lausen, 1995), and Psychotic Like Experiences (PLE), as measured by the Peters et al. Delusions Inventory (Peters, Joseph, & Garety, 1999), found no mediation effect. Furthermore, affective ToM was not a predictor of PLE in the study population. Affective ToM did not mediate specific pathways and while it was found that neglect predicted paranoia, none of the subscales implemented seemed to predict hallucinations. However, in order to interpret these results, a number of limitations had to be taken into consideration.

In order to identify the strengths and limitations of the research, the Newcastle-Ottawa Quality assessment scale (Wells et al., 2000), adapted for cross sectional studies (Modesti et al., 2016), was implemented for assessing the quality of the research paper. This was the same scale implemented for assessing the quality of the papers identified by the review. Comparing the research papers with similar papers implementing the same scale would provide an idea of where

the research paper stands in terms of quality in the literature. The research paper obtained five stars out of eight, showing an acceptable quality level.

The missing stars belonged to the selection section. While this paper was found to have put in place strategies to have a sample which was somewhat representative of the average in the target population by using non-random sampling, the characteristics of the sample were found to be a clear confounder for this study. Furthermore, the response rate was unsatisfactory and comparability between respondents and non-respondents could not be performed. Lastly, this paper implemented a general measure for measuring target constructs, which may have limited the study sensitivity to the target variables. However, this paper scored maximum on comparability, as the study controls for all relevant variables (gender, age, education). This paper also achieved the maximum score on outcome, as the statistical tests used to analyse the data were clearly described, appropriate, measures of associations presented, including confidence intervals and the probability levels where required.

Strengths

The research paper was an analogue study, that is a study in which the non-clinical population serve as a proxy for the relevant clinical population. In this research, a non-clinical sample has been recruited having in mind a target population experiencing psychosis. This process was justified, as PLE are common in the general population and it has been proposed that psychosis experiences are likely to be part of a continuum between a clinical and non-clinical population (van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). This is a strength as it allows research to be conducted with participants without going through lengthy ethical procedures, be less likely to upset participants, who are already struggling due to their psychosis related difficulties, and obtaining wider sample size which allow more precise

statistical analysis. Unfortunately, implementing a non-clinical sample caused a number of limitations which are described later.

The use of strict statistical analysis procedure was considered to be a strength of this paper. Choices were consistently made using statistical validity as the main criteria, rather than looking for significant effects. Data were analysed exclusively based on theoretically derived hypotheses, no further analyses were performed allowing for “fishing for results”, a practice which has been found to hinder conclusion validity (Wester, 2011). Analyses were conducted adhering to the statistical assumption underlying the tests and results were interpreted with these in mind, stating when conditions such as power and normal distributions were not met. Furthermore, outliers were chosen to be removed even when their inclusion would be likely to help confirm hypotheses. While this may have affected the ability of the study to find results which are more likely to be publishable, it provided confidence in the findings’ replicability and generalisability.

It is thought that the crisis in psychological research in the last decade was due to publication bias, an issue in which an interest in finding significant results lead to a lack of articles being published in which non-significant results were found instead or which were replications of older studies (Nosek & Lakens, 2014). As a result, the knowledge about entire areas of research could be biased as relevant results simply are not accessible because they were never published. Therefore, a strength of this study lies in being able to detail all characteristics that lead to a non-significant result, allowing replicability and inspiring further research, rather than adapting its hypotheses to fit with more appetising results. If the research study will be published, there will be a new and replicable piece of evidence in the literature; that is, in a general sample recruited through social media and in which all individuals with mental health

conditions were excluded, the RMET is not associated with PLE and does not mediate the association between CT and PLE when PLE are measured through a general scale.

Limitations

The most relevant limitations of the research paper were the characteristics of the sample and the nature of the questionnaires used. The statistical analyses were not powered enough to detect small effect sizes and the remaining sample's characteristics were unusual. The lack of power made it impossible to determine the true effect of affective ToM in the association between CT and PLE. Specifically, the idea that affective ToM is a mediator of this relationship or a predictor of PLE cannot be completely rejected. It might be possible that an effect exists, whilst small. Furthermore, the sample had very high levels of education and CT, while presenting with low levels of PLE, besides other unusual characteristics.

Possibly, this was due to using social media. While social media have been extensively used for advertising research, this is still a new methodology, for which the advantages and disadvantages need to be understood. While an important advantage to the project was to access an extensive sample in a relatively short amount of time, there was minimal control on the target population this would reach. Possibly, individuals who are likely to participate to research projects online are also individuals who have a specific interest in the matter, for example academics. This may explain the high educational levels of the sample implemented. Furthermore, considering that the principal investigator is a trainee clinical psychologist, it is likely that a substantial minority of the sample was constituted by fellow clinical psychologist trainees, which are expected to present with unusually high levels of affective ToM, this further contributing to masking significant results.

However, while reasons for the lower level of PLE were addressed in the ethical issues, the higher level of CT of the sample were more difficult to explain. A possible reason would be that the data to which the sample was compared against were developed in the early 2000s. Thanks to a decrease in stigma in relation to abuse, people may feel more able to talk about adverse experiences or to accept these have occurred. Conversely, experiences which were considered normal in the past, are more likely to be experienced as abuse now that media report more of this. Regardless of the reasons, the unusual characteristics of the sample implemented may have affected results, and this needs to be taken into consideration when attempting replicability and at the time to interpret results.

Another important limitation of the research study, is the use of a general scale for PLE in order to assess specific symptoms, such as paranoia and hallucinations. Results from the systematic literature review confirmed that when implementing a few items of a general scale in order to measure paranoia, it is less likely to find association with other measures. This is probably because the sub-scales are not sensitive enough. Unfortunately, at the time the results of the review became clear, the data collection process was far too advanced to change the questionnaires implemented. A generic scale was chosen for its convenience: a shorter questionnaire for participants and a readily available overall measure, however in hindsight specific measures would have been implemented instead. Based on the review results, if in the research study a paranoia-specific measure was implemented, an effect of RMET on paranoia would have been more likely to be found. This is an important finding which should inform further research.

Further Research

Further research in the area should focus on the issues highlighted. Firstly, it would be interesting to investigate whether the RMET mediates the association between CT and PLE when the sample implemented is more likely to have experienced PLE or affective ToM deficits. This can be achieved by applying for the national health service ethics approval and including a sample with a wider range of experiences. In order to have a more representative sample in terms of education, participants could be excluded randomly from over-represented groups. For example, in the case of the research study, the group of individuals with a doctorate would have been reduced in number. This process, apart from allowing for a better understanding of the relationship between CT, PLE and affective ToM in both the general and the clinical population, would highlight how methodological differences affect results. This would be achieved by comparing effect sizes of dividing the sample into two groups based on the presence of a diagnosis (mean differences) and by considering mental health difficulties as part of a continuum and including any possible participant (correlation).

Second, based on the results of the meta-analysis, it would be interesting to investigate whether the RMET mediates the association between CT and PLE when specific measures for PLE were implemented instead of a general scale. For paranoia for example, authors implemented either the paranoia scale (Fenigstein & Venable, 1992) or the Green Paranoid Thoughts Scale (Green et al., 2008), with the former resulting in wider effect sizes. For hallucinations, the newly revised version of the Launay-Slade Hallucinations Scale (Larøi, Marczewski, & Linden, 2004) found effective in exploring experiences of hallucinations in the non-clinical population, could be implemented. Analysing the relationship of these scales with the RMET in the general population would clarify the results reported in the research paper.

These would also provide information regarding which specific pathways are affected by affective ToM. Furthermore, these can be compared directly against sub-scales of more general scales such as the PANSS, the results informing on sensitivity.

Lastly, another interesting line of research, possibly the most interesting one, would be around the exploration of the psychological constructs assessed by the RMET. The RMET has been considered as a general test of ToM (e.g. de Achával et al., 2010), general “emotion recognition” (Harrison, Sullivan, Tchanturia, & Treasure, 2010), emotion perception (Oakley, Brewer, Bird, & Catmur, 2016), “cognitive empathy” (Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004), “the affective component of ToM” (Brown, Tas, Can, Esen-Danaci, & Brüne, 2014), “the social-perceptual component of ToM” (Wang, Wang, Chen, Zhu, & Wang, 2008) and possibly others. This means that either there is no clarity about what the test actually measures or the boundaries of different social cognition domains are not well defined or understood. Therefore, the authors are making different assumptions about what they are measuring. Research examining the former issues could include a review and meta-analysis of all the studies in which the correlation between RMET and other tests of social cognition was provided and the brain regions which are activated during performance on these tests. By cross-referencing results, it would become clearer what the RMET measures, as wider effect sizes would be reported by the more representative tests and activated brain regions. However, studies examining the second issue, whether the nature of different components and sub-components are understood and their boundaries clear, would be far more complex to design.

Personal Reflections

An interesting and unexpected outcome of working on this project was the need to explore the nature of the variables implemented. Through the systematic literature review

process, it was observed that in the literature there is a tendency to make inferences regarding psychological constructs, such as ToM or paranoia, without exploring the nature of the measures implemented. For example, when exploring the literature, it becomes clear that the relationship between ToM and paranoia were explored using tests measuring quite different psychological constructs. General inferences about their association were made with tests exploring cognitive ToM, affective ToM, paranoia as a complaint, paranoia as part of a diagnosis and on occasions not even evaluated through formal assessments. However, conclusions did not seem to discriminate between these different concepts. Therefore, it is not surprising then that there is controversy about the relationship between ToM and PLE, when the tests implemented, measure such different variables.

While this project set out to explore the mediation role of social cognition in the CT and psychosis association, it soon became clear that not only was the paper non-encompassing the complexity of social cognition, but also ToM. Finally, when Affective ToM became the target variable, there were also doubts about whether this was actually the concept explored. Therefore, a positive outcome of this research was to identify and specify this issue and provide more clarity about the psychological constructs implemented. However, it leaves one wondering if this is an issue common in psychological research rather than exclusive for the variables implemented in this thesis.

While this study obtained an overall score of five (out of eight) on the Newcastle-Ottawa Quality assessment scale, it is important not to confound quantity and quality. Interpreting the score of this kind of scale quantitatively may cause important information to be overlooked. The weight of individual items of the scale may differ in terms of overall quality. Furthermore, it has been argued that using scores of this scale for reviews may produce arbitrary results (Stang,

2010). Interestingly, this study is a clear example of how the weight of individual items of the scale may differently impact on the overall quality of a paper. While the research paper's selection procedures were clearly described, the resulting sample was unrepresentative. While this only accounted for one star on the scale, the consequences on the overall quality of the paper were so severe, that a considerable amount of work went into exploring and analysing the specific characteristics of the sample in order to provide a valid interpretation of the findings. This fact provides further evidence that these kinds of scales should be used to explore qualitative information rather than implementing quantitative scores to compare different papers.

The limitations and considerations of the review inspired further reflections. Besides the ones already discussed in the article, an important limitation was the fact that when the included research papers' authors were asked to provide the present author with data in order for this to be entered in the meta-analysis, they did not answer the request or were unable to access the data. One of the reasons for which no significant differences were found between sub-groups was the reduced number of participants and articles analysed that this caused. Interestingly, the very lack of cooperation from authors of published research can be a limit to the amount of information which can be inferred by a meta-analysis. Furthermore, there was an almost complete lack of studies implementing a non-clinical sample, showing how implementing selection criteria based on pre-determined diagnosis, and not consider PLE as part of continuum, can be a limit to the amount of information inferable from research. While these studies provide information about specific PLE in people who have received a diagnosis, it is unclear how PLE present in non-clinical sample or even in the control groups of said studies. The research paper tried to fill this gap.

Conclusion

Although interpreting the research study was limited by certain practical considerations in order to be conducted correctly, it is thought to be of acceptable quality when a quality assessment scale is used as part of the evaluation process. The strengths of this paper were considered to be its analogue nature, the strict statistical analysis used, the effort to highlight the importance of non-significant results and the recognition of an issue in the way psychological constructs have been defined or conceptualised in the literature. The limitations were found to be in numbers; too few participants in the sample with very unusual scores, too few items in the sub-scales identifying specific PLE, too few articles implemented in the meta-analysis. Further research should concentrate on exploring the association of RMET and specific PLE with specific scales and including sample with mental health difficulties. Furthermore, an exciting and misunderstood area of research is open to exploration, there is a clear need for a robust understanding of social cognition components, their boundaries and the tests which measure them.

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Ethics Proposal



Matia Monastra

Trainee Clinical Psychologist

Division of Health Research

Approval letter (latest)



Applicant: Matia Monastra
Supervisor: Bill Sellwood
Department: Health Research
FHMREC Reference: FHMREC17111

13 August 2018

Dear Matia

Re: Is the relationship between trauma and psychosis mediated by social cognition? An analogue study

Thank you for submitting your research ethics amendment application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for the amendment to this research project.

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Tel:- 01542 593987

Email:- fhmresearchsupport@lancaster.ac.uk

Yours sincerely,

A handwritten signature in black ink that reads "R.E. Case".

Becky Case
Research Ethics Officer, Secretary to FHMREC.

Research Materials

Thesis Research Protocol



***Title:** Is the relationship between trauma and psychosis mediated by social cognition? An analogue study*

Applicant: Matia Monastra (Trainee Clinical Psychologist, Lancaster University)

Supervisor: Professor Bill Sellwood (Programme Director, Lancaster University)

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The fact that childhood trauma (CT) and psychosis are associated is largely accepted (Read, Fink, Rudegeair, Felitti, & Whitfield, 2008; Varese et al., 2012). The biological underpinnings of this association are ascribed to the effects that CT has on the developing brain, enhancing vulnerability to psychosis (Kilcommons & Morrison, 2005). One area of research concerning this association has reported that vulnerability to psychosis might be triggered by the dissociative response the brain has to CT (Read, Perry, Moskowitz, & Connolly, 2001). As a result of, or alongside this process, it seems that a multitude of variables impact on this complex relationship including quality of life and social cognition (Green et al., 2011). Social cognition refers to the cognitive and emotional abilities required to understand and predict other people's mental states and behaviours (Adolphs, 2009). It is a complex concept including reference to Theory of Mind (ToM), emotional processing, social perception and attributional style (Green & Horan, 2010). While conceptually related, the different components of this construct may have separate neural underpinnings, as is the case for ToM and emotional processing (C. D. Frith & Frith, 1999; U. Frith & Frith, 2001) implying that their impact on psychosis might differ.

Brüne (2005) found sufficient empirical evidence that ToM, the ability to interpret one's own and other people's mental and emotional states, is specifically impaired in psychosis. Whether an impaired ToM accounts for the poor social functioning of individuals presenting with psychosis is still actively debated (Brüne, 2005), but research tends to show that this is the case (Roncone et al., 2002). Regardless, it has been established that child abuse is associated with poorer psychosocial outcomes per se (Lysaker, Meyer, Evans, Clements, & Marks, 2001). It follows that poorer psychosocial outcomes, as a consequence of child trauma, might be related to the development of psychosis.

It has been argued that different types of trauma might vary in their impact on the nature of psychosis (Heins et al., 2011; Sitko, Bentall, Shevlin, & Sellwood, 2014). For individuals experiencing psychosis, a history of sexual abuse in childhood seems to be related to hallucinations (Read, Agar, Argyle, & Aderhold, 2003) while neglect, the failure to meet a child's needs, seems to be associated with paranoia (Bentall et al., 2014; Bentall, Wickham, Shevlin, & Varese, 2012; Johnson, Smailes, Cohen, Brown, & Bernstein, 2000). It has also been found that childhood trauma might lead to neuropsychological deficits in adulthood (Majer, Nater, Lin, Capuron, & Reeves, 2010). The mediation effect of different variables changes depending on the type of trauma experienced. Different patterns of deficits in metacognitive components may lead to various mental health disorders because of differences in neuropsychological underpinnings (Lysaker, Dimaggio, Buck, Carcione, & Nicolò, 2007). It is therefore argued that social cognition might impact differently on individuals experiencing psychosis depending on the type of trauma experienced.

Considering ToM specifically, deficits have been found in individuals presenting with paranoid delusions (Craig, Hatton, Craig, & Bentall, 2004; Langdon, Siegert, McClure, & Harrington, 2005), specifically persecutory delusion-like beliefs. It is possible that this is because a person with ToM difficulties may find it more difficult to attribute the negative actions of others to situational circumstances (Bentall & Fernyhough, 2008). However, besides third-person auditory hallucinations (C. D. Frith, 2014) which are arguably closely related to paranoia, such a clear link between ToM and hallucinations has not been established. The development of hallucinations is more likely to involve sensory components which are not necessarily socially related. It is therefore of interest to ascertain how different variables might interact. In view of the evidence provided, it can be suggested that ToM may be related to the relationship between

neglect and paranoia, but not to the relationship between sexual abuse and hallucinating. Given the studies outlined above, it is surprising that this potential relationship has not been explored.

In line with recent research by Semerari, Carcione, Dimaggio, Nicolò and Procacci (2007) and Mancuso, Horan, Kern and Green (2011), it is suggested that social cognition, as a multi-component skill, may be an important mediator in the relationship between CT and psychosis. While ToM alone does not explain the complexity of social cognition, it has been chosen as a mediator for several reasons. First, questionnaires that explore all the components of social cognition do not exist. Second, ToM is widely considered as a vulnerability marker for psychosis (Bora & Pantelis, 2013). Third, controversy still exists about the idea that ToM is impaired in individuals presenting with paranoia (FERNYHOUGH, JONES, WHITTLE, WATERHOUSE, & BENTALL, 2008; RANDALL, CORCORAN, DAY, & BENTALL, 2003). Finally, no research has been conducted on ToM deficits in adults who have experienced neglect or sexual abuse as children. Understanding ToM specific modulation effects would provide a better understanding of psychosis.

To this end a range of variables will be measured through a series of online questionnaires provided to healthy participants, as non-clinical participants are often found to present with psychotic symptoms or closely related phenomena (Verdoux & van Os, 2002). A review analysing estimates of the prevalence and (one year) incidence of psychotic symptoms and experiences (Jim Van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009) reported a median prevalence of 5.3% and an incidence of 3.1% in non-clinical populations. While these overall measures might be considered a low signal to noise ratio when conducting research, higher percentages have been found when exploring specific psychotic experiences such as the ones investigated in this study. For example, Verdoux and van Os (2002) found that

25.5% of a non-clinical sample believed themselves to be persecuted in some way (paranoia) while 9.3% heard their thoughts echoing back to them (hallucinations). Based on these studies, it has been argued that psychotic symptoms lie on a continuum across non-clinical and clinical groups. Based on recent studies supporting this (Shevlin, McElroy, Bentall, Reininghaus, & Murphy, 2016), it is argued that healthy participants constitute an appropriate population for the study of this relationship.

Questionnaires were chosen to measure the presence of a variety of childhood traumas, level of ToM and presence of psychotic-like experiences, specifically hallucinations and paranoia. While research has examined the influence that different variables have on the relationship between CT and psychosis, there is no model which explores the mediation of social cognition components. A deeper understanding of the relationship between these variables may provide clinicians with a clearer rationale to investigate relevant experiences (Sitko et al., 2014). By having more points of access to someone's experience, clinicians can provide more effective therapeutic interventions.

The present study proposes that in the general population, ToM, as a fundamental process of social cognition (Lewis, Carpendale, Towse, & Maridaki-Kassotaki, 2010) mediates the relationship between CT and the occurrence of psychotic like phenomena. The hypothesis is that ToM mediates the relationship between CT and the presence of any psychotic phenomena. This study will also explore how different variables interact, analysing ToM's mediation effect on the relationship between different types of CT (sexual abuse and neglect) and psychotic-like phenomena (hallucinations and paranoia). It is expected that ToM mediates the relationship between neglect and paranoia, but not the one between sexual abuse and hallucinations.

Method

Design

The design is summarized as a cross-sectional, questionnaire-based, analogue study using regression analysis. The mediation model showing direct and indirect effects of the independent and dependent variables is presented in Appendix A.

Participants

Participants will be individuals aged 18 or over who have not been diagnosed with mental health or psychiatric disorders and who do not have any identified organic pathology (e.g. traumatic brain injury). These individuals will also have the capacity to consent to the study and be able to read and write in English. Participants will be mostly students. Based on the work of Fritz and MacKinnon (2007), for the data analysis outlined below, the sample sizes required (including a Type I error of .05 and power of .8), are between 403 and 427 (depending on β path's values). In order to draw inferences about the general population based on this study, adequate power for mediation analysis is required so an appropriate sample size has been calculated. Similar studies in the past have calculated an adequate sample size using the recruitment procedures described below, therefore the current sample size is considered realistic. However, if the numbers required by the power analysis are not reached, or mediation effects are not found, it will be possible to continue the study by using a simpler regression model.

Materials

Participants will complete a series of questionnaires examining the different variables described. Below is a description of each formal questionnaire and the variables that they measure.

CT (different types). The Childhood Trauma Questionnaire (CTQ) (Bernstein & Fink,

1998) consists of 28 items and is a self-report questionnaire which screens for any occurrence of CT. The areas assessed are emotional abuse, emotional neglect, physical abuse, physical neglect and sexual abuse. Its psychometric properties are as follows: test-retest reliability coefficients of 0.79 to 0.86, internal consistency coefficients of between 0.66 and 0.92 (Bernstein & Fink, 1998). Measures of emotional neglect will be related to the variable 'Neglect' while measures of sexual abuse will be related to the variable 'Sexual abuse'. Confirmatory factor analyses indicates that the items on the CTQ perform equivalently across differing maltreatment histories illustrating its ability to investigate individual components (Bernstein et al., 2003). A fee will need to be paid to obtain a license for the CTQ. The complete kit costs £163.71 including VAT. If the DClinPsy will not cover this fee, another appropriate but free questionnaire will be used, for example the Child Abuse and Trauma Scale (CATS; Sanders & Becker-Lausen, 1995) (Appendix B), after confirmation from the research director.

ToM. The "Reading the Mind in the Eyes" (Baron - Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) (Appendix C) consists of 36 items (photographs), showing the eye-region of the face of different individuals. The participant is asked to choose which of four words best describes the feelings of the person in the photograph. This is thought to show how well the participant "tune in" another person's mental state. A validation study (Vellante et al., 2013) showed an internal consistency (Cronbach's alpha) of .605 and maximal weighted internal consistency reliability of .719. Test-retest reliability was .833 (95% confidence interval=.745 to .902). The Principal Investigator (PI) will create an online adaptation. It is acknowledged that once the questionnaire is converted to an online format, the parametric properties of the test may change and this will be taken into consideration.

Psychotic-like experiences. A questionnaire including 24 items of delusional ideation

and hallucinatory experiences (J Van Os et al., 1999) (Appendix D) was created by combining the Peters et al. Delusions Inventory (PDI; Peters, Joseph, & Garety, 1999) and three items of hallucinatory experience previously used by Van Os et al. (1999). While the validity of self-reported psychotic experience has been questioned (Jablensky, 1995), this tool has been found appropriate to identify hallucinatory and delusional symptoms in non-clinical, clinical but not psychotic and psychotic populations (Verdoux & van Os, 2002).

Procedure

Recruitment. Participants will be recruited through both professional and academic contacts of the research team, contacting University Students directly (for example, Lancaster and Manchester University), and by advertising with professional networks and social media groups. If relevant research recruitment policies will be present for specific Universities or professional bodies I will contact, these will be examined and a request for recruitment submitted in the form suggested on these policies (such as email correspondence or social media). This process may be repeated with other Universities or professional bodies until the required sample size is obtained (see proposed analysis). As recruitment targets individuals who do not present with a specific condition and in order to make the sample representative of the population, individuals will be recruited from different professional areas and background as possible. No specific interest groups or NHS based groups will need to be contacted in the process. Individuals will be asked to complete a web-based survey through email. Once accepted, the survey questionnaires will be accessible through Qualtrics (Qualtrics, 2015) (or other survey software solutions) and advertised in line with the terms of Lancaster University. A similar approach has been used successfully, for example by Pickering, Simpson and Bentall (2008) and Fernyhough et al. (2008). A sample email which may be used is presented in Appendix E.

Potential participants will be able to access a link which will direct them to the Survey questionnaires. Furthermore, participants will be given the possibility to enter their email in order to be included in a prize draw. Prizes will consist of three Amazon vouchers of different value (50, 25 and 15 pounds).

Administering the measures. The web-based survey will be presented in 3 different sections. The first section comprises the participants' information sheet (Appendix F) in which information about the study will be provided. If participants are happy to give their informed consent, by ticking the relevant "I have understood and I am happy to participate to the study" box (which will be included in the survey), they will have access to the second section where demographic data will be gathered in order to ascertain degree of match with the inclusion criteria (Appendix G). Following this, the three questionnaires can be accessed. Once completed, participants will be thanked for their participation, a link to the participant information sheet provided for them to have future access if needed. The entire set of questionnaires is estimated to take 25 minutes to complete. Five more minutes will be needed to read the general information regarding the study background (and other relevant information, such as confidentiality procedures and information regarding possible support if considered necessary) (Appendix F). The CTQ is estimated to take five minutes by the college of psychology of the Nova Southeastern University (NSU, 2017), ten minutes required for the "Reading the Mind in the Eyes" questionnaire and five for the questionnaire measuring psychotic-like experiences. At the end of the questionnaire, a link will be provided for participants who would like to enter their email and been included in a prize draw.

Proposed Analysis

The data will be analysed using IBM SPSS Version 22.0 (IBM, 2013) using a

downloadable plug-in to run mediation analyses (PROCESS; Hayes, 2016). In a mediation model, the objective is to identify and explain the processes that underlie the relationship between an independent variable and a dependent variable, via the inclusion of a third hypothetical variable, known as a mediator variable. In this case, to explain the relationship between childhood trauma and psychotic-like experiences, theory of mind is included as the mediator variable.

After dealing with missing data, normality and homogeneity will be analysed. If data are not normally distributed, transformations will be attempted. The choice of the statistical mediation method of analysis will be based on data distribution characteristics. However, it is likely that mediation will be analysed through bootstrapping, as recommended by Preacher and Hayes (2008), for which the assumption of normality of the sampling distribution of the indirect effect does not need to be met.

If the assumptions for a mediation model are not met, e.g. α and β path's values between independent/dependent variables and mediators are not significant, a regression model exploring the interactions will be reported instead.

The data collected will look at a range of experiences usually present in healthy participants, as non-clinical participants are often found to present with psychotic symptoms or closely related phenomena, called psychotic-like experiences. For example, paranoia and hallucinations (examined in this study) are often experienced by individuals who do not experience psychosis (see introduction). If such experiences are not identified in the sample, this information will be equally important. By analysing social cognition characteristics and trauma experienced by the sample, it will be possible to investigate what has impacted on this.

Data Management Plan (DMP)

Data Collection

The data will be collected online using Qualtrics Research survey software (Qualtrics, 2015), an online survey platform, provided free of charge by Lancaster University for use by its students and staff. It uses Transport Layer Security encryption for all transmitted data safeguarding users data, meeting the general requirements set by the FISMA Act of 2002 (The United States' department of justice, 2002).

Storage, backup and security

The survey will be sent through anonymous surveys links or responses will be automatically anonymised and therefore the PI will be unable to track information that may identify respondents. This process makes the data entirely confidential. The results of the interview are automatically stored in the Data and Analysis section of the Qualtrics Research survey software in the account of the PI and therefore accessible only by the PI. The PI will transfer the information to an SPSS file which will be stored in the PI's Lancaster University personal file store; this is equipped with password-protected access. In the unlikely event the personal file store is lost or corrupted, data will still be accessible online as a copy of the database will be saved in Lancaster University's Box, a high-grade encryption online storage system.

For the participants who opted to be included in the prize draw, a distinct database will be created in which only email addresses will be stored. This database will undergo the same process outlined above but will be kept separate from the main database. This new database will be destroyed once the prizes have been distributed. In the event that a winner fails to claim their voucher, a new winner will be drawn again after one month. This procedure will be communicated to the winner in the same email in which the prize can be claimed.

Data Sharing

Data will be stored by the DClinPsy administration team in an encryption protected environment. Data will be retained for 10 years, following general recommendations. The data custodian will be Professor Sellwood.

Practical Issues

Considering the large sample size, recruitment may well be a problem, therefore, the research process will be started as soon as possible. In the event that one university alone cannot attract enough participants, two further universities will be consulted to accelerate the process. Advertising on social networks will also be undertaken as soon as possible.

Ethical Concerns

As the proposed research is an analogue study, no risk to vulnerable adults is foreseen. An analogue study is an experimental study in which participants closely resemble the target population. In this case, in order to investigate aspect of psychosis, the psychotic-like experiences of individuals who do not meet criteria for psychosis, are analysed.

However, it is acknowledged that the experience of abuse or psychosis may be a sensitive issue for certain individuals. Participants who complete the questionnaires might arrive at the conclusion that they have experienced trauma or psychosis and this could be distressing for them. Because of this, participants will be informed that they can stop completing the survey at any time. The data in questionnaires which have not been completed will be destroyed. A debrief sheet will also be provided at the end of the questionnaires. Information on how to receive help or support on issues arising from participation will be provided. Participants will have to confirm consent (Appendix I) after reading the participant information (Appendix F). The latter will include sample items from the scales to make it clear about the nature of the issues being studied.

Dissemination

The target journal for this study is the Psychiatry Research (homepage at www.elsevier.com/locate/psychres). This journal publishes short but complete research reports on the biochemical, physiological, genetic, psychological and social determinants of human behaviour. Psychiatric Research holds a CiteScore of 2.63, with an impact factor of 2.466. These factors would provide my research, if published, with the appropriate visibility for it to have an impact on current clinical practice.

Timescale

July 2017: Thesis Proposal submission

August 2017: Ethics proposal submission

October 2017: Introduction and methods for the systematic literature review (SLR)

October 2017: December (2017): Data collection

November 2017: Results and discussion of the SLR

December 2017: Final draft of the SLR

January 2018: Introduction and methods of the thesis

March 2018: Results and discussion of the thesis

April 2018: Final draft of the thesis

May 2018: Final submission of the thesis

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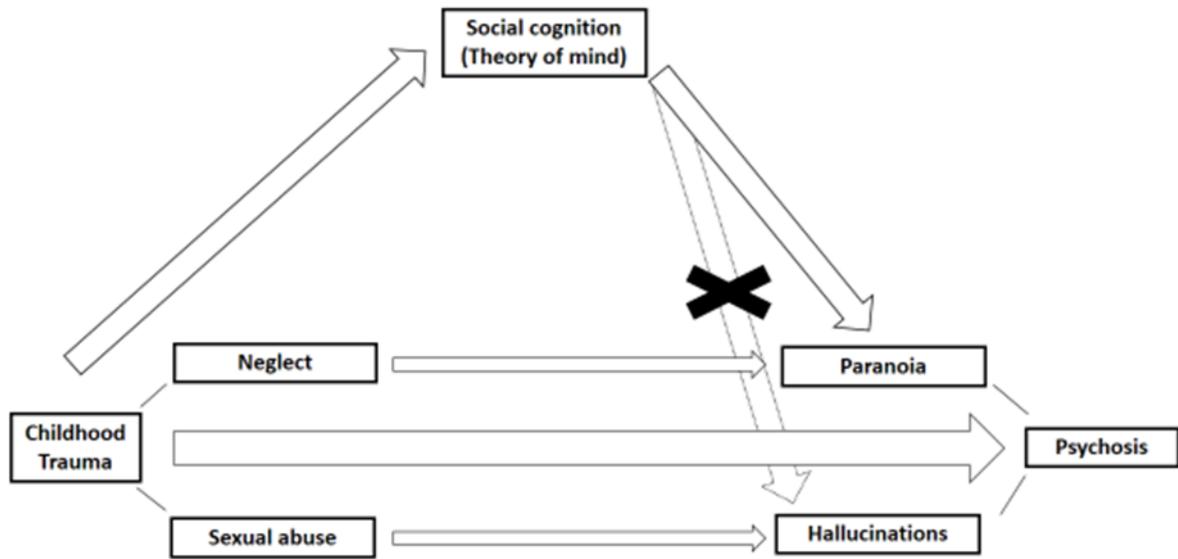
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Appendix A
Research Design



Appendix B

The Child Abuse and Trauma Scale

The CTQ has not been included in full as the University has not purchased it as yet. The Child Abuse and Trauma Scale is included instead.

Résumé—Cet article porte sur un nouvel instrument, le Child Abuse and Trauma Scale, qui quantifie la fréquence et la portée de diverses expériences malheureuses subies durant leur enfance et leur adolescence, par les personnes à qui on administre le test. L'instrument a été testé auprès de deux échantillons considérables de jeunes collégiens et collégiennes ainsi qu'un petit échantillon clinique de personnes ayant comme diagnostic le désordre de personnalités multiples. Dans les deux grands échantillons, le test a fourni des données cohérentes et s'est avéré fiable lorsque répété. Le test semble aussi être valide en ce qu'il a démontré une corrélation importante par rapport aux problèmes de dissociation, de dépression, de difficultés dans les relations interpersonnelles et a démontré aussi que les personnes interrogées étaient sujettes à devenir des victimes, ce qui est souvent une des séquelles typiques des traumatismes et des mauvais traitements connus en enfance ou en adolescence. Le fait que l'échantillon clinique a eu des scores élevés renforce la validité de l'instrument. Les auteurs proposent que les mauvais traitements psychologiques sont au coeur des éléments destructeurs de la maltraitance et la négligence. Ils sont d'avis que leur instrument pourra servir d'indice pour mesurer ces traumatismes psychologiques.

Resumen—Este trabajo describe una medida de auto-reporte, la Escala de Abuso y Trauma Infantil, que ofrece un índice cuantitativo de la frecuencia y la extensión de varios tipos de experiencias negativas en la infancia y la adolescencia. Los datos sobre esta evaluación están presentados para dos grandes muestras de estudiantes universitarios y para una pequeña muestra clínica de sujetos con un diagnóstico de Desorden de Personalidad Múltiple. La fuerte consistencia interna y confiabilidad test-retest de la escala en la población universitaria documentada, y su validez son comprobadas.

APPENDIX: CHILD ABUSE AND TRAUMA SCALE

MARGIN NOTES: SA = Sexual Abuse Subscale Item
 PUN = Punishment Subscale Item
 NEG = Neglect/Negative Home Atmosphere Subscale Item
 R = Reverse-scored item

HOME ENVIRONMENT QUESTIONNAIRE

This questionnaire seeks to determine the general atmosphere of your home when you were a child or teenager and how you felt you were treated by your parents or principal caretaker. (If you were not raised by one or both of your biological parents, please respond to the questions below in terms of the person or persons who had the primary responsibility for your upbringing as a child.) Where a question inquires about the behavior of both of your parents and your parents differed in their behavior, please respond in terms of the parent whose behavior was the more severe or worse.

In responding to these questions, simply circle the appropriate number according to the following definitions:

- 0 = never
- 1 = rarely
- 2 = sometimes

Psychological maltreatment

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3 = very often
4 = always

To illustrate, here is a hypothetical question:

Did your parents criticize you when you were young? 0 1 2 3 4

If you were rarely criticized, you should circle number 1.

Please answer all the questions.

	1. Did your parents ridicule you?	0 1 2 3 4
NEG	2. Did you ever seek outside help or guidance because of problems in your home?	0 1 2 3 4
NEG	3. Did your parents verbally abuse each other?	0 1 2 3 4
PUN	4. Were you expected to follow a strict code of behavior in your home?	0 1 2 3 4
R-PUN	5. When you were punished as a child or teenager, did you understand the reason you were punished?	0 1 2 3 4
PUN	6. When you didn't follow the rules of the house, how often were you severely punished?	0 1 2 3 4
NEG	7. As a child did you feel unwanted or emotionally neglected?	0 1 2 3 4
	8. Did your parents insult you or call you names?	0 1 2 3 4
SA	9. Before you were 14, did you engage in any sexual activity with an adult?	0 1 2 3 4
NEG	10. Were your parents unhappy with each other?	0 1 2 3 4
NEG	11. Were your parents unwilling to attend any of your school-related activities?	0 1 2 3 4
	12. As a child were you punished in unusual ways (e.g., being locked in a closet for a long time or being tied up)?	0 1 2 3 4
SA	13. Were there traumatic or upsetting sexual experiences when you were a child or teenager that you couldn't speak to adults about?	0 1 2 3 4
NEG	14. Did you every think you wanted to leave your family and live with another family?	0 1 2 3 4
SA	15. Did you ever witness the sexual mistreatment of another family member?	0 1 2 3 4
NEG	16. Did you ever think seriously about running away from home?	0 1 2 3 4
	17. Did you witness the physical mistreatment of another family member?	0 1 2 3 4
R-PUN	18. When you were punished as a child or teenager, did you feel the punishment was deserved?	0 1 2 3 4
NEG	19. As a child or teenager, did you feel disliked by either of your parents?	0 1 2 3 4
	20. How often did your parents get really angry with you?	0 1 2 3 4
	21. As a child did you feel that your home was charged with the possibility of unpredictable physical violence?	0 1 2 3 4
R	22. Did you feel comfortable bringing friends home to visit?	0 1 2 3 4
R	23. Did you feel safe living at home?	0 1 2 3 4
R-PUN	24. When you were punished as a child or teenager, did you feel "the punishment fit the crime"?	0 1 2 3 4
	25. Did your parents ever verbally lash out at you when you did not expect it?	0 1 2 3 4
SA	26. Did you have traumatic sexual experiences as a child or teenager?	0 1 2 3 4
NEG	27. Were you lonely as a child?	0 1 2 3 4
	28. Did your parents yell at you?	0 1 2 3 4
SA	29. When either of your parents was intoxicated, were you ever afraid of being sexually mistreated?	0 1 2 3 4
NEG	30. Did you every wish for a friend to share your life?	0 1 2 3 4
NEG	31. How often were you left at home alone as a child?	0 1 2 3 4
	32. Did your parents blame you for things you didn't do?	0 1 2 3 4
NEG	33. To what extent did either of your parents drink heavily or abuse drugs?	0 1 2 3 4
PUN	34. Did your parents ever hit or beat you when you did not expect it?	0 1 2 3 4
SA	35. Did your relationship with your parents ever involve a sexual experience?	0 1 2 3 4
NEG	36. As a child, did you have to take care of yourself before you were old enough?	0 1 2 3 4
	37. Were you physically mistreated as a child or teenager?	0 1 2 3 4
NEG	38. Was your childhood stressful?	0 1 2 3 4

Appendix C

The Reading the Mind in the Eyes Test

practice

jealous

panicked



arrogant

hateful

1

playful

comforting



irritated

bored

2

terrified

upset



arrogant

annoyed

3

joking

flustered



desire

convinced

4

joking

insisting



amused

relaxed

5

irritated

sarcastic



worried

friendly

6

aghast

fantasizing



impatient

alarmed

7

apologetic

friendly



uneasy

dispirited

8

despondent

relieved



shy

excited

9

annoyed

hostile



horrified

preoccupied

10

cautious

insisting



bored

aghast

terrified

amused



regretful

flirtatious

12

indifferent

embarrassed



sceptical

dispirited

13

decisive

anticipating



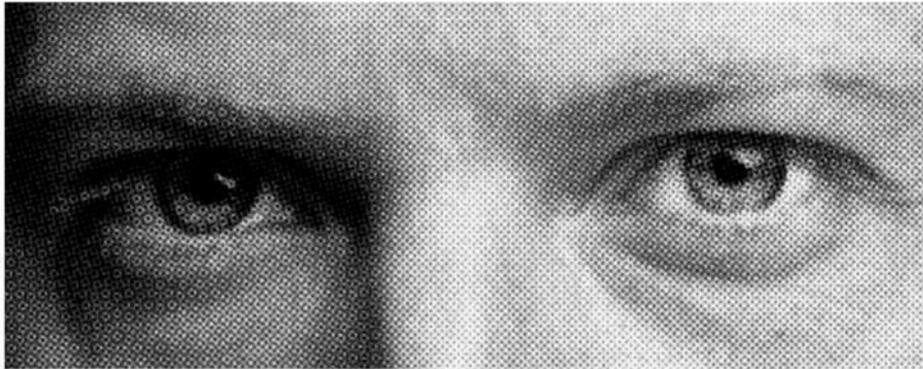
threatening

shy

14

irritated

disappointed



depressed

accusing

15

contemplative

flustered



encouraging

amused

16

irritated

thoughtful



encouraging

sympathetic

17

doubtful

affectionate



playful

aghast

18

decisive

amused



aghast

bored

19

arrogant

grateful



sarcastic

tentative

20

dominant

friendly



guilty

horrified

21

embarrassed

fantasizing



confused

panicked

22

preoccupied

grateful



insisting

imploring

contented

apologetic



defiant

curious

24

pensive

irritated



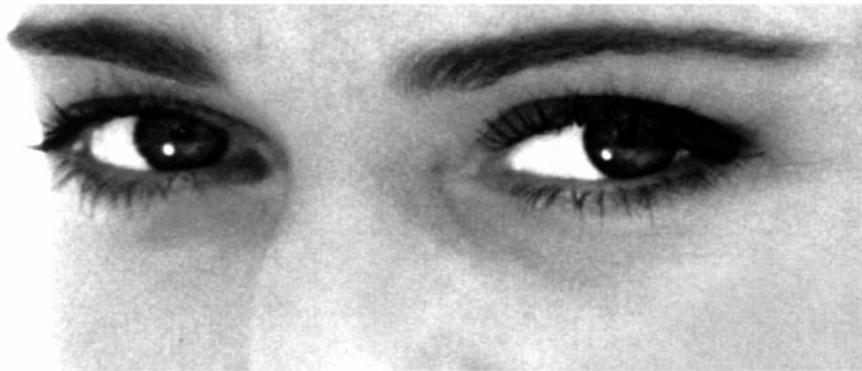
excited

hostile

25

panicked

incredulous



despondent

interested

26

alarmed

shy



hostile

anxious

27

joking

cautious



arrogant

reassuring

interested

joking



affectionate

contented

impatient

aghast



irritated

reflective

30

grateful

flirtatious



hostile

disappointed

ashamed

confident



joking

dispirited

serious

ashamed



bewildered

alarmed

embarrassed

guilty



fantasizing

concerned

34

aghast

baffled



distrustful

terrified

puzzled

nervous



insisting

contemplative

36

ashamed

nervous



suspicious

indecisive

Appendix D

The PDI-21 and 3 hallucinatory items

Schizophrenia Bulletin, Vol. 30, No. 4, 2004

E. Peters et al.

<p>1) Do you ever feel as if people seem to drop hints about you or say things with a double meaning ?</p> <p>NO YES</p> <p>(please circle)</p>	<p>Not at all distressing</p> <p>1 2 3 4 5</p>	<p>Very distressing</p>
	<p>Hardly ever think about it</p> <p>1 2 3 4 5</p>	<p>Think about it all the time</p>
	<p>Don't believe it's true</p> <p>1 2 3 4 5</p>	<p>Believe it is absolutely true</p>
<p>2) Do you ever feel as if things in magazines or on TV were written especially for you ?</p> <p>NO YES</p> <p>(please circle)</p>	<p>Not at all distressing</p> <p>1 2 3 4 5</p>	<p>Very distressing</p>
	<p>Hardly ever think about it</p> <p>1 2 3 4 5</p>	<p>Think about it all the time</p>
	<p>Don't believe it's true</p> <p>1 2 3 4 5</p>	<p>Believe it is absolutely true</p>
<p>3) Do you ever feel as if some people are not what they seem to be ?</p> <p>NO YES</p> <p>(please circle)</p>	<p>Not at all distressing</p> <p>1 2 3 4 5</p>	<p>Very distressing</p>
	<p>Hardly ever think about it</p> <p>1 2 3 4 5</p>	<p>Think about it all the time</p>
	<p>Don't believe it's true</p> <p>1 2 3 4 5</p>	<p>Believe it is absolutely true</p>
<p>4) Do you ever feel as if you are being persecuted in some way ?</p> <p>NO YES</p> <p>(please circle)</p>	<p>Not at all distressing</p> <p>1 2 3 4 5</p>	<p>Very distressing</p>
	<p>Hardly ever think about it</p> <p>1 2 3 4 5</p>	<p>Think about it all the time</p>
	<p>Don't believe it's true</p> <p>1 2 3 4 5</p>	<p>Believe it is absolutely true</p>
<p>5) Do you ever feel as if there is a conspiracy against you ?</p> <p>NO YES</p> <p>(please circle)</p>	<p>Not at all distressing</p> <p>1 2 3 4 5</p>	<p>Very distressing</p>
	<p>Hardly ever think about it</p> <p>1 2 3 4 5</p>	<p>Think about it all the time</p>
	<p>Don't believe it's true</p> <p>1 2 3 4 5</p>	<p>Believe it is absolutely true</p>

6) Do you ever feel as if you are, or destined to be someone very important ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

7) Do you ever feel that you are a very special or unusual person ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

8) Do you ever feel that you are especially close to God ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

9) Do you ever think people can communicate telepathically ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

10) Do you ever feel as if electrical devices such as computers can influence the way you think ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

<p>11) Do you ever feel as if you have been chosen by God in some way ?</p> <p>NO YES</p> <p>(please circle)</p>	<table border="1"> <tr> <td>Not at all distressing</td> <td></td> <td></td> <td></td> <td></td> <td>Very distressing</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Hardly ever think about it</td> <td></td> <td></td> <td></td> <td></td> <td>Think about it all the time</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Don't believe it's true</td> <td></td> <td></td> <td></td> <td></td> <td>Believe it is absolutely true</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> </table>	Not at all distressing					Very distressing	1	2	3	4	5		Hardly ever think about it					Think about it all the time	1	2	3	4	5		Don't believe it's true					Believe it is absolutely true	1	2	3	4	5	
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1	2	3	4	5																																	
Don't believe it's true					Believe it is absolutely true																																
1	2	3	4	5																																	
<p>12) Do you believe in the power of witchcraft, voodoo or the occult ?</p> <p>NO YES</p> <p>(please circle)</p>	<table border="1"> <tr> <td>Not at all distressing</td> <td></td> <td></td> <td></td> <td></td> <td>Very distressing</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Hardly ever think about it</td> <td></td> <td></td> <td></td> <td></td> <td>Think about it all the time</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Don't believe it's true</td> <td></td> <td></td> <td></td> <td></td> <td>Believe it is absolutely true</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> </table>	Not at all distressing					Very distressing	1	2	3	4	5		Hardly ever think about it					Think about it all the time	1	2	3	4	5		Don't believe it's true					Believe it is absolutely true	1	2	3	4	5	
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1	2	3	4	5																																	
Don't believe it's true					Believe it is absolutely true																																
1	2	3	4	5																																	
<p>13) Are you often worried that your partner may be unfaithful ?</p> <p>NO YES</p> <p>(please circle)</p>	<table border="1"> <tr> <td>Not at all distressing</td> <td></td> <td></td> <td></td> <td></td> <td>Very distressing</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Hardly ever think about it</td> <td></td> <td></td> <td></td> <td></td> <td>Think about it all the time</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Don't believe it's true</td> <td></td> <td></td> <td></td> <td></td> <td>Believe it is absolutely true</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> </table>	Not at all distressing					Very distressing	1	2	3	4	5		Hardly ever think about it					Think about it all the time	1	2	3	4	5		Don't believe it's true					Believe it is absolutely true	1	2	3	4	5	
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1	2	3	4	5																																	
Don't believe it's true					Believe it is absolutely true																																
1	2	3	4	5																																	
<p>14) Do you ever feel that you have sinned more than the average person ?</p> <p>NO YES</p> <p>(please circle)</p>	<table border="1"> <tr> <td>Not at all distressing</td> <td></td> <td></td> <td></td> <td></td> <td>Very distressing</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Hardly ever think about it</td> <td></td> <td></td> <td></td> <td></td> <td>Think about it all the time</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Don't believe it's true</td> <td></td> <td></td> <td></td> <td></td> <td>Believe it is absolutely true</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> </table>	Not at all distressing					Very distressing	1	2	3	4	5		Hardly ever think about it					Think about it all the time	1	2	3	4	5		Don't believe it's true					Believe it is absolutely true	1	2	3	4	5	
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1	2	3	4	5																																	
Don't believe it's true					Believe it is absolutely true																																
1	2	3	4	5																																	
<p>15) Do you ever feel that people look at you oddly because of your appearance ?</p> <p>NO YES</p> <p>(please circle)</p>	<table border="1"> <tr> <td>Not at all distressing</td> <td></td> <td></td> <td></td> <td></td> <td>Very distressing</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Hardly ever think about it</td> <td></td> <td></td> <td></td> <td></td> <td>Think about it all the time</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Don't believe it's true</td> <td></td> <td></td> <td></td> <td></td> <td>Believe it is absolutely true</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> </table>	Not at all distressing					Very distressing	1	2	3	4	5		Hardly ever think about it					Think about it all the time	1	2	3	4	5		Don't believe it's true					Believe it is absolutely true	1	2	3	4	5	
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Hardly ever think about it					Think about it all the time																																
1	2	3	4	5																																	
Don't believe it's true					Believe it is absolutely true																																
1	2	3	4	5																																	

16) Do you ever feel as if you had no thoughts in your head at all ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

17) Do you ever feel as if the world is about to end ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

18) Do your thoughts ever feel alien to you in some way ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

19) Have your thoughts ever been so vivid that you were worried other people would hear them ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

20) Do you ever feel as if your own thoughts were being echoed back to you ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

21) Do you ever feel as if you are a robot or zombie without a will of your own ?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

22) Do you ever hear voices in your head?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

23) Do you ever hear voices conversing in your head?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

24) Do you ever hear voices giving you commands in your head?

NO YES
(please circle)

Not at all distressing					Very distressing
1	2	3	4	5	
Hardly ever think about it					Think about it all the time
1	2	3	4	5	
Don't believe it's true					Believe it is absolutely true
1	2	3	4	5	

The last three items were not included in the original version of the test

Appendix E

Advert to be posted or email to be sent to potential participants

My name is Matia Monastra and I am a doctorate student conducting research on the relationship between difficult experiences in childhood, such as trauma, and later unusual experiences. I am doing this by carrying out an online survey and am inviting you to participate. If you have not experienced particularly bad events in the past we still need you to participate, so that we can understand the full range of experiences. The survey will take between 20-30 minutes to complete. If you like, at the end of the survey, you can provide your email and you will be included in a prize draw for an Amazon voucher.

Your participation in this study is completely voluntary and your responses will be strictly confidential. If you are interested in taking part in this project and you would like to know more about it, please read the Participant Information Sheet (attached).

If you would like to undertake this Survey, just click on:

<Link>

Thank you very much for your time and support.

Kind Regards,

Matia Monastra

Appendix F



Participant Information Sheet

My name is Matia Monastra and I am conducting this research as a student in the Doctorate in Clinical Psychology programme at Lancaster University, Lancaster, United Kingdom.

What is the purpose of this study?

The purpose of this study is to study the relationship between Childhood Trauma and unusual experiences related to psychosis and the ability to understand others' thoughts and actions. Childhood Trauma is defined as "the experience of an event by a child that is emotionally painful or distressing, which often results in lasting mental and physical effects". We need to recruit people who have a full range of experiences, so if you have not had particularly bad experiences we would still like you to take part.

Why have I been approached? (For University recruitment only)

You have been approached because you are a student of the University of 'insert University name'. Every student from your University is likely to receive this e-mail. People who have, and have not, experienced trauma or psychosis are welcome to participate.

Do I have to take part?

No. It is completely up to you to decide whether or not you participate in this study.

**What will I be asked to do if I take part?**

If you decide you would like to take part, you would be asked to complete a series of online questionnaires that will take between 20 and 30 minutes.

Will my data be identifiable?

The information you provide is confidential. While gender and age are requested in order to describe the characteristics of the sample, identifiable information such as your name or date of birth is not required. Even myself as the main researcher, will not be able to identify who you are. In the case you will provide your email in order to access the prize draw, this will also be kept confidential and in a different database, therefore this will not be able to be linked to your answers. Your email will be deleted from the database once the prize draw have been completed.

Can I opt out?

No, once your data has been submitted you cannot opt out. This is because your data is completely anonymous and confidential and therefore I would not be able to identify your data as yours once you have answer the questionnaires. However, if you do not complete the questionnaires, all your data will be deleted.

What will happen to the results?



The results will be analysed, summarised and reported in a dissertation. This may be written up and be submitted for publication in an academic journal. The data may also be used for further research by the Division of Health of Lancaster University.

Are there any risks in taking part?

Some of the issues we will ask about may be distressing and have personal relevance to you. We have therefore provided some example questions at this stage so that you can be aware of this before deciding whether you would like to participate.

“When you were growing up...

Did you have to wear dirty clothes?

Did you think your parents wished you had never been born?

People in your family hit you so hard that it left you with bruises or marks?”

If you experience any distress following participation, or think that you might have experienced some of the conditions discussed in the questionnaires and you find this distressing, you are encouraged to access free mental health support via your General Practitioner (GP) or to contact the resources provided at the end of this page.

It is possible some participants in your study might think they have some of the conditions/illnesses discussed in the questionnaires which they could find unnerving/distressing.

□

Has this project been reviewed?

This study has been reviewed and approved by the Faculty of Health and Medicine Research Ethics Committee at Lancaster University.



Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher or see below.

MATIA MONASTRA

Clinical Psychology, Div. of Health Research, Furness Building, Lancaster University,
Lancaster, LA1 4YG

m.monastra@lancaster.ac.uk 01524 592754

Supervisor and complaints:

If you wish to contact another member of the research team you can contact:

Professor Bill Sellwood

Tel: +44 1524 593998

Email: b.sellwood@lancaster.ac.uk

Health Research Division

Lancaster University

Lancaster

LA1 4YG

If you wish to contact someone outside of the Doctorate Programme you can contact:

Professor Roger Pickup

Tel: +44 (0)1524 593746

Email: r.pickup@lancaster.ac.uk



Biomedical and Life Sciences

Lancaster University

Lancaster

LA1 4YG

Resources in the event of distress

Should you feel distressed, either as a result of taking part or in the future, you can access free mental health support via your General Practitioner (GP) or contact mental health charity such as the Samaritans (<https://www.samaritans.org/>) or MIND

(<http://www.lancashiremind.org.uk/>). If you are a student of Lancaster University you can also contact the Wellbeing, counselling and mental health services (<http://www.lancaster.ac.uk/student-based-services/wellbeing-counselling-and-mental-health/>).

Thank you for taking the time to read this information sheet.

Appendix G



Demographics and Criteria Matching Questions

What is your gender? (tick on box)

- Male
- Female
- Other: [text box]

How old are you?

[select number]

How many years of formal education do you have?

[select number] Comment: [text box]

How would you describe your ethnic origin?

[text box]

What is your marital status?

[text box]

Have you ever been diagnosed with a mental health or psychiatric disorder? (tick one box)

- Yes
- No
- Comment: [text box]

Have you ever had a brain injury or another brain problem? (for example, epilepsy) (tick one box)

- Yes
- No
- Comment: [text box]

Appendix H



Debrief Sheet

Thank you for participating in the study!

If you did not complete the questionnaire, your data will be deleted. If you did, your data will be analysed. I would like to remind you that your data is completely anonymous and confidential. Please, introduce your email below if you like to enter a prize draw for Amazon Vouchers.

I would also like to remind you that should you feel distressed, either as a result of taking part or in the future, you can access free mental health support via your General Practitioner (GP) or contact mental health charity such as the Samaritans (<https://www.samaritans.org/>) or MIND

(<http://www.lancashiremind.org.uk/>). If you are a student of Lancaster University you can also contact the Wellbeing, counselling and mental health services (<http://www.lancaster.ac.uk/student-based-services/wellbeing-counselling-and-mental-health/>). Further information is provided on the Participant Information Sheet.

Please, feel free to email me if you would like to obtain further information about the study or are interested in the study outcome. If you decide to do so, I want to remind you that I will not be able to access the data you provided as the process is completely anonymous so your

data will remain confidential. My contact, which you can also find on the Participant Information Sheet, follow:

MATIA MONASTRA

Clinical Psychology, Div. of Health Research, Furness Building, Lancaster University,
Lancaster, LA1 4YG

m.monastra@lancaster.ac.uk 01524 592754

Appendix I



Consent Form

By proceeding to the survey you confirm that:

- You have read the information sheet and understand what is expected of you within this study
- You confirm that you understand that any responses/information you give will remain anonymous
- Your participation is voluntary
- You consent for the information you provide to be discussed with my supervisor at Lancaster University
- You consent to Lancaster University keeping the anonymised data for a period of 10 years after the study has finished
- By clicking on this link, you consent to [taking part in the current study.](#)

FHMREC Application Form

Faculty of Health and Medicine Research Ethics Committee (FHMREC)

Lancaster University

Application for Ethical Approval for Research

for additional advice on completing this form, hover cursor over 'guidance'.

**Guidance on completing this form is also available as a word
document**

Title of Project: Is the relationship between trauma and psychosis mediated by social cognition?

An analogue study

Name of applicant/researcher: Matia Monastra

ACP ID number (if applicable)*:

Funding source (if applicable)

Grant code (if applicable):

***If your project has *not* been costed on ACP, you will also need to complete the Governance Checklist [\[link\]](#).**

Type of study

Involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants. **Complete sections one, two and four of this form**

Includes *direct* involvement by human subjects. **Complete sections one, three and four of this form**

SECTION ONE**1. Appointment/position held by applicant and Division within FHM** Trainee Clinical

Psychologist

2. Contact information for applicant:**E-mail:** m.monastra@lancaster.ac.uk**Telephone:** 07874694873 (please give a

number on which you can be contacted at short notice)

Address: 61 Wood St flat 2 L14AL Liverpool**3. Names and appointments of all members of the research team (including degree where applicable)**

Matia Monastra. Principal Investigator. Trainee Clinical Psychologist. Lancaster University.

Professor Bill Sellwood. Research Supervisor. Professor at Lancaster University, Health research.

3. If this is a student project, please indicate what type of project by marking the relevant

box/deleting as appropriate: (please note that UG and taught masters projects should complete

FHMREC form UG-tPG, following the procedures set out on the [FHMREC website](#)PG Diploma Masters by research PhD Thesis PhD Pall. Care

<input type="checkbox"/>	PhD Pub. Health <input type="checkbox"/>	PhD Org. Health & Well Being <input type="checkbox"/>	PhD Mental Health <input type="checkbox"/>	MD
<input type="checkbox"/>	DCLinPsy SRP <input type="checkbox"/> [if SRP Service Evaluation, please also indicate here: <input type="checkbox"/>			DCLinPsy Thesis
<input checked="" type="checkbox"/>				

4. Project supervisor(s), if different from applicant: Professor Bill Sellwood

5. Appointment held by supervisor(s) and institution(s) where based (if applicable): Professor at Lancaster University, Health Research

SECTION TWO

Complete this section if your project involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants

<p>1. Anticipated project dates (month and year) Start date: End date:</p>
<p>2. Please state the aims and objectives of the project (no more than 150 words, in lay-person's language):</p>
<p>Data Management</p>

For additional guidance on data management, please go to [Research Data Management webpage](#), or email the RDM support email: rdm@lancaster.ac.uk

3. Please describe briefly the data or records to be studied, or the evaluation to be undertaken.

4a. How will any data or records be obtained?

4b. Will you be gathering data from websites, discussion forums and on-line 'chat-rooms' no

4c. If yes, where relevant has permission / agreement been secured from the website moderator? no

4d. If you are only using those sites that are open access and do not require registration, have you made your intentions clear to other site users? no

4e. If no, please give your reasons

5. What plans are in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with the Data Protection Act 1998.

6a. Is the secondary data you will be using in the public domain? no

6b. If NO, please indicate the original purpose for which the data was collected, and comment on whether consent was gathered for additional later use of the data.

Please answer the following question *only* if you have not completed a Data Management Plan for an external funder

7a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE?

7b. Are there any restrictions on sharing your data?

8. Confidentiality and Anonymity

a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications? yes

b. How will the confidentiality and anonymity of participants who provided the original data be maintained?

9. What are the plans for dissemination of findings from the research?

10. What other ethical considerations (if any), not previously noted on this application, do you think there are in the proposed study? How will these issues be addressed?

SECTION THREE

Complete this section if your project includes *direct* involvement by human subjects

1. Summary of research protocol in lay terms (indicative maximum length 150 words):

It is widely agreed that individuals who experience childhood trauma are more likely to develop psychotic symptoms although it is unclear how this link is formed. It has been argued that social cognition (the ability of understanding others' thoughts, behaviours and feelings) is compromised in these individuals. Moreover, it has been argued that different kinds of childhood trauma are more likely to cause a specific symptom of psychosis.

The aim of this study is to find out whether the occurrence of psychotic like phenomena in the context of childhood traumas depends on deficits in social cognition. To do this, non-clinical participants will be asked to complete questionnaires designed to explore whether they experienced childhood trauma and if so, what kind of trauma, their social cognition's ability, whether psychosis related symptoms are present and if so, which ones, specifically hallucinations or paranoia.

2. Anticipated project dates (month and year only)

Start date: 10/17

End date 06/18

Data Collection and Management

For additional guidance on data management, please go to [Research Data Management](#) webpage, or email the RDM support email: rdm@lancaster.ac.uk

3. Please describe the sample of participants to be studied (including maximum & minimum number, age, gender):

Participants will be individuals aged 18 or over who have not been diagnosed with mental health or psychiatric disorders and who do not have any identified organic pathology (e.g. traumatic brain injury). These individuals will also have the capacity to consent to the study and be able to read and write in English. This study is restricted to English tests as the formal questionnaires utilised has either not been translated in other languages or their psychometric characteristics changed in the translation. Participants will be mostly students. For the data analysis outlined below, the sample sizes required (including a Type I error of .05 and power of .8), are between 403 and 427 (depending on β path's values). EDIT 3.3.2. In order to a inferences about the general population based on this study, adequate power for mediation analysis is required so an appropriate sample size has been calculated. EDIT 3.3.2

EDIT 3.3.1 Similar studies in the past have calculated an adequate sample size using the recruitment procedures described below, therefore the current sample size is considered realistic. However, if the numbers required by the power analysis are not reached, or mediation effects are not found, it will be possible to continue the study by using a simpler regression model. EDIT 3.3.1

4. How will participants be recruited and from where? Be as specific as possible. Ensure that you provide the *full versions* of all recruitment materials you intend to use with this application (eg adverts, flyers, posters).

EDIT 3.4 Participants will be recruited through both professional and academic contacts of the research team, contacting University Students directly (for example, Lancaster and Manchester

University), and by advertising with professional networks and social media groups. If relevant research recruitment policies will be present for specific Universities or professional bodies I will contact, these will be examined and a request for recruitment submitted in the form suggested on these policies (such as email correspondence or social media). This process may be repeated with other Universities or professional bodies until the required sample size is obtained (see proposed analysis). As recruitment targets individuals who do not present with a specific condition and in order to make the sample representative of the population, individuals will be recruited from different professional areas and background as possible. No specific interest groups or NHS based groups will need to be contacted in the process. Individuals will be asked to complete a web-based survey through email. Once accepted, the survey questionnaires will be accessible through Qualtrics (Qualtrics, 2015) (or other survey software solutions) and advertised in line with the terms of Lancaster University. A similar approach has been used successfully, for example by Pickering, Simpson and Bentall (2008) and Fernyhough et al. (2008). A sample email which may be used is presented in Appendix E on protocol. Potential participants will be able to access a link which will direct them to the Survey questionnaires. EDIT 3.4

5. Briefly describe your data collection and analysis methods, and the rationale for their use.

The data will be collected online using Qualtrics Research survey software, an online survey platform, provided free of charge by Lancaster University for use by its students and staff. It uses Transport Layer Security encryption for all transmitted data safeguarding users data, meeting requirements for confidentiality

The data will be analysed using IBM SPSS Version 22.0 using a downloadable plug-in to run mediation analyses. EDIT 3.3.2 In a mediation model, the objective is to identify and explain the processes that underlie the relationship between an independent variable and a dependent variable, via

the inclusion of a third hypothetical variable, known as a mediator variable. In this case, to explain the relationship between childhood trauma and psychotic-like experiences, theory of mind is included as the mediator variable. EDIT 3.3.2

After dealing with missing data, normality and homogeneity will be analysed. If data are not normally distributed, transformations will be attempted. The choice of the statistical mediation method of analysis will be based on data distribution characteristics. However, it is likely that mediation will be analysed through bootstrapping, for which the assumption of normality of the sampling distribution of the indirect effect does not need to be met.

If the assumptions for a mediation model are not met, e.g. α and β path's values between independent/dependent variables and mediators are not significant, a regression model exploring the interactions will be reported instead.

EDIT 3.5 The data collected will look at a range of experiences usually present in healthy participants, as non-clinical participants are often found to present with psychotic symptoms or closely related phenomena, called psychotic-like experiences. For example, paranoia and hallucinations (examined in this study) are often experienced by individuals who do not experience psychosis (see introduction on protocol). If such experiences are not identified in the sample, this information will be equally important. By analysing social cognition characteristics and trauma experienced by the sample, it will be possible to investigate what has impacted on this. EDIT 3.5

MARCHAMENDMENTEDIT At the end of the questionnaire, a link will be provided for participants who would like to enter their email and been included in a prize draw (of three Amazon Vouchers).MARCHAMENDMENTEDIT

6. What plan is in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc.)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with the Data Protection Act 1998.

The results of the interview are automatically stored in the Data and Analysis section of the Qualtrics Research survey software in the account of the PI and therefore accessible only by the PI. The PI will transfer the information to an SPSS file which will be stored in the PI's Lancaster University personal file store; this is equipped with password-protected access. In the unlikely event the personal file store is lost or corrupted, data will still be accessible online as a copy of the database will be saved in Lancaster University's Box, a high-grade encryption online storage system. Furthermore, data will be stored by the DClinPsy administration team in an encryption protected environment. Data will be retained for 10 years, following general recommendations. The data custodian will be Professor Sellwood.

MARCHAMENDMENTEDIT For the participants who opted to be included in the prize draw, a distinct database will be created in which only email addresses will be stored. This database will undergo the same process outlined above but will be kept separate from the main database. This new database will be destroyed once the prizes have been distributed. In the event that a winner fails to claim their voucher, a new winner will be drawn again after one month. This procedure will be communicated to the winner in the same email in which the prize can be claimed. MARCHAMENDMENTEDIT

7. Will audio or video recording take place? no audio video

a. Please confirm that portable devices (laptop, USB drive etc) will be encrypted where they are used for identifiable data. If it is not possible to encrypt your portable devices, please comment on the steps you will take to protect the data. NA

b What arrangements have been made for audio/video data storage? At what point in the research will tapes/digital recordings/files be destroyed?

NA

Please answer the following questions *only* if you have not completed a Data Management Plan for an external funder

8a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE?

Data will be deposited in Lancaser University's institutional repository PURE.

8b. Are there any restrictions on sharing your data ?

Considering the confidential nature of the data, no restrictions have been identified.

Furthermore, access will be granted on a case by case basis by the Faculty of Health and Medicine to genuine researchers.

9. Consent

a. Will you take all necessary steps to obtain the voluntary and informed consent of the prospective participant(s) or, in the case of individual(s) not capable of giving informed consent, the permission of a legally authorised representative in accordance with applicable law? yes

b. Detail the procedure you will use for obtaining consent?

The first section comprises the participants' information sheet (Appendix F in protocol) in which information about the study will be provided. If participants are happy to give their informed consent, by ticking the relevant "I have understood and I am happy to participate to the study" box (which will be

included in the survey), they will have access to the second section where demographic data will be gathered in order to ascertain degree of match with the inclusion criteria EDIT 3.9 (see Appendix G on protocol). EDIT 3.9

10. What discomfort (including psychological eg distressing or sensitive topics), inconvenience or danger could be caused by participation in the project? Please indicate plans to address these potential risks. State the timescales within which participants may withdraw from the study, noting your reasons.

As the proposed research is an analogue study, no risk to vulnerable adults is foreseen. EDIT 3.10.1 An analogue study is an experimental study in which participants closely resemble the target population. In this case, in order to investigate aspect of psychosis, the psychotic-like experiences of individuals who do not meet criteria for psychosis, are analysed. EDIT 3.10.1

EDIT 3.10.others However, it is acknowledged that the experience of abuse or psychosis may be a sensitive issue for certain individuals. Participants who complete the questionnaires might arrive at the conclusion that they have experienced trauma or psychosis and this could be distressing for them. Because of this, participants will be informed that they can stop completing the survey at any time. The data in questionnaires which have not been completed will be destroyed. A debrief sheet will also be provided at the end of the questionnaires. Information on how to receive help or support on issues arising from participation will be provided. Participants will have to confirm consent (Appendix I) after reading the participant information (Appendix F). The latter will include sample items from the scales to make it clear about the nature of the issues being studied. EDIT 3.10.others

11. What potential risks may exist for the researcher(s)? Please indicate plans to address such risks (for example, noting the support available to you; counselling considerations arising from the sensitive or distressing nature of the research/topic; details of the lone worker plan you will follow, and the steps you will take).

No potential risks have been identified for the PI. However, if risk arises, the PI is able to access support through their clinical tutor.

12. Whilst we do not generally expect direct benefits to participants as a result of this research, please state here any that result from completion of the study.

Although participants may find completing the survey interesting, no direct benefits have been identified.

13. Details of any incentives/payments (including out-of-pocket expenses) made to participants:

NA

14. Confidentiality and Anonymity

a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications? yes

b. Please include details of how the confidentiality and anonymity of participants will be ensured, and the limits to confidentiality.

The survey will be sent through anonymous surveys links or responses will be automatically anonymised and therefore the PI will be unable to track information that may identify respondents. This process makes the data entirely confidential.

15. If relevant, describe the involvement of your target participant group in the *design and conduct* of your research.

NA

16. What are the plans for dissemination of findings from the research? If you are a student, include here your thesis.

This project is a doctoral thesis. Furthermore, the target journal for this study is the Psychiatry Research (homepage at www.elsevier.com/locate/psychres). This journal publishes short but complete

research reports on the biochemical, physiological, genetic, psychological and social determinants of human behaviour. Psychiatry Research holds a CiteScore of 2.63, with an impact factor of 2.466. These factors would provide my research, if published, with the appropriate visibility for it to have an impact on current clinical practice.

17. What particular ethical considerations, not previously noted on this application, do you think there are in the proposed study? Are there any matters about which you wish to seek guidance from the FHMREC?

NA

SECTION FOUR: signatureApplicant electronic signature:

Date

Student applicants: please tick to confirm that you have discussed this application with your supervisor, and that they are happy for the application to proceed to ethical review

Project Supervisor name (if applicable):

Date application

discussed **Submission Guidance**

1. **Submit your FHMREC application by email to Diane Hopkins (d.hopkins@lancaster.ac.uk) as two separate documents:**
 - i. **FHMREC application form.**
Before submitting, ensure all guidance comments are hidden by going into 'Review' in the menu above then choosing *show markup>balloons>show all revisions in line*.
 - ii. **Supporting materials.**
Collate the **following materials for your study, if relevant, into a single word document:**
 - a. **Your full research proposal (background, literature review, methodology/methods, ethical considerations).**
 - b. Advertising materials (posters, e-mails)
 - c. Letters/emails of invitation to participate
 - d. Participant information sheets
 - e. Consent forms
 - f. Questionnaires, surveys, demographic sheets
 - g. Interview schedules, interview question guides, focus group scripts
 - h. Debriefing sheets, resource lists

Please note that you DO NOT need to submit pre-existing measures or handbooks which support your work, but which cannot be amended following ethical review. These should simply be referred to in your application form.

2. Submission deadlines:
 - i. Projects including direct involvement of human subjects [**section 3 of the form was completed**]. The *electronic* version of your application should be submitted to **Diane Hopkins by the committee deadline date**. Committee meeting dates and application submission dates are listed on the [FHMREC website](#). Prior to the FHMREC meeting you may be contacted by the lead reviewer for further clarification of your application. Please ensure you are available to attend the committee meeting (either in person or via telephone) on the day that your application is considered, if required to do so.
 - ii. The following projects will normally be dealt with via chair's action, and may be submitted at any time. [**Section 3 of the form has *not* been completed, and is not required**]. Those involving:
 - a. existing documents/data only;
 - b. the evaluation of an existing project with no direct contact with human participants;
 - c. service evaluations.
3. **You must submit this application from your Lancaster University email address, and copy your supervisor in to the email in which you submit this application**

