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Doctoral Thesis

The Salience of Relational Experiences: Linking Childhood Interpersonal Adversity, Attachment Style, and the Subclinical Psychosis Phenotype

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CONTENTS

1. INTRODUCTION.....9

2. BACKGROUND.....13

2.1. The Continuum Model of Schizotypy and Schizophrenia.....13

2.1.1. The Multidimensional Structure of Schizotypy, its Assessment, and Validity.....14

2.2. Psychosocial Risk Factors for Schizotypy and Schizophrenia: The Case of Childhood Interpersonal Adversity.....15

2.2.1. Measurement of Childhood Interpersonal Adversity.....17

2.2.2. Plausible Mechanisms to Explain the Adversity—Psychosis Link.....17

2.3. Attachment Theory.....18

2.3.1. The Attachment Style Construct.....20

2.3.2. Measurement and Validity of Attachment Styles.....22

3. AIMS AND OUTLINE OF THIS THESIS.....25

References.....28

4. EMPIRICAL WORK

SECTION 1: ATTACHMENT.....39

Chapter 1: Spanish version of the Psychosis Attachment Measure: Adaptation process and psychometric properties.....41

Summary.....42

Introduction.....44

STUDY 1.....46

Overview.....46

Method.....47

Results.....48

Discussion....49
STUDY 2....50
Overview....50
Method....50
Results....51
Discussion....52
General Discussion....53
Tables and Figures....56
References....59
Chapter 2: Real-life expression of adult attachment styles....65
Abstract....66
Introduction....67
Methods....72
Results....74
Discussion....77
Tables and Figures....83
References....88
SECTION 2: SCHIZOTYPY....93
Chapter 3: Positive and negative schizotypy are associated with prodromal and schizophrenia-spectrum symptoms....95
Abstract....96
Introduction....97
Methods....99
Results....101
Discussion....104

Tables 110

References 113

SECTION 3: ATTACHMENT AND SCHIZOTYPY 119

Chapter 4: Association between attachment prototypes and schizotypy dimensions in two independent non-clinical samples of Spanish and American young adults 121

Abstract 122

Introduction 123

Methods 127

Results 129

Discussion 130

Tables 135

References 138

SECTION 4: MEDIATING MECHANISMS IN THE LINK BETWEEN CHILDHOOD INTERPERSONAL ADVERSITY AND THE SUBCLINICAL PSYCHOSIS PHENOTYPE: THE ROLE OF ATTACHMENT STYLE 147

Chapter 5: Mechanisms mediating the pathway from environmental adversity to psychosis proneness 149

Abstract 150

Introduction 151

Candidate Environmental Factors 152

Mediating Mechanisms 154

Conclusions and Future Directions 164

References 168

Chapter 6: Fearful attachment mediates the association of childhood trauma with schizotypy and psychotic-like experiences 175
Abstract.....176
Introduction 177
Methods 178
Results.....179
Discussion.....180
Table.....182
References.....183
Chapter 7: Interview investigation of insecure attachment styles mediating between poor childhood care and schizophrenia-spectrum psychopathology.....187
Abstract.....188
Introduction 189
Material and methods.....191
Results.....194
Discussion.....195
Tables.....200
References.....204
5. GENERAL DISCUSSION 209
5.1. Summary of Findings 209
5.2. Integration and Theoretical Implications 211
5.3. Implications for Intervention Initiatives and Clinical Work.....215
5.4. Limitations.....216
5.5. Future Directions.....217
5.6. Conclusion 219

References.....221

Acknowledgements.....225

CURRICULUM VITAE.....227

1. INTRODUCTION

Schizophrenia and related psychotic disorders are among the most severe mental conditions. They are associated with considerable personal suffering as well as with significant costs and burden to the individual, the family, and the society at large (Andlin-Sobocki & Rössler, 2005; Rössler, Salize, van Os, & Riecher-Rössler, 2005; Shah, Mizrahi, & McKenzie, 2011; van Os & Kapur, 2009). The onset of psychotic disorders most often occurs in late adolescence or early adult life and their lifetime prevalence is estimated at around 3% (Perälä et al., 2007; van Os & Kapur, 2009). Despite intensive study, their etiology remains incompletely understood; however, there is accruing work showing that several factors (e.g., genetic, biological, psychosocial) are contributory and most likely interact in complex ways to produce vulnerability (Shah, Tandon, & Keshavan, 2013; van Os, Krabbendam, Myin-Germeys, & Delespaul, 2005; van Os, Kenis, & Rutten, 2010). Understanding how these debilitating disorders develop is essential for identifying fruitful targets for effective prophylactic and therapeutic interventions.

Although traditionally medical models have viewed the symptoms of schizophrenia as categorical entities (i.e., present versus absent), there is growing evidence from multiple lines of research suggesting that schizophrenia-related phenotypes are better conceptualized as continuous rather than categorical—with vulnerability extending well beyond the diagnostic thresholds (Johns et al., 2004; Kwapil, Chapman, & Chapman, 1999; Myin-Germeys, Krabbendam, & van Os, 2003). Indeed, recent reviews and meta-analyses have shown that a substantial minority of individuals from the general population experience milder forms of psychotic symptoms (in the absence of disorder) and that clinically relevant psychosis only constitutes a small proportion of the phenotypic continuum (Kelleher & Cannon, 2011; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009; Linscott & van Os, 2013).

The work presented in this thesis is framed within the continuum model of schizotypy and schizophrenia. Schizotypy can be conceptualized as the underlying vulnerability for schizophrenia-spectrum psychopathology that is expressed as a multidimensional personality disposition with traits distributed across continua of increasing severity (Barrantes-Vidal, Grant, & Kwapil, in press; Kwapil, Barrantes-Vidal, & Silvia, 2008). Schizotypy provides a useful construct for understanding the etiology and expression of schizophrenia-spectrum psychopathology because it subsumes a broad range of conditions (including subclinical and clinical expressions) under a single conceptual framework that is not constrained by diagnostic boundaries (Kwapil & Barrantes-Vidal, in press).

Over the last decade, considerable empirical evidence has pointed to the significance of a range of psychosocial factors in the vulnerability for schizotypy and schizophrenia (Bentall & Fernyhough, 2008; Nelson, Seal, Pantelis, & Phillips, 2013; van Os et al., 2009; van Os et al., 2010). One such factor is childhood interpersonal adversity. Exposure to childhood interpersonal adversity has been consistently associated with psychotic disorders, psychotic symptoms and experiences, and schizotypy traits (Matheson, Shepherd, Pinchbeck, Laurens, & Carr, 2013; Varese et al., 2012; Velikonja, Mason, & Fisher, in press). However, knowledge of the mechanisms underlying this association is still in its infancy, with a limited number of studies having been designed to identify mechanistic pathways leading to different symptom profiles (Bentall et al., 2014).

Attachment theory, which emphasizes the crucial role of relational experiences with respect to adaptation and functioning throughout the lifespan, has been proposed as an explanatory theory for understanding the link between childhood interpersonal adversity and psychotic phenomena (Read & Gumley, 2008). Attachment researchers have typically focused on measuring individual differences in attachment style—a construct that encompasses inner representations of self and others, affect regulation strategies, and interpersonal functioning (Mikulincer & Shaver, 2007). Insecure attachment styles have been associated with several

emotional, cognitive, and social difficulties (e.g., affective dysregulation, dysfunctional schemas, impaired interpersonal functioning) that appear to be implicated in pathways leading to the features of schizotypy and schizophrenia, suggesting that attachment theory can provide a framework within which to understand the development and persistence of such features (Berry, Barrowclough, & Wearden, 2007, 2008).

Recent systematic reviews have confirmed the utility of the attachment style construct for investigating the expression, course, and treatment of psychosis (Gumley, Taylor, Schwannauer, & MacBeth, 2014; Korver-Nieberg, Berry, Meijer, & de Haan, 2014); however, the role of attachment styles in linking childhood experience with schizotypy and schizophrenia has been scarcely examined. Moreover, although insecure attachment styles have been associated with psychotic phenomenology in clinical and nonclinical samples, whether there exists specificity of style to type of symptom or symptom dimension is yet to be fully clarified. Determining differential associations between attachment styles and symptom dimensions would be useful for identifying risk pathways as well as for uncovering possible processes involved.

The empirical studies conducted as part of this thesis are embedded in a larger longitudinal project investigating risk and resilience factors in relation to the expression and persistence of the extended psychosis phenotype in Spanish young adults. The work carried out in the current thesis had the primary goal of shedding new light on the ways in which childhood interpersonal adversity and attachment styles may contribute to our understanding of schizotypy and other schizophrenia-spectrum phenotypes in nonclinical individuals. This work may contribute to expand and refine current psychosocial models of psychosis vulnerability and, given that these factors are potentially malleable, the findings may ultimately have implications that could be translated into intervention approaches aimed at preventing or mitigating the expression of clinical psychosis.

2. BACKGROUND

2.1. The Continuum Model of Schizotypy and Schizophrenia

According to current etiological theories, the underlying vulnerability for schizophrenia-spectrum disorders is expressed across a dynamic continuum of subclinical and clinical manifestations referred to as schizotypy (Claridge, 1997; Kwapil et al., 2008; Kwapil & Barrantes-Vidal, 2012; Meehl, 1999). Although the majority of non-disordered individuals with high schizotypy are not expected to decompensate, they may experience attenuated or transient forms of the symptoms inherent to schizophrenia and are at heightened risk for developing schizophrenia-spectrum disorders (Kwapil, Gross, Silvia, & Barrantes-Vidal, 2013). Notably, schizotypy and schizophrenia are not considered to be qualitatively distinct or separate entities; rather, schizophrenia is viewed as representing the most extreme expression of schizotypy. By the same token, constructs such as the prodrome and spectrum personality disorders are also presumed to represent manifestations along the schizotypy continuum (Kwapil & Barrantes-Vidal, in press).

The schizotypy model suggests that the same etiological factors underpin both subclinical and clinical expressions and, indeed, several studies have revealed that schizotypy shares genetic and environmental risk factors with schizophrenia (for reviews, see Barrantes-Vidal et al., in press; Nelson et al., 2013). Therefore, schizotypy offers a useful construct for identifying etiological mechanisms and understanding developmental pathways while circumventing the confounding factors associated with clinical status such as chronicity, medication, and hospitalization (Kwapil & Barrantes-Vidal, 2012).

2.1.1. The Multidimensional Structure of Schizotypy, its Assessment, and Validity

Schizophrenia and schizotypy are constructs of marked heterogeneity and research suggests that they are characterized by a common multidimensional structure. In factor-analytic studies, the positive, negative, and disorganized symptom dimensions are the most frequently identified (e.g., Lenzenweger & Dworkin, 1996; Liddle, 1987; Raine et al., 1994; Vollema & Hoijtink, 2000). The positive (or psychotic-like) dimension encompasses features that reflect distortion or excess in normal functioning; it ranges from magical thinking, referential ideas, and perceptual abnormalities to full-blown hallucinations and delusions. The negative (or deficit-like) dimension encompasses features that reflect diminution or impairment in normal functions and includes anergia, anhedonia, affective flattening, avolition, asociality, and alogia. The disorganized dimension encompasses features that reflect disruptions in the capacity to organize and express thoughts, behavior, and affect; it ranges from oddities and mild disturbances to grossly disorganized behavior and formal thought disorder (Kwapil & Barrantes-Vidal, 2012, in press). The conceptualization and assessment of schizotypy and schizophrenia as multidimensional are crucial for advancing our understanding of these constructs.

The assessment of schizotypy has traditionally been carried out through psychometric inventories. This is a relatively inexpensive and noninvasive approach that is useful for screening large samples of individuals from the general population (Kwapil et al., 2008). Among the most frequently used inventories are the Wisconsin Schizotypy Scales (WSS), which include the Perceptual Aberration (Chapman, Chapman, & Raulin, 1978), Magical Ideation (Eckblad & Chapman, 1983), Physical Anhedonia (Chapman, Chapman, & Raulin, 1976), and Revised Social Anhedonia (Eckblad, Chapman, Chapman, & Mishlove, 1982) Scales. The WSS were used to assess schizotypy in the work conducted as part of the current thesis.

Research on the structure of the WSS indicates that two factors representing positive and negative schizotypy underlie the scales, and this structure has been replicated in different

countries (Kwapil et al., 2008; Kwapil, Ros-Morente, Silvia, & Barrantes-Vidal, 2012; Qunbar, Silvia, Barrantes-Vidal, & Kwapil, 2012). With regard to the validity of positive and negative schizotypy, Kwapil et al. (2008) demonstrated that these dimensions were differentially associated with measures of personality, psychopathology, and adjustment. For example, positive schizotypy was associated with psychotic-like experiences and mood disorders, whereas negative schizotypy was associated with schizoid and negative symptoms. Studies have also supported the ecological validity of the dimensions by showing that they relate to distinct patterns of daily life experiences. For instance, positive schizotypy has been associated with higher negative affect, suspiciousness, and feeling unwanted, whereas negative schizotypy has been associated with decreased positive affect and social disinterest (Kwapil, Brown, Silvia, Myin-Germeys, & Barrantes-Vidal, 2012). Furthermore, the dimensions have been found to predict the development of schizophrenia-spectrum disorders longitudinally (Kwapil et al., 2013).

The majority of research examining the validity of positive and negative schizotypy has been conducted in North American and British samples. Therefore, further research is required to assess the construct validity of the schizotypy dimensions in other cultures, as well as to investigate their associations with other affective and psychopathology measures that are presumably related to schizotypy but have not been examined in previous studies (e.g., prodromal symptoms).

2.2. Psychosocial Risk Factors for Schizotypy and Schizophrenia: The Case of Childhood Interpersonal Adversity

The contribution of psychosocial environmental factors to the etiology and course of psychotic phenomena has received renewed interest in recent years. This may be due, in part, to the fact that epidemiological research has revealed considerable variation in the

incidence/expression of schizophrenia in different social contexts (McGrath & Susser, 2009; Morgan, Charalambides, Hutchinson, & Murray, 2010; van Os & Kapur, 2009). In this regard, evidence has continued to accumulate linking an array of macro- and micro-environmental factors with an increased risk for psychosis at both clinical and subclinical levels of expression (Brown, 2011; van Os et al., 2009; van Os et al., 2010). The most prominently studied factors include growing up in an urban environment, migrant or ethnic minority status, cannabis use, stressful life events, and childhood interpersonal adversity. The present thesis focuses on the last factor.

When examining interpersonal forms of adversity in childhood, a broad range of experiences may be included; these typically encompass sexual abuse, physical abuse and neglect, emotional abuse and neglect, as well as bullying by peers before the age of 18 years. Considerable evidence has shown that exposure to such adversities is associated with a number of psychiatric outcomes (e.g., Kessler et al., 2010). In the field of psychosis, this association has become well established with respect to clinical disorders, psychotic symptoms and experiences, and schizotypy traits (Matheson et al., 2013; Varese et al., 2012; Velikonja et al., 2014). The evidence is generally more robust for the positive symptom dimension, although associations have also been reported with the negative (e.g., Alemany et al., 2013; DeRosse, Nitzburg, Kompancaril, & Malhotra, 2014) and disorganized (e.g., Powers, Thomas, Ressler, & Bradley, 2011; Raine, Fung, & Lam, 2011) dimensions.

Crucially, the association of childhood adversity with clinical and subclinical psychosis phenotypes has been found when using prospective designs (Aresenault et al., 2011; Cutajar et al., 2010; Fisher et al., 2013; Kelleher et al., 2013) as well as when taking into account familial risk for psychosis (Alemany et al., 2013; Arsenault et al., 2011; Fisher et al., 2014). Moreover, the strength of the associations between adverse experiences and self-reported symptoms was found to be comparable in healthy volunteers and psychotic disorder patients (DeRosse et al., 2014).

In sum, the adversity—psychosis link is consistently robust across the spectrum of clinical and nonclinical manifestations. Although further research is required to determine causation, the current evidence appears to support a causal interpretation (Barrantes-Vidal, 2014; van Winkel, van Nierop, Myin-Germeys, & van Os, 2013).

2.2.1. Measurement of Childhood Interpersonal Adversity

A limitation of much of the research conducted thus far is that the assessment of adverse experiences has tended to rely on crude measurements, such as checklists with questions that require "yes/no" responses (Fisher & Craig, 2008; Velikonja et al., 2014). Additionally, a shortcoming of many epidemiological studies is that the trauma measures used may not able to capture more subtle forms of interpersonal adversity, which can also have detrimental effects on psychological functioning. Reviews of the studies on the link between childhood adversity and psychosis (e.g., Bendall, Jackson, Hulbert, & McGorry, 2008) have suggested that research in the field would benefit from the use of extensively validated trauma measures that involve questioning about objective information such as the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998) and the Childhood Experience of Care and Abuse (CECA; Bifulco, Brown, & Harris, 1994). These are the measures used in the studies presented in the current thesis.

2.2.2. Plausible Mechanisms to Explain the Adversity—Psychosis Link

Although the association between exposure to childhood interpersonal adversity and psychotic phenomena is well established, there remain gaps in our understanding of the underlying processes involved. Several biological and psychological mechanisms have been proposed and a review of research on this issue is presented in Chapter 5. Theoretical work has

suggested that early adverse interpersonal experiences might increase the risk for psychosis through the formation of insecure attachment styles (Read & Gumley, 2008). Indeed, childhood interpersonal adversity has been consistently linked to the presence of insecure attachment (Baer & Martinez, 2006; Bifulco & Thomas, 2013; Muller, Sicoli, & Lemieux, 2000; Toth, Gravener-Davis, Guild, & Cicchetti, 2013) and insecure forms of attachment have been associated with psychotic phenomena in clinical and nonclinical samples (Korver-Nieberg et al., 2014). Thus, the possibility that attachment styles may be one of the mechanisms underlying the observed associations between adversity exposure and psychotic phenomena merits empirical attention.

2.3. Attachment Theory

Attachment theory (Bowlby, 1973, 1980, 1982; Ainsworth, Blehar, Waters, & Wall, 1978) was first designed to explain the nature of an infant's tie to primary caregivers and how the internalized experience of such relationships impacts upon adaptation and functioning throughout life. The theory has been widely (and successfully) used in the realm of adult relationships (see Cassady & Shaver, 2008, for reviews) and in developing lifespan models of risk and resilience for psychopathology (Bifulco & Thomas, 2013).

Bowlby (1982) suggested that human beings are born with a set of innate behavioral (or motivational) systems—one of which is the "attachment behavioral system". This system becomes activated by appraisals of internal or external threat and motivates the seeking and maintenance of proximity to supporting/caring others (termed attachment figures). The goal of the attachment system is to achieve "felt security" (Sroufe & Waters, 1977). At an evolutionary level, the attachment system's primary strategy (i.e., proximity seeking) is thought to enhance the chances of a child's survival. This does not mean that the attachment system is only active

in early life. Indeed, whilst attachment-related behaviors are particularly prominent in infancy and childhood, the attachment system continues to be active throughout development and into old age (as famously said by Bowlby, 1979, p. 129, “from the cradle to the grave”).

Whereas in infancy actual proximity seeking behaviors are characteristic, later in life individuals also rely upon the activation of mental representations that can produce a sense of security (Mikulincer & Shaver, 2007). These mental representations are one of the central tenets of attachment theory and describe the way in which the mind employs previous history to construe experience (Egeland & Carlson, 2004; Siegel, 2012). Specifically, the theory states that repeated interactions with attachment figures become internalized in the form of “internal working models” (cognitive/affective schemata) of the self and others that are carried forward over time and frame interactions with the social world (Bartholomew & Horowtiz, 1991; Bowlby, 1973; Siegel, 2012). These inner working models are regarded as a critical source of continuity in the functioning of the attachment system across life (Mikulincer & Shaver, 2003).

One of the primary features of internal working models is that they encode strategies of affect regulation (Schore & Schore, 2008). In fact, the regulation of affect and stress is a main function of the attachment system throughout the lifespan (Bifulco & Thomas, 2013). The particular strategies that individuals use to achieve the sense of “felt security” are considered to be contingent upon their histories of distress regulation with attachment figures (Kobak & Sceery, 1988). That is, when proximity seeking has been responded to by available and sensitively responsive figures (i.e., figures who have effectively served as a “secure base” for exploratory behavior and a “safe haven” in the face of distress; Bowlby, 1988), this facilitates the attainment of attachment security and the reliance on effective regulatory strategies. However, when proximity seeking has consistently failed to attain its goal, the individual will tend to rely on “secondary attachment strategies” characterized by hyperactivation (maximization) or deactivation (minimization) of the attachment system in an effort to manage distress (Mikulincer & Shaver, 2007).

2.3.1. The Attachment Style Construct

Before turning attention to the attachment style construct, it is important to note that different adult attachment models and measures exist that differ in the number and conceptualization of attachment patterns (which poses a challenge when comparing findings across studies). Most of the attachment models have emerged from two different research traditions: the developmental/psychodynamic tradition (which measures attachment as a state of mind) and the personality/social psychology tradition (which measures attachment as a relating style; Bifulco, Mahon, Kwon, Moran, Jacobs, 2003). Although both traditions identify attachment patterns that are similar to those identified in childhood, they focus on different aspects of attachment and are associated with different assessment methods. The work carried out in this thesis is based on the personality/social psychology approach to conceptualizing and measuring attachment; therefore, the definitions presented below are drawn from this line of work.

Attachment styles may be conceptualized as systematic or chronic patterns of relational expectations, needs, emotions, and behaviors that reflect individual differences in internal working models and affect regulation strategies (Berry et al., 2007; Fraley & Shaver, 2000). Attachment styles are broadly conceptualized as being of a secure or insecure nature and there is general agreement in the literature that attachment anxiety (associated with attachment system hyperactivation) and attachment avoidance (associated with attachment system deactivation) are the two main forms of attachment insecurity (Mikulincer & Shaver, 2007). The characteristic features of attachment anxiety include a high need for closeness, chronic worries about separation or rejection, and vigilance towards interpersonal threats. The characteristic features of attachment avoidance include discomfort with closeness, overly high autonomy, and dismissal of interpersonal threats (Brennan, Clark, & Shaver, 1998; Mikulincer & Shaver, 2003).

The different forms of attachment insecurity may predispose individuals to different configurations of symptoms or disorders (Mikulincer & Shaver, 2012).

An influential model of individual differences in adult attachment is that developed by Bartholomew and colleagues (Bartholomew, 1990; Bartholomew & Horowitz, 1991; Griffin & Bartholomew, 1994). These authors proposed an attachment framework in which different combinations of high and low attachment anxiety and avoidance defined four prototypic attachment styles: secure (low anxiety, low avoidance), preoccupied (high anxiety, low avoidance), dismissing (low anxiety, high avoidance), and fearful (high anxiety, high avoidance). The anxiety and avoidance dimensions are also considered to map onto the internal working models of the self and others, respectively. Therefore, as an example, the fearful style is described as having negative models of the self and others as well as high anxiety and avoidance in relationships.

As regards to the continuity between infant and adult attachment styles, attachment theory hypothesizes stability of style via the mechanism of the internal working model (Bifulco & Thomas, 2013), which is considered to be self-perpetuating (Bowlby, 1988; Collins & Read, 1994). Although the task of assessing continuity of attachment across the lifespan is muddled by the fact that there is a lack of comparable assessments of attachment for different developmental stages (Bifulco & Thomas, 2013), research has found a moderate degree of stability between infant and adult attachment patterns (Fonagy et al., 2010; Fraley, 2002; Waters, Hamilton, & Weinfield, 2000), with the evidence suggesting that security of attachment tends to be less stable under stressful life circumstances (Mikulincer & Shaver, 2007). Attachment researchers have suggested that insecure styles in early life may be considered “initiating conditions” that impact upon the individual’s regulatory capacities and dynamically shape the way experiences are engaged (Egeland & Carlson, 2004; Sroufe, Carlson, Levy, & Egeland, 1999; Sroufe, Coffino, & Carlson, 2010). In this sense, development is conceptualized in terms of pathways in which change always remains a possibility but is constrained by the

paths previously followed (Bowlby, 1973; Sroufe & Siegel, 2011). As put by Sroufe et al. (2010), "early experience is not deterministic yet always remains a part of the developmental landscape" (p. 39).

2.3.2. Measurement and Validity of Attachment Styles

With regard to measurement, the personality/social psychology tradition to attachment research has been characterized by assessing attachment styles via self-report instruments (Mikulincer & Shaver, 2007). For example, the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991) was the first self-report designed to assess Bartholomew's attachment framework and is currently still one of the most extensively used instruments of adult attachment. Within the specific field of psychosis, recent reviews (Gumley et al., 2014; Korver-Nieberg et al., 2014) indicate that the Psychosis Attachment Measure (PAM; Berry, Wearden, Barrowclough, & Liversidge, 2006) is the most commonly used self-report. The PAM was specifically designed to assess attachment in psychosis populations and has been useful for advancing research in the field. As such, being able to employ such an instrument within the Spanish cultural context would be useful for research and clinical purposes.

It should be noted that although questionnaire measures have been characteristic of the personality/social psychology tradition, a relatively new interview —the Attachment Style Interview (ASI; Bifulco, Moran, Ball, & Bernazzani, 2002)— provides an alternative to such measures and its use is continuously increasing across different countries, such as the United Kingdom, Portugal, Italy, and Japan (Bifulco & Thomas, 2013). One of the advantages of the ASI is that it allows obtaining a more contextualized assessment than that afforded by self-reports because it uses a number of probing and follow-up questions that elicit descriptive information. The attachment styles measured by the ASI are similar to those in Bartholomew's attachment model, but it incorporates an additional assessment of anger that is not included in

other frameworks. The ASI has demonstrated to be valuable for investigating psychosocial models of vulnerability to depression (Bifulco, 2002; Bifulco & Thomas, 2013), but has not yet been used within the field of psychosis research.

In terms of validity, extensive research has supported the construct validity of a number of adult attachment measures (including those described above). There is also considerable evidence showing that adult attachment styles relate to different cognitive, affective, interpersonal, and behavioral variables that are theoretically influenced by an individual's attachment style—even after controlling for constructs such as self-esteem or trait anxiety (for review, see Mikulincer & Shaver, 2007). Interestingly, however, there is a paucity of research examining the ecological validity of the attachment styles. Researchers have increasingly employed the Experience Sampling Method, a random time-sampling procedure, to investigate the ecological validity of psychological and personality constructs (such as the expression of schizotypy) and thus this method might be valuable for examining the real-life expression of attachment styles.

3. AIMS AND OUTLINE OF THIS THESIS

The main aim of this thesis was to examine the role of childhood interpersonal adversity and attachment styles in relation to schizotypy and other schizophrenia-spectrum phenotypes in nonclinical young adults. Based on this overarching goal, the thesis sought to address issues related to the measurement and validity of the attachment style and schizotypy constructs; to investigate associations between attachment styles and schizotypy dimensions; and to examine the role of insecure attachment styles as potential mechanisms mediating the associations of childhood interpersonal adversities with a spectrum of subclinical psychotic phenomena. These aims led to the following research, which is divided into four main sections:

The **first section** is dedicated to research on the assessment and validity of adult attachment styles. *Chapter 1* presents a study on the adaptation and preliminary psychometric properties of the Spanish version of the PAM, a contribution that was considered relevant in order to provide a suitable measure that may aid future research and practice with clinical populations. It was expected that the measure would show good conceptual and semantic equivalence as well as comparable psychometric properties to the English version of the scale. The study described in *Chapter 2* examined the real-life expression of adult attachment styles using the Experience Sampling Method. It was hypothesized that participants' affective states, cognitive appraisals, and social functioning in the flow of daily life would vary in meaningful ways according to their attachment style, which would provide evidence of ecological validity of the attachment styles. For example, as compared with secure attachment, anxious attachment was expected to relate to negative affect and perceived social rejection, whereas avoidant attachment was expected to relate to low positive affect and decreased desire for company. An additional aim of this study was to examine whether attachment styles moderated the

associations of social contact and social closeness with momentary affect, appraisals, and social functioning.

The **second section** of the thesis is dedicated to psychometric schizotypy. Specifically, the study presented in *Chapter 3* examined the validity of the positive and negative schizotypy dimensions in Spanish young adults. This study sought to extend previous research by investigating the associations of positive and negative schizotypy with measures of schizophrenia-spectrum psychopathology, functioning, affective states, prodromal symptoms, self-esteem, and self- and other-schemas. It was hypothesized that the schizotypy dimensions would show differential patterns of association with these measures. Specifically, positive schizotypy was expected to relate to psychotic-like symptoms and measures assessing negative affect, whereas negative schizotypy was expected to relate to schizoid and negative symptoms as well as to measures of diminished affect.

The **third section** of the thesis is dedicated to the association between attachment and schizotypy. *Chapter 4* describes a study[1] that aimed to examine the associations between attachment styles and schizotypy dimensions in two nonclinical samples of Spanish and American young adults. Following attachment theory and the characteristics of the hyperactivating and deactivating attachment strategies, it was expected that, across both samples, preoccupied attachment would be associated with positive schizotypy, dismissing attachment with negative schizotypy, and fearful attachment with both schizotypy dimensions.

The **fourth section** of the thesis sought to increase our understanding of the pathways between childhood adversity and psychotic phenomena. *Chapter 5* presents a review of the extant research on the mediating mechanisms underlying the association between psychosocial adversity and psychosis proneness. This review provides the background and context to the next two chapters, which focus specifically on testing the hypothesis that insecure attachment

[1] Parts of the results of this study are contained in the thesis of Dr. Bedoya, the second author of the article.

may be one of the mechanisms underlying the adversity—psychosis link. *Chapter 6* describes a self-report study investigating the mediating role of insecure attachment styles in the associations of childhood trauma with measures of psychosis proneness. *Chapter 7* presents an interview study investigating the mediating role of insecure attachment styles in the associations of adverse parental care with subclinical schizophrenia-spectrum psychopathology.

Finally, the thesis closes with a summary of the key results, a consideration of the theoretical and intervention implications of the research findings, and a discussion on the limitations and directions for further research.

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SECTION 1

ATTACHMENT

Chapter 1

Spanish version of the Psychosis Attachment Measure: Adaptation process and psychometric properties

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Summary

Introduction: Attachment theory has recently been postulated as a useful framework for enhancing our understanding of the role of psychosocial and environmental factors in relation to the vulnerability, expression, and course of psychosis. In this paper we present the Spanish adaptation and psychometric properties of the Psychosis Attachment Measure (PAM), a 16-item self-report scale specifically designed to measure adult attachment in people with psychosis.

Method: In study 1, the PAM was adapted into Spanish following the translation/back-translation procedure and was administered to 24 early psychosis patients to evaluate its intelligibility. In study 2, the psychometric properties of the scale were assessed in a sample of 235 university students. The students completed the PAM and the Relationship Questionnaire (RQ) via an Internet website.

Results: Results from study 1 demonstrated that the Spanish version of the scale is semantically and conceptually equivalent to the original English version and that it is appropriate for use with people experiencing psychotic symptoms. Paralleling the findings from the English version of the instrument, results from study 2 indicated that two factors, conceptually representing anxiety and avoidance, underlie the Spanish version of the PAM. The anxiety and avoidance subscales were found to have adequate levels of internal reliability and to be associated in a theoretically predicted fashion with the four prototypes of adult attachment measured with the RQ.

Discussion: The good psychometric properties exhibited by the instrument support its use for the assessment of adult attachment styles in the Spanish cultural context and allow for the comparability of findings across cultures. Having a Spanish instrument for assessing attachment in psychosis populations is a relevant contribution that opens up new avenues for research and clinical applications.

Keywords: PAM; attachment; psychosis; Spanish adaptation; psychometric properties

Resumen

Introducción: Recientemente se ha postulado a la teoría del apego como un marco conceptual de gran utilidad para mejorar la comprensión del papel de los factores psicosociales y ambientales en relación a la vulnerabilidad, expresión y curso evolutivo de la psicosis. En este artículo presentamos la adaptación española y las propiedades psicométricas de la *Psychosis Attachment Measure* (PAM), una escala de 16 reactivos diseñada para medir el apego adulto en población con psicosis.

Método: En el estudio 1 la PAM se adaptó al español siguiendo la metodología de traducción/retro-traducción y se administró a 24 pacientes con psicosis temprana para evaluar su comprensión del instrumento. En el estudio 2 se analizaron sus propiedades psicométricas en una muestra de 235 estudiantes universitarios. Los estudiantes completaron la PAM y el Cuestionario de Relación (RQ) a través de una página de Internet.

Resultados: Los resultados del estudio 1 demostraron que la adaptación del instrumento es conceptual y semánticamente equivalente a la versión original en inglés y que es apropiada para usarse en personas que presentan síntomas psicóticos. Replicando los hallazgos obtenidos con la medida original, los resultados del estudio 2 indicaron que dos factores, que conceptualmente representan ansiedad y evitación, subyacen a la versión española de la PAM. Las subescalas de ansiedad y evitación mostraron tener una consistencia interna adecuada, así como estar asociadas de forma teóricamente coherente con los cuatro prototipos de apego medidos con el RQ.

Discusión: La escala presenta unas propiedades psicométricas adecuadas, lo cual apoya su utilización para la evaluación de los estilos de apego adulto en el contexto cultural español y hace posible la comparación de resultados obtenidos en diferentes culturas. Disponer de un instrumento en español para evaluar el apego en población con psicosis es una aportación relevante que abre nuevos panoramas en ámbitos clínicos y de investigación.

Palabras clave: PAM; apego; psicosis, adaptación española; propiedades psicométricas

Introduction

There is mounting evidence supporting the central role of interpersonal relationships in understanding and treating a diverse array of psychiatric disorders.[1] A recent line of work has explored how Bowlby's[2,3,4] attachment theory can be used in the field of psychosis to enhance our understanding of how psychosocial factors impact on the vulnerability, expression, and course of psychotic disorders.[5,6,7] Specifically, it has been suggested that attachment theory and research could be useful for elucidating: (1) the developmental pathway through which childhood adversity can lead to psychotic symptoms;[8] (2) the difficulties in interpersonal and social functioning that characterize people with psychosis;[9,10] (3) the way in which attachment relationships contribute to the configuration of different coping styles that affect the course of, and recovery from, the disorder;[11] and (4) the underlying factors that influence treatment adherence, such as the therapeutic alliance.[9,12]

Attachment theory postulates that based on early interactions with significant figures individuals build mental representations or "internal working models" of the self and others.[3] These models are essential in shaping cognitive and affective processes throughout the lifespan and provide the foundation of an individual's attachment style.[13] Attachment styles are distinctive patterns of relational expectations, emotions, cognitions, and behaviors that are shaped by a person's cumulative attachment experiences.[13,14]

Individual differences in attachment may be characterized in terms of security versus insecurity. Interactions with available and sensitively responsive attachment figures promote a secure attachment style, characterized by comfort with closeness, confidence in the availability and trustworthiness of significant others, and the capacity to manage distress in constructive ways.[13,15] In contrast, when attachment figures are not responsive or emotionally available, the sense of security is not achieved, which can lead to the formation of insecure attachment styles.[15]

There is general consensus in the attachment literature about the existence of two independent dimensions regarding attachment insecurity. The two dimensions have been conceptualized from the "attachment behavioral systems" perspective as "anxiety" and "avoidance"[16] and from the "internal working models" perspective as representing the negativity of a person's "model of self" and "model of others".[17] The first dimension, model of self or anxiety, is associated with a negative self-image and reflects a strong desire for closeness as well as a fear of being rejected by significant figures. The second dimension, model of others or avoidance, is associated with a negative view of others and reflects a high need for self-reliance coupled with discomfort with closeness and emotional intimacy with others.[13,16]

Empirical research on the association between attachment and psychosis has provided evidence of a high prevalence of insecure styles in patients diagnosed with schizophrenia-spectrum disorders.[18,19] However, studies in this field have been limited, in part, by various methodological problems related to the difficulty of measuring attachment in people with psychosis with the most widely used measures.[20] Specifically, the use of the Adult Attachment Interview (AAI),[21] which is coded in terms of the coherence of a person's narrative in describing early experiences with attachment figures, has been questioned because the presence of positive symptoms may result in an incoherent discourse, therefore affecting the results of the interview.[22,23] On the other hand, the use of existing self-report instruments, which assess a person's thoughts, feelings, and behaviors in the context of close relationships,[13] has been questioned because they tend to focus on romantic relationships and are thus less suitable for people with psychosis, who are commonly isolated and are less likely to have a romantic partner.[24,25]

Berry et al.[20] developed the Psychosis Attachment Measure (PAM) out of the need to have an instrument of adult attachment designed specifically for use with people with psychosis. The PAM is composed of 16 items that assess the two dimensions of adult attachment, anxiety (eight items) and avoidance (eight items), and it also includes an open-ended question at the

end asking respondents to indicate the relationships they were thinking about while answering the scale. The items were derived from existing self-report questionnaires,[16,17] but its adequacy for use in psychosis populations lies in the fact that, unlike most instruments, it is applicable to people who do not currently have, or have never had, a romantic relationship.[9] A further advantage of the PAM is that items are rated on a simple and anchored four-point Likert scale, which is more appropriate for people with psychosis who often experience cognitive difficulties that may complicate understanding wide-ranging scales with insufficient anchor points. The PAM was originally developed and validated in a sample of university students[20] and in subsequent years it has also been shown to have good psychometric properties in clinical samples.[9] In addition, its brevity of application and simplicity of scoring make it a practical tool for use in clinical and research settings.

In the present investigation two studies were carried out: The aim of study 1 was to perform a comprehensive process of cultural adaptation of the PAM into Spanish and to administer it to a group of people with early psychosis. Study 2 aimed to examine the psychometric properties of the Spanish adaptation by assessing its factor structure, criterion validity, and the internal consistency reliability of its subscales.

STUDY 1

Overview

There has been a call for researchers to describe in sufficient detail the procedures followed when translating and adapting attachment instruments from one culture to another.[26] In study 1 we report on the process followed to adapt the PAM into Spanish and describe how we arrived at the final version of the instrument after pre-testing it in a sample of early psychosis patients.

Method

Adaptation Process

The linguistic and cultural adaptation of the PAM was carried out using the translation/back-translation method, which involves various steps that allow for corroboration of the semantic and conceptual equivalence between the original instrument and the generated version (Figure 1). During the adaptation process the guidelines of the International Test Commission[27] were followed, as well as the suggestions provided by several authors.[26,28,29]

In the first step, two independent forward translations of the original instrument were made. Following the stipulations of Hambleton[29] to ensure that the translations preserve the nuances of the original items, the translations were carried out by Spanish-speaking persons who were not only familiar with both the target and source culture, but who were also knowledgeable of the constructs assessed by the measure. The two translations were reviewed independently by three additional evaluators, who compared all the items and pointed out those susceptible to improvements. Subsequently, meetings were held between the translators and reviewers in which adjustments were made to the items with discrepancies and by consensus a first version of the scale was agreed upon.

The preliminary Spanish version was back-translated into English by a bilingual British Clinical Psychologist with residency in Barcelona, who was blind to the original version of the instrument. This first back-translation was then sent to the principal author of the English PAM (KB), who carried out a comparison between the original and the back-translated items. For this purpose she evaluated the conceptual equivalence (if the same theoretical construct is measured in both cultures) and the semantic equivalence (if the meaning is the same in both cultural contexts) of the items, using a four-category ranking with the following characteristics: The items that show full semantic and conceptual coincidence with the original ones are classified as “Type A”. When items show satisfactory conceptual equivalence, but differ in one or more words from the original version, they are labeled as “Type B”. Those items that

preserve the original meaning but do not show a satisfactory conceptual equivalence are classified as “Type C”. Finally, the “Type D” label is assigned to items with no coincidence between the back-translation and the original version.

The items that did not show “Type A” equivalence with respect to the originals were re-examined by the research team. Alternative formulations were proposed until a satisfactory version was accepted through consensus. The modified items were subjected to a new back-translation process and subsequently KB used the same classification system to assess whether the equivalence had improved for the problematic items.

Pre-testing

In order to evaluate the intelligibility of the measure and refine it prior to assessing its psychometric properties, the generated Spanish version was pre-tested among 24 early psychosis patients linked to the Sant Pere Claver Early Psychosis Program (SPC-EPP), currently being carried out at three specialized Community Mental Health centers in Barcelona.[30] Patients ranged in age from 15 to 31 (M = 23.46, SD = 4.8) and 58.3% were men. Of these, 8 (33.3%) met DSM-IV criteria for a first episode of a psychotic disorder (FEP)[31] and 16 (66.7%) met criteria for one or more of the Ultra-High Risk for psychosis (UHR) groups based on the Comprehensive Assessment of At Risk Mental States (CAARMS).[32] Patients completed the questionnaire and were later asked about any difficulties in the comprehension of instructions, scale items, and response categories. Once this phase was completed, the research team incorporated the necessary changes and obtained the definitive Spanish version of the instrument.

Results

Adaptation Process

The classification of the back-translated items according to their conceptual and semantic equivalence with the original version revealed that of the 16 items, 13 were classified as having "Type A" equivalence (81.25%) and 3 as "Type B" (18.75%). The open-ended

question that composes the second part of the scale was rated as “Type A”. No items received a “Type C” or “Type D” classification. With the purpose of improving the equivalence of the “Type B” items, the research team asked KB to nuance their meaning and discussed with her the use of certain terms. New Spanish alternatives were generated for these items for which a final version was agreed upon after an iterative process of new back-translation and equivalence assessment. For example, for item 2, it was decided to keep the term “*apoyarme en”* (“lean on”) to reflect the English phrase “depend on” because the research team agreed that its linguistic equivalent (“*depender de*”) has a more negative connotation in the Spanish cultural context. For item 14, “I worry that if I displease other people, they won’t want to know me anymore”, the team concluded that the literal Spanish translation of the phrase “won’t want to know me anymore” (“*ya no querrán conocerme*”) would be unclear to Spanish respondents and as such it was decided to use the wording “*ya no querrán relacionarse conmigo*” (“won’t want to have a relationship with me”).

Pre-testing

The 24 early psychosis patients considered the questionnaire to be understandable, well structured, and easy to complete. Taking into account their feedback, the wording of three items (7, 13, and 16) was modified to improve their intelligibility. Also, one patient mentioned being unsure about how to respond to the scale and thus the research team decided to add the phrase “This statement describes me” (“*Esta frase me describe*”) on top of the response categories in order to make it more straightforward for respondents.

Discussion

The adaptation process followed in this study has allowed us to obtain a Spanish version of the PAM that preserves the semantic and conceptual equivalence of the original English version. Furthermore, the results of the pre-test phase showed that the adapted instrument is appropriate for use with people experiencing psychotic symptoms in the Spanish cultural context. Carrying out this type of adaptation avoids the complexity of developing a new

instrument and allows for making reference to the values obtained in the process of validation of the original measure. In sum, the present study demonstrated that the Spanish version of the PAM is a highly understandable instrument that shows good equivalence with the English version. This, in turn, guarantees to a considerable extent that the measure preserves the function and validity of the original questionnaire.

STUDY 2

Overview

The goal of the second study was to assess the psychometric characteristics of the Spanish version of the PAM. The specific aims were to examine the instrument's underlying factor structure, determine the internal consistency reliability of the anxiety and avoidance subscales, and assess its criterion validity by correlating its subscales with the four attachment prototypes measured by the Relationship Questionnaire (RQ).[17] It was hypothesized that a two-factor structure would underlie the Spanish adaptation of the instrument and that the anxiety and avoidance subscales would exhibit good internal consistency. Furthermore, it was predicted that the anxiety subscale would have a significant positive correlation with the RQ preoccupied prototype, whereas the avoidance subscale would have a significant positive correlation with the RQ dismissing prototype. The two subscales were also expected to show a positive, albeit smaller, association with the RQ fearful prototype (which is composed of high avoidance and high anxiety).

Method

Participants

Participants were 235 undergraduate and postgraduate students from public universities in Barcelona, who responded to an e-mail (sent out to approximately 360 students) that invited them to go to a web page to take part in a study about the instruments used to assess interpersonal relationships. Students volunteered to participate in the study and were not pre-

selected based upon any criteria. Of the participants, 72 (30.6%) were men and 163 (69.4%) were women, with ages ranging from 19 to 55 (M = 27.13, SD = 5.93). The majority of the sample was composed of psychology students (54.5%).

Measures

In addition to completing the Spanish version of the PAM, participants were asked to fill out the Relationship Questionnaire (RQ)[17] in its Spanish version.[33] The RQ is based on Bartholomew's[34] attachment model, which conceptualizes four prototypes of adult attachment based on the intersection of two underlying dimensions, model of self (or anxiety) and model of others (or avoidance). The RQ consists of four paragraphs, each describing a prototype of adult attachment: secure (low avoidance, low anxiety), dismissing (high avoidance, low anxiety), preoccupied (low avoidance, high anxiety), and fearful (high avoidance, high anxiety). Participants were asked to provide a rating for each description on a 7-point scale ranging from "strongly disagree" to "strongly agree" and to select the statement that best describes the way they approach close relationships. The RQ has been shown to have acceptable reliability and validity.[35,36] The continuous ratings of each attachment prototype were used for analyses.

Results

Factor Structure

A principal components analysis (PCA) with varimax rotation was performed on the 16 items to determine the underlying factor structure of the Spanish adaptation of the scale. Visual inspection of the scree plot clearly indicated a two-factor solution, consistent with the findings from the English version of the PAM. Therefore we proceeded to perform a second analysis with the extraction components fixed to two. The Kaiser-Meyer-Olkin measure confirmed the sampling adequacy for the analysis (KMO = .81), and Bartlett's Test of Sphericity, $\chi 2$ (120) = 1015.90, $p<.001$, suggested that the correlations among items were sufficiently large for PCA.[37] The results revealed two distinct factors with all items loading substantially onto the expected factor. After rotation, loadings ranged from .52 to .77 and none of the items cross-loaded above

.26 onto the other component (see Appendix A). The two factors contributed to 43.13% of the total variance, with the first factor (anxiety) accounting for 22.39% of the variance and the second factor (avoidance) explaining 20.75% of the variance.

Internal Consistency Reliability

PAM scores for the anxiety and avoidance dimensions were calculated by averaging the scores for the items that loaded onto the anxiety and avoidance factors. Internal consistency reliability was assessed for the two subscales using Cronbach's Alpha. The coefficients were found to be .81 for the anxiety subscale and .78 for the avoidance subscale, which are comparable to the values reported for the English version of the scale.[9,20,38] The two dimensions were not significantly correlated ($r = -.10$, $p = .14$), suggesting that they are indeed distinct constructs.

Criterion Validity

Table 1 displays the association between the PAM subscale scores and the four RQ attachment prototype ratings. Consistent with theoretical predictions, the results revealed that the anxiety dimension was most strongly correlated with the RQ preoccupied prototype ($r = .44$, $p<.001$), whereas the avoidance dimension was most strongly correlated with the RQ dismissing prototype ($r = .46$, $p<.001$). Note also that both subscale scores were significantly positively correlated with the fearful prototype, which comprises both high avoidance and high anxiety.

Discussion

Study 2 aimed to analyze the factor structure, internal consistency reliability, and criterion validity of the Spanish version of the PAM in a sample of university students. Results paralleled the findings obtained with the English instrument and suggest that the Spanish version of the scale works well in the Spanish cultural context. Firstly, as in Berry et al.,[9,20,38] the analysis revealed a two-factor structure representing the constructs of attachment anxiety and avoidance. Secondly, we found good levels of internal reliability for the instrument's subscales,

with values comparable to those reported for the English PAM. Finally, support for criterion validity was obtained given that both the anxiety and avoidance dimensions were associated in a theoretically predicted fashion with the four prototypes of adult attachment measured by the RQ. Taken together, the findings indicate that the Spanish adaptation of the PAM displays good psychometric properties. Future work is warranted to investigate the psychometric characteristics of the scale with clinical samples as well as to determine its convergent and discriminant validity.

General Discussion

In the current scientific panorama, the field of psychosis is experiencing a considerable growth in the number of multicenter projects and multicultural investigations.[39-41] At the same time, practitioners and researchers addressing psychotic disorders have increasingly been encouraged to incorporate the evaluation of attachment styles in their assessments.[8] This emerging body of work has brought about the need to adapt the relevant assessment instruments so that they can be properly used in populations other than those for which they were designed. In the present research two studies were carried out with the purpose of adapting the PAM for use in the Spanish cultural context. The findings demonstrated that the Spanish version of the scale maintains semantic and conceptual equivalence as well as comparable psychometric properties with respect to the English version.

The process of translation and cultural adaptation followed in study 1 allowed to ensure the equivalence and quality of the Spanish version of the scale. It is important to note that a very valuable step in the adaptation process was the examination of its adequacy for use with individuals experiencing psychotic symptoms. We purposely targeted early psychosis patients to pre-test the measure because attachment might be particularly significant in the onset of a psychotic disorder[9] and because in the prodromal and first-episode phases the interpersonal

characteristics that impact on treatment engagement and the therapeutic alliance might be more accessible and amenable to intervention.[42]

The analyses performed in study 2 showed that the Spanish PAM has the intended factor structure, indicating that it clearly distinguishes the two dimensions of adult attachment. The measure was also shown to have internally consistent subscales and appropriate concurrent validity with another measure of adult attachment. Overall, the good psychometric properties exhibited by the instrument support its use for the assessment of adult attachment styles and allow for the comparability of findings across cultures.

The current research had some limitations that should be taken into consideration when interpreting the results. The PAM's psychometric properties were tested in a sample of university students with predominantly female participants. Future studies should examine the scale in non-student samples with wider variability in terms of socio-demographic characteristics. Moreover, although the psychometric characteristics of the English version of the scale have been replicated in both clinical and university student samples, research is required with clinical populations in order to expand the validation of the Spanish instrument by relating it to clinical, treatment, and outcome measures. An additional limitation of the present investigation was the use of an Internet-based approach to recruit participants because this method restricts the sample to students who were self-selected. However, from an ethical standpoint, web designs allow research participants to withdraw from the study at any time while keeping their anonymity, so participation can be considered to be less contaminated by motivational confounding.[43]

In closing, the Spanish version of the PAM appears to be a reliable and valid self-report measure of adult attachment. Considering that attachment theory has recently been postulated as a useful framework that may afford valuable insights into the affective, cognitive, and interpersonal components that contribute to the vulnerability, development, and course of psychosis,[6,7] having an instrument for assessing attachment styles in the Spanish population

with psychosis is a relevant contribution that opens up new avenues for research and clinical applications.

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Figure 1

Outline of the steps involved in the adaptation process

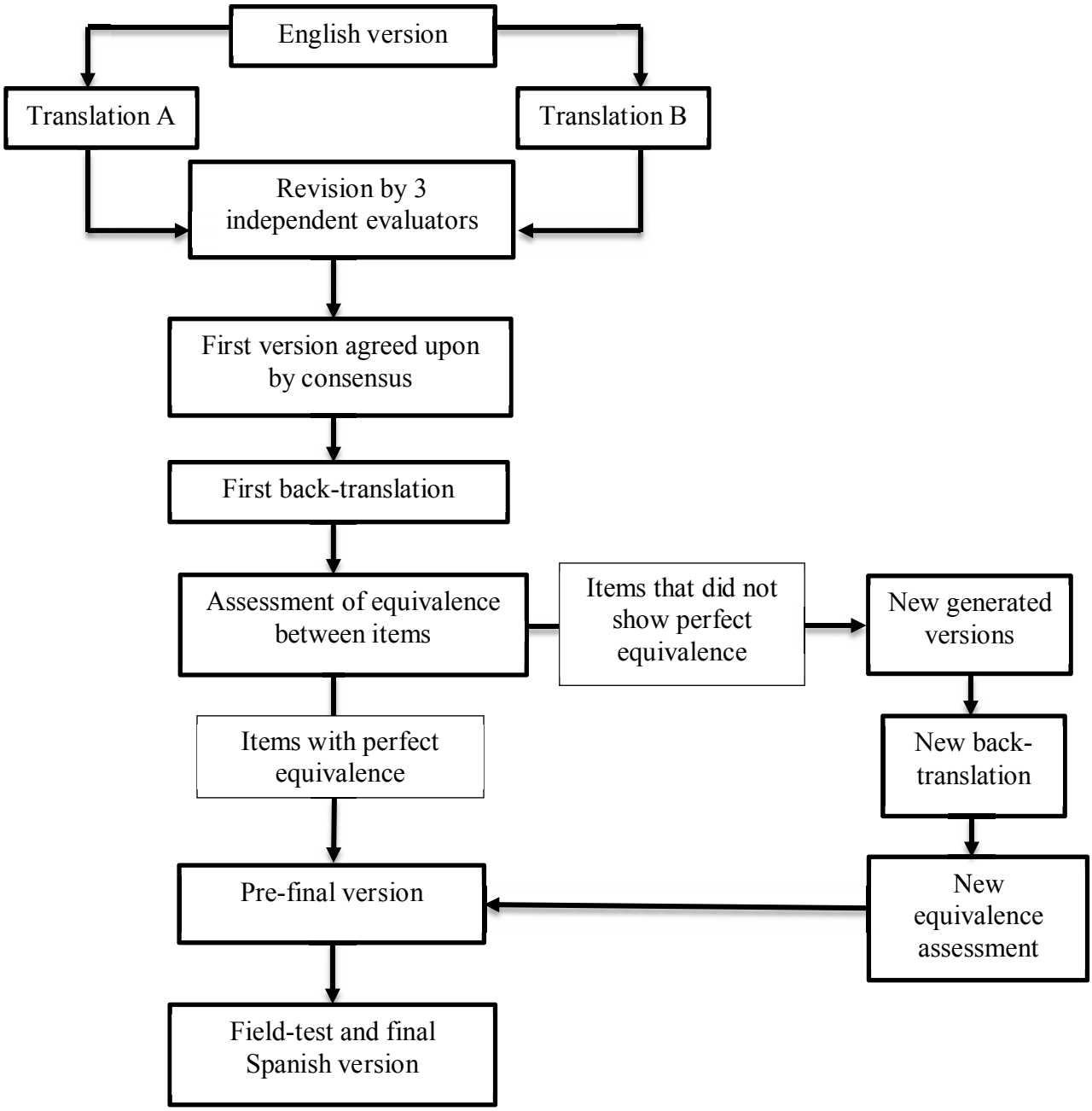

Table 1

Associations between the PAM subscales and the four RQ prototypes of adult attachment

	RQ prototypes			
PAM subscales	Secure	Preoccupied	Dismissing	Fearful
Anxiety	.01	.44*	-.25*	.22*
Avoidance	-.23*	.09	.46*	.33*

Note. RQ = Relationship Questionnaire; PAM = Psychosis Attachment Measure.
* $p \leq .001$

Appendix A

Principal components analysis with varimax rotation and scoring procedure

Item	Factor 1 Anxiety	Factor 2 Avoidance
3. Tiendo a entristecerme, ponerme ansioso/a o enfadarme si otras personas no están ahí cuando las necesito.	**.709**	-.157
5. Me preocupa que personas importantes en mi vida no estén presentes en un futuro.	**.593**	.119
6. Pido a los demás que me reafirmen que les importo.	**.626**	-.148
7. Me afecta mucho que otras personas no aprueben lo que hago.	**.696**	-.090
10. Me preocupa que si la gente llega a conocerme mejor, no les voy a gustar.	**.547**	.255
12. Me preocupo mucho por mis relaciones con otras personas.	**.681**	-.109
14. Me preocupa que si no complazco a los demás ya no querrán relacionarse conmigo.	**.678**	.143
15. Me preocupa tener que afrontar solo/a mis problemas y situaciones difíciles.	**.670**	-.196
1. Prefiero no mostrar a otras personas mis verdaderos pensamientos y sentimientos.	.002	**.621**
2. Me es fácil apoyarme en otras personas cuando tengo problemas o situaciones difíciles. (R)	-.114	**.768**
4. Normalmente hablo sobre mis problemas y preocupaciones con otras personas. (R)	-.195	**.710**
8. Encuentro difícil aceptar la ayuda de otras personas cuando tengo problemas o dificultades.	.155	**.618**
9. Me ayuda acudir a otras personas cuando estoy estresado/a. (R)	-.195	**.541**
11. Cuando me siento estresado/a, prefiero estar solo/a a estar acompañado/a por otras personas.	.074	**.603**
13. Trato de afrontar por mí mismo/a las situaciones estresantes.	-.170	**.520**
16. Me siento incómodo/a cuando otras personas quieren conocerme mejor.	.176	**.573**

Note. Items rated: 0, not at all (*nada*); 1, a little (*un poco*); 2, quite a bit (*bastante*); 3, very much (*mucho*). (R) = Reverse items (2, 4, and 9). Scoring: Anxiety: (3 + 5 + 6 + 7 + 10 + 12 + 14 + 15) / 8; Avoidance: (1 + 2 + 4 + 8 + 9 + 11 + 13 + 16) / 8.

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Chapter 2

Real-life expression of adult attachment styles

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Abstract

Background: The way in which attachment styles are expressed in the moment as individuals navigate their real-life settings has remained an area largely untapped by attachment research. The present study used Experience Sampling Methodology (ESM) to examine (1) the daily life expression of attachment styles in the domains of affect, cognition, and social functioning, and (2) whether attachment styles moderate the associations of social contact and social closeness with momentary affect, appraisals, and social functioning.

Methods: Two hundred and six Spanish young adults were administered the Attachment Style Interview (ASI) and were signaled randomly eight times daily for one week to complete questionnaires about their current experiences and social context.

Results: Compared with secure attachment, anxious attachment was associated with hyperactivating tendencies, such as higher negative affect, stress, and perceived social rejection. By contrast, relative to secure attachment, avoidant attachment was associated with deactivating tendencies, such as decreased positive states and decreased desire for social contact when alone. Furthermore, the differential expression of attachment styles in social contexts was dependent upon the subjective appraisal of the closeness of social contacts, and not merely upon the presence of social interactions.

Conclusions: The findings support the ecological validity of the ASI and the person-by-situation character of attachment theory. Moreover, they highlight the utility of ESM for investigating how the predictions derived from attachment theory play out in the natural flow of real life.

Keywords: experience sampling methodology; attachment styles; ecological validity

Introduction

Attachment theory [1-3], along with its theoretical and empirical extensions (e.g., [4-6]), is a useful and influential framework for understanding personality development, relational processes, and the regulation of affect. Over the past two decades, an increasing body of research has accrued on the origins and correlates of individual differences in adult attachment styles [7]. However, an important limitation of previous studies is that many failed to take into account the effect of context on the expression of attachment styles. This is surprising given that attachment theory is in essence a "person by situation" interactionist theoretical framework [8, 9], and possibly derives from the scarcity of methods allowing for such a dynamic approach. Although significant insights have been obtained by focusing on individual differences in retrospective reports of the expression of attachment, at present there is scant knowledge regarding how attachment styles are expressed in the moment and how they play out in real-world settings [10]. The current study extends previous work by employing experience sampling methodology (ESM), a random time-sampling procedure, to examine the daily life expression of adult attachment styles in a non-clinical sample of young adults.

Attachment Theory and the Attachment Style Construct

Attachment theory is a lifespan approach that postulates that people are born with an innate motivational system (termed the attachment behavioral system) that becomes activated during times of actual or symbolic threat, prompting the individual to seek proximity to particular others with the goal of alleviating distress and obtaining a sense of security [1]. A cornerstone of the theory is that individuals build cognitive-affective representations, or "internal working models" of the self and others, based on their cumulative history of interactions with attachment figures [2, 11]. These models guide how information from the social world is appraised and play an essential role in the process of affect regulation throughout the lifespan [12, 13].

The majority of research on adult attachment has centered on attachment styles and

their measurement (see [7] for a review). In broad terms, attachment styles may be conceptualized in terms of security versus insecurity. Repeated interactions with emotionally accessible and sensitively responsive attachment figures promote the formation of a secure attachment style, characterized by positive internal working models and effective strategies for coping with distress. Conversely, repeated interactions with unresponsive or inconsistent figures result in the risk of developing insecure attachment styles, characterized by negative internal working models of the self and/or others and the use of less optimal affect regulation strategies [7].

Although there is a wide range of conceptualizations and measures of attachment insecurity, these are generally defined by high levels of anxiety and/or avoidance in close relationships. Attachment anxiety reflects a desire for closeness and a worry of being rejected by or separated from significant others, whereas attachment avoidance reflects a strong preference for self-reliance, as well as discomfort with closeness and intimacy with others [14-16]. These styles involve distinct secondary attachment strategies for regulating distress – individuals with attachment anxiety tend to use a hyperactivating (or maximizing) strategy, while individuals with attachment avoidance tend to rely on a deactivating (or minimizing) strategy [4, 5, 17, 18]. Indeed, previous empirical studies indicate that attachment anxiety is associated with increased negative emotional responses and distress, heightened detection of threats in the environment, and negative views of the self [19-23]. By contrast, attachment avoidance is associated with emotional inhibition or suppression, the dismissal of threatening events, and inflation of self-conceptions [7, 24, 25].

Examining Attachment Styles in Daily Life

Only a few studies have examined attachment styles in the context of everyday life. Most of these studies have used event-contingent sampling techniques, such as the Rochester Interaction Record (RIR) [26], and have primarily focused on assessing how individual differences in self-reported attachment are related to responses to social interactions in general

and/or to specific social interactions (e.g., with acquaintances, friends, family members, close others, same- and opposite-sex peers). Despite various methodological and attachment classification differences that complicate direct comparison of these findings, this body of research has shown that compared to secure attachment, anxious (or preoccupied) attachment is associated with more variability in terms of positive emotions and promotive interactions (a composite measure of disclosure and support) [27], lower self-esteem [28], greater feelings of anxiety and rejection, as well as perceiving more negative emotions in others [29]. In contrast, compared to secure attachment, avoidant (or dismissing) attachment has been associated with lower levels of happiness and self-disclosure [29], lower perceived quality of interactions with romantic partners [30], a tendency to differentiate less between close and non-close others in terms of disclosure [28], and higher negative affect along with lower positive affect, intimacy, and enjoyment in opposite-sex interactions [27].

Studies using event-contingent methods such as the RIR have shed light on how varying social encounters trigger differential responses as a function of attachment style; however, since the focus is on objectively defined interactional phenomena (e.g., interactions lasting 10 minutes or longer), these types of paradigms are unable to capture the wide range of naturally occurring subjective states and appraisals that take place as individuals navigate through their daily life. Unlike previous research, the current study used ESM, a within-day self-assessment technique in which participants are prompted at random intervals to answer brief questionnaires about their current experiences. ESM offers several advantages compared to traditional laboratory or clinic-based assessment procedures (e.g., [31-33]). These include: (1) ESM repeatedly assesses participants in their daily environment, thereby enhancing ecological validity, (2) it captures information at the time of the signal, thus minimizing retrospective recall bias, and (3) it allows for investigating the context of participants' experiences.

To our knowledge, the work of Torquati and Raffaelli [10] is the only ESM study that has assessed how daily life experiences of emotion differed as a function of attachment category

(secure vs. insecure) and context (being alone or in the presence of familiar intimates). In a sample of undergraduate students, they found that both when in the presence of familiar intimates and when alone, the secure group reported higher levels of emotions relating to energy and connection than the insecure group. Additionally, when alone, securely attached individuals reported greater levels of positive affect than insecurely attached individuals. Moreover, although the two groups did not differ in the variability of their emotional states, participants with a secure style endorsed more extreme positive emotional states across all social contexts, whereas those with insecure styles endorsed more extreme negative emotional states, particularly when they were alone. Their results supported the notion that attachment styles exert a broad influence on affective experiences; nevertheless, an important limitation of this study was that it only reported findings comparing secure versus insecure participants, and thus it is was not possible to distinguish between the expression of each insecure attachment style – which presumably have differential expressions. Therefore, further empirical research is needed to examine how attachment styles are expressed in the flow of daily life and whether the interplay between attachment styles and the features of the environment gives rise to different patterns of experiences in the moment. Demonstrating that attachment styles exhibit meaningful associations with real-world experiences in the domains that are theoretically influenced by an individual's attachment style would provide evidence of the validity of the attachment style construct in the immediate context in which the person is embedded. Moreover, identifying attachment-style variations in how the social context relates to momentary experiences would enhance our understanding of how attachment styles operate in the immediate social milieu.

Goals and Hypotheses

The present study examines the expression of secure, anxious, and avoidant attachment styles in daily life using ESM. It extends previous research in several ways. First, the current study employs an interview, rather than a self-report measure, to assess attachment styles. The Attachment Style Interview (ASI) [34] is a semi-structured interview that belongs to the social

psychology tradition of attachment research and has the strength of utilizing contextualized narrative and objective examples to determine the individual's current attachment style. Second, this study examines the expression of attachment styles at random time points across participants' daily life, not just during particular events such as social interactions, and thus captures a more extensive profile of person-environment transactions. Third, this study examines the impact of two aspects of the social context on the expression of attachment styles in the moment: social contact and perceived social closeness when with others. None of the previous diary studies have examined attachment style differences in the effects of social contact and social closeness on participants' subjective appraisals of themselves (e.g., their coping capabilities), their current situation (e.g., how stressful it is), or their social functioning (e.g., preference for being alone).

The first aim of this study was to examine the associations between attachment styles and measures of affect, cognitive appraisals (about the self, others, and the situation), and social functioning as they occur in daily life. Following attachment theory, it was hypothesized that compared to both insecure attachment groups, secure attachment would be associated with higher ratings of positive affect, self-esteem, feeling cared for, as well as with experiencing more closeness in social interactions. In terms of insecure attachment, a different pattern was predicted for the anxious and avoidant styles. We hypothesized that compared to securely attached participants, those with anxious attachment would endorse higher levels of negative affect, affect instability, subjective stress, feeling unable to cope, and perceived social rejection. We predicted that avoidant attachment, as compared with the secure style, would be associated with lower ratings of positive affect, a decreased desire to be with others when alone, and an increased preference for being alone when with others. In essence, this would provide evidence of ecological construct validity of the attachment styles.

The second aim of the current study was to investigate whether attachment styles moderate the associations of social contact and social closeness with momentary affect,

appraisals, and social functioning. Given the lack of engagement and emotional distance that characterizes avoidant attachment, it was hypothesized that social contact would elicit less positive affect in avoidant participants as compared to their secure peers. Additionally, given that one of the most salient features of anxious individuals is that they desire closeness but fear rejection and abandonment**,** it was predicted that anxious participants would experience higher negative affect with people with whom they did not feel close, than would those with a secure attachment.

Methods

Ethics Statement

The study was approved by the Universitat Autónoma de Barcelona (Spain) Ethics Committee and conformed to the Helsinki Declaration. Participants provided written informed consent and were paid for their participation.

Participants

Participants were 206 (44 men, 162 women) undergraduate students recruited from the Universitat Autónoma de Barcelona. The mean age of the sample was 21.3 years (*SD* = 2.4). An additional 8 participants enrolled in the study and completed the interview phase, but were omitted from the analyses due to failing to complete the ESM protocols.

Materials and Procedure

Participants were assessed with the ASI, along with other interview and questionnaire measures not used in the present study. The ASI is a semi-structured interview that measures current attachment style based on the context and content of a person's experiences in close relationships. The interview is composed of two parts: First, a behavioral evaluation of the ability to make and maintain relationships is made on the basis of the overall quality of the person's ongoing relationships with up to three supportive figures (referred to as "very close others"), including partner if applicable. Second, ratings are obtained for seven attitudinal scales that

reflect anxiety (e.g., fear of rejection, fear of separation, desire for company) and avoidance (e.g., constraints on closeness, mistrust, self-reliance) in relationships. The interview scales are scored according to specific rating rules and benchmark examples. The scores obtained on the interview are combined to enable the classification of the person's attachment profile, which encompasses both the attachment style categorization and the degree of severity for the insecure styles. Previous studies have provided evidence for the reliability and validity of the ASI [16, 35]. In the present study, the three main attachment style categories (i.e., secure, anxious, and avoidant) were used for analyses.

ESM data were collected on palm pilot personal digital assistants (PDAs). The PDAs signaled the participants to complete brief questionnaires eight times a day, between 10 a.m. and 10 p.m., for seven consecutive days. When prompted by the signal, the participants had 5 minutes to initiate responding. After this time window or upon completion of the questionnaire, the PDA would become inactive until the next signal. Each questionnaire took approximately 2 minutes to complete.

The ESM questionnaire inquired about the following daily life experiences: (1) affect in the moment, (2) appraisals about the self, (3) appraisals about others, (4) appraisals of the current situation, (5) social contact, and (6) social appraisals and functioning (see Table 1 for the English translation of the ESM items used in the present study). The social contact item (i.e., "Right now I am alone") was answered dichotomously (yes/no), whereas the remaining items were answered using 7-point scales from 1 (not at all) to 7 (very much). These labels were intended to enhance the presentation of the results, but note that the ESM items subsumed under each label were analyzed individually. For the sake of aiding interpretation, the labels make a distinction between affective states and cognitive appraisals; however, we recognize that such a distinction is not clear-cut and that affect and cognition are complexly intertwined processes. Likewise, we grouped appraisals as pertaining to the self, others, or the situation. This distinction is somewhat artificial but useful for organizing the presentation of the data. Note

that, unlike most previous studies, the label “appraisals about others” does not refer to participants’ ratings of interaction partners, but to the manner in which participants’ experience others’ motives, actions, or esteem towards them.

Statistical Method

ESM data have a hierarchical structure in which daily life ratings (level 1 data) are nested within participants (level 2 data). Multilevel or hierarchical linear modeling techniques are a standard approach for the analysis of ESM data [36, 37]. The multilevel analyses examined two types of relations between the attachment groups and daily life experiences. First, we assessed the independent effects of level 2 predictors (attachment style groups) on level 1 dependent measures (ESM ratings in daily life). Second, cross-level interactions (or slopes-as-outcomes) examined whether level 1 relationships (e.g., closeness and negative affect in the moment) varied as a function of level 2 variables (attachment groups). The analyses were conducted with Mplus 6 [38]. To examine the effects of attachment, the analyses included two dummy-coded attachment style variables that were entered simultaneously as the level 2 predictors, following Cohen, Cohen, West, and Aiken [39]. The first dummy code contrasted the anxious and secure attachment groups, and the second contrasted the avoidant and secure attachment groups. Note that direct comparisons of the anxious and avoidant attachment groups were not made, given that our hypotheses focused on differences between secure and insecure attachment. Level 1 predictors were group-mean centered [40]. The data departed from normality in some cases, so parameter estimates were calculated using maximum likelihood estimation with robust standard errors.

Results

Based upon the ASI, 119 (57.8%) of the participants were categorized as having secure attachment, 46 (22.3%) as having anxious attachment, and 41 (19.9%) as having avoidant attachment. These percentages are comparable to those reported in previous studies using the

ASI in non-clinical samples (e.g., [41, 42]). The attachment groups did not differ in terms of age or sex. Participants completed an average of 40.8 usable ESM questionnaires (*SD* = 9.1). The attachment groups did not differ on the mean number of usable questionnaires (Secure = 40.8, *SD* = 8.2; Anxious = 40.5, *SD* = 9.8; Avoidant = 41.1, *SD* = 10.9).

Expression of Attachment Styles in Daily Life

Table 1 presents the direct effects of attachment on daily life experiences. Compared to participants with a secure attachment, those with an anxious attachment reported higher negative affect, lower positive affect, as well as greater fear of losing control in daily life. As expected, the avoidant and secure groups did not differ in their ratings of negative affect, but avoidant participants reported feeling less happy than their secure counterparts. In addition to comparing the attachment groups on the experience of mean levels of affect in daily life, we also compared the groups on variance of affect using one-way ANOVAs. Note that this was not nested data because each participant had a single (within-person) variance score based upon their own distribution of happiness or negative affect. The ANOVA was significant for negative affect variance, $F(2,203) = 5.58$, $p < .01$. Post-hoc comparisons using Dunnett's t-test indicated that the anxious attachment group exceeded the secure attachment group, $p < .01$. The avoidant and secure attachment groups did not differ. The ANOVA for happiness variance was not significant, $F(2,203) = 0.48$.

The attachment styles were also differentiated by their appraisals of the self, others, and the situation. Relative to both insecure groups, secure individuals endorsed more positive views on all items tapping appraisals about the self. That is, both anxious and avoidant participants perceived themselves in a more negative manner and were less confident in their coping capacities. Consistent with our hypotheses, individuals with an anxious or avoidant style reported feeling less cared for by others than did those with a secure attachment. Participants with an anxious style also differed from their secure peers in that they felt more suspicious and mistreated in the moment. In terms of appraisals about the situation, compared to secure

attachment, anxious attachment was associated with expressing decreased enjoyment and competence regarding current activities, as well as with reports that the current situation was less positive and more stressful. Avoidant participants perceived their immediate situation as less positive, but not as more stressful, than secure participants.

Regarding social appraisals and functioning, the attachment groups did not differ in terms of how often they were with other people at the time of the signal (on average, secure participants were alone 42.6% of the time, anxious participants 41.9% of the time, and avoidant participants 48.1% of the time). Participants with a secure style reported greater feelings of closeness than did those with an anxious or avoidant style. As expected, anxiously attached individuals were more likely than secure ones to report that they were alone because others did not want to be with them (i.e., perceived social rejection). Moreover, in contrast to secure individuals, those with an avoidant attachment showed a decreased desire to be with others when alone, and an increased preference to be alone when with others. Unexpectedly, compared with the secure group, the anxious group also displayed a higher preference for being alone when with others.

Moderating Effects of Attachment Styles on the Association of Social Context with Daily Life Experiences

Two sets of cross-level interaction analyses were conducted to examine the extent to which participants' social context impacted the expression of attachment styles in daily life. Specifically, we examined whether attachment styles moderated the association of social contact (alone = 1; with others = 2) and social closeness when with others with measures of affect, appraisals, and functioning in the moment (Table 2). Overall, the report of being with other people at the time of the signal was significantly associated with experiencing greater happiness, decreased negative affect, having more positive self-appraisals, feeling more cared for by others, as well as with viewing one's situation more positively. However, these

associations were not moderated by attachment style, indicating that the impact of social contact on daily life experiences was not differentially expressed for the attachment groups.

The closeness of social contacts in the moment was also associated with the momentary experience of affect, appraisals, and functioning. However, in contrast to social contact, the effects of social closeness on daily life experiences were significantly moderated by attachment style. When in the presence of people they did not feel close to, anxious participants reported more negative and less positive experiences than did those with a secure attachment. Specifically, as closeness diminished, anxious individuals experienced greater decreases in happiness and increased negative affect (Figure 1), appraised their current situation as less positive and more stressful (Figure 2), experienced greater decreases in their ability to cope, and reported a stronger preference for being alone than their securely attached peers. Cross-level analyses also revealed that as closeness diminished, avoidant participants felt less cared for by others than did those with a secure attachment (Figure 3).

Discussion

To our knowledge, the current study is the first to examine how adult attachment styles, as measured by interview, are expressed in daily life using ESM in a sample of non-clinical young adults. As hypothesized, we found that participants' momentary affective states, cognitive appraisals, and social functioning varied in meaningful ways as a function of their attachment style. These results support the construct and ecological validity of the ASI as a sensitive measure of attachment styles. Furthermore, they extend previous research by demonstrating that the effects of attachment style on daily life experiences are manifested across a variety of contexts and are not limited to interactional settings. In addition, the present study investigated the impact of social context on the expression of attachment styles in the moment. The findings indicated that insecure individuals are especially reactive to the subjective nature of social contacts in their everyday life, not simply to the impact of whether they are alone or with others.

Attachment Strategies in Daily Life

Overall, the results regarding the daily life expression of attachment styles confirmed our theory-based predictions. Relative to both anxious and avoidant participants, those holding a secure style reported greater feelings of happiness, more positive self-appraisals, viewed their current situation more positively, felt more cared for by others, and felt closer to the people they were with. These findings are consistent with previous work showing that secure attachment is associated with a sense of self-efficacy, optimistic appraisals towards life in general, as well as positive interpersonal attitudes [7, 18]. Moreover, the pattern of positive momentary experiences reported by secure, as compared to insecure, participants supports the notion that attachment security allows individuals to engage with their environment in a way that fosters psychological and relational benefits [43].

In the present study, the most pronounced differences emerged between the secure and anxious attachment groups. These differences showed that the daily experiences of individuals with an anxious style were consistent with the use of hyperactivating strategies. That is, compared with their secure peers, anxious participants approached their daily person-environment transactions with amplification of distress (e.g., higher negative affect, greater fear of losing control, higher subjective stress), decreased positive affect, and greater variability in the experience of negative affect. These results support Mikulincer and Shaver's [5] characterization of anxiously attached people as possessing a "chaotic emotional architecture" (p. 109) that contributes to the dysregulation of negative affect. We also found that anxiously attached participants endorsed more negative and less positive appraisals about themselves and their current situation than their secure counterparts, which supports the negative effects of hyperactivating strategies on people's cognitive appraisals. Moreover, relative to secure participants, anxious ones felt less cared for by others, less close to the people they were with, more suspicious, more mistreated, and, when alone, were more likely to hold attributions of not being wanted. This pattern of findings provides strong empirical evidence that the appraisals

that anxious individuals make in the realm of daily life are characterized by a hypervigilance to interpersonal sources of threat and hypersensitivity towards rejection. The results also revealed that when anxiously attached participants were with others, they displayed a stronger preference for being alone than their secure peers. Although this finding was not expected, the cross-level interactions seem to suggest that this is driven by a heightened discomfort that arises when anxious individuals are in the presence of people with whom they do not feel close.

In regards to avoidantly attached participants, the results showed that their daily life experiences were consistent with the reliance on deactivating strategies. As predicted, compared with secure subjects, avoidant ones endorsed a stronger preference for being alone when with others and a decreased desire to be with others when alone. Additionally, relative to their secure peers, they tended to approach their person-environment transactions with decreased happiness and less positive views of their situation, but not with amplification of negative states. Avoidant participants also felt less cared for by others and less close to the people they were with than did secure participants. This is consistent with their psychological barriers towards closeness and possibly indicates that their lack of involvement in relationships that elicit closeness and care may reinforce their underlying models in a self-perpetuating manner. Avoidant individuals also reported more negative views of themselves than did those with a secure attachment. Although avoidantly attached people have often been conceptualized as holding a positive self-model [11], research suggests that their positive views of themselves reflect defensive processes of self-inflation [7]. It could be that when asked to report on their experiences in the moment, avoidant individuals are less able to suppress the vulnerable nature of their sense of self. Indeed, it has been posited that ESM assessments allow less room for people to resort to self-interpretation or use mental heuristics when reporting on their self-perceptions [44].

The Impact of Social Context on the Expression of Attachment Styles

Contrary to our initial expectation, the impact of social context on the expression of attachment styles in the moment was only observed for social closeness and not for social contact. This finding is important because it highlights a boundary condition of the effects of attachment style in social contexts — namely, that the manifestation of attachment styles depends on the subjective appraisal of the closeness of social contacts, rather than on the simple presence of social interactions. The finding that it is social appraisals, not simply social contact, that interacts with attachment is compatible with the description of attachment as a "person by situation" interactionist theory that at its core involves appraisal of the social context.

Increased levels of perceived closeness were associated with differential responses for anxious and avoidant individuals. Compared with the secure group, the affective states, situation appraisals, coping capacities, and social functioning of the anxious group worsened as closeness diminished; or, seen from the opposite perspective, improved as closeness increased. This pattern of results may be interpreted to suggest that when in the presence of people they do not feel close to, anxious people's preoccupation with rejection and approval is amplified and this permeates their subjective experiences. By contrast, increased levels of closeness might enhance their momentary sense of felt-security and provide them with the self-validation they long for, which in turn could bring about an improvement in their subjective experiences. The finding that greater closeness seemed to aid anxious participants with the regulation of various self-states (e.g., affect, coping, stress) resonates with the work of Pietromonaco and Barrett [45], who, using a variant of the RIR, concluded that individuals holding a preoccupied attachment valued their interacting partners more when the interactions had provided help with self-regulatory processess.

The results also demonstrated that as closeness diminished avoidant subjects felt less cared for by others than their secure peers. Because avoidant individuals approach their interpersonal interactions in a way that minimizes the possibility of frustration (in order to keep

their attachment system deactivated), it may be that experiencing closeness discomfirms their low expectations (e.g., about others' responsiveness) and thus makes them more perceptive to the caring attitudes of others. Notably, the fact that greater closeness affected appraisal about others, but not their self-states, is in line with the contention that avoidantly attached people resort to autoregulation (i.e., they turn to themselves to regulate their internal states) [46]. Additional research is required to elucidate the specific psychological mechanisms that make up the experience of momentary closeness and how it is associated with beneficial effects for insecurely attached individuals.

Specificity of Attachment Processes in Daily Life

The results of this study are relevant to the broader debate in the attachment field regarding the specificity of attachment-related processes in adulthood (see [10, 27, 28]). On the one hand, the fact that attachment styles predicted individual's subjective experiences across the range of situations they encountered during the week, and not only those that were interaction-based, suggests that attachment styles are relevant features of personality functioning that have pervasive effects on how individuals experience their inner and outer worlds. On the other hand, the findings that attachment styles moderated the effects of perceived social closeness on daily life experiences (but not the effects of mere social contact on these experiences) highlights the fact that attachment styles are differentially expressed under relational circumstances that might bring attachment concerns to the fore. Thus, we believe that a richer understanding of attachment dynamics will come from efforts that examine their expression at both the individual and relational level.

Limitations and Future Directions

Additional research is warranted to address the limitations of the present study. First, we used a sample of college students with predominantly female participants. Future studies would benefit from assessing the expression of attachment styles in community samples with a wider age range and a more representative distribution in terms of gender. Second, it should be noted

that the cross-level interactions of the effects of social closeness on the expression of attachment styles were interpreted in line with theoretical propositions from the attachment literature; nevertheless, given the correlational nature of these data, the opposite interpretation is also plausible (e.g., less coping capacity contributing to lower perceived closeness). Finally, it would also be important for future work to assess the extent to which our findings are generalizable across different cultures. Given that we found theoretically expected daily life correlates of attachment styles in a Spanish sample, the results would seem to fit with the notion that attachment strategies are universal characteristics [47, 48]. However, studies in different cultures are needed to establish the cross-cultural ecological validity of attachment styles.

Concluding Remarks

The extent to which attachment style differences are expressed in real time as individuals navigate their real-life settings has remained an area largely untapped by research in the attachment field. The present investigation provided a novel contribution by using an interview-based measure to assess adult attachment styles and by employing a random time-sampling procedure that demonstrated that the hallmark features of secure, anxious, and avoidant individuals are reflected in their day-to-day person-environment transactions. The current study further extends the validity of the attachment style construct to the realm of everyday life and, moreover, points to the utility of employing ESM for obtaining a more finely-grained understanding of how the predictions derived from attachment theory play out in the natural flow of real life.

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Table 1

Direct effects of attachment style on daily life experiences

Level 1 Criterion	Level 2 Predictors	
	Anxious vs. Secure γ_{01} (*df* = 203)	**Avoidant vs. Secure** γ_{02} (*df* = 203)
Affect in the moment		
Right now I feel happy	-0.526 (SE=0.148)***	-0.426 (SE=0.147)**
Right now I feel relaxed	-0.483 (SE=0.150)**	-0.151 (SE=0.144)
Right now I fear losing control	1.032 (SE=0.289)***	0.091 (SE=0.371)
Negative affect index	0.341 (SE=0.089)***	0.065 (SE=0.103)
Appraisals about the self		
Right now I feel good about myself	-0.695 (SE=0.149)***	-0.384 (SE=0.163)*
Right now I feel guilty or ashamed	0.266 (SE=0.076)**	0.214 (SE=0.109)*
Right now I can cope	-0.591 (SE=0.143)***	-0.368 (SE=0.160)*
Appraisals about others		
Right now I feel that others care about me	-0.439 (SE=0.194)*	-0.520 (SE=0.212)*
Right now I feel suspicious	0.314 (SE=0.087)***	0.083 (SE=0.064)
Right now I feel mistreated	1.030 (SE=0.317)**	0.752 (SE=0.384)
Appraisals about the situation		
I like what I'm doing right now	-0.398 (SE=0.142)**	-0.231 (SE=0.121)
Right now I can do my current activity	-0.377 (SE=0.135)**	-0.127 (SE=0.146)
My current situation is positive	-0.687 (SE=0.177)***	-0.402 (SE=0.158)*
My current situation is stressful	0.560 (SE=0.185)**	0.058 (SE=0.174)
Social appraisals and functioning		
Right now I am alone	0.025 (SE=0.129)	-0.242 (SE=0.152)
When alone:		
I am alone because people do not want to be with me	1.288 (SE=0.501)*	0.245 (SE=0.560)
Right now I would prefer to be with people	-0.018 (SE=0.219)	-0.435 (SE=0.210)*
When with others:		
I feel close to this person (these people)	-0.434 (SE=0.146)**	-0.379 (SE=0.158)*
Right now I would prefer to be alone	0.488 (SE=0.126)***	0.373 (SE=0.134)**

Note. Negative affect index was computed by averaging the scores for the following three items: “Right now I feel sad/anxious/angry”.

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

Table 2

Cross-level interactions of social contact and closeness with daily life experiences

Level 1 Criterion	Level 1 Predictor	Level 2 Predictors[@]		
		γ_{10} (*df* = 203)	Anxious vs. Secure γ_{11} (*df* = 203)	Avoidant vs. Secure γ_{12} (*df* = 203)
Right now I feel happy	Contact	0.393 (0.035)***	0.001 (0.090)	-0.002 (0.090)
Negative affect index	Contact	-0.049 (0.021)*	-0.033 (0.058)	0.030 (0.048)
Right now I feel that others care about me	Contact	0.403 (0.042)***	-0.120 (0.098)	0.154 (0.121)
Right now I feel good about myself	Contact	0.174 (0.026)***	-0.034 (0.067)	-0.019 (0.065)
Right now I can cope	Contact	0.143 (0.029)***	-0.027 (0.084)	0.030 (0.069)
My current situation is positive	Contact	0.245 (0.027)***	-0.060 (0.072)	0.007 (0.065)
My current situation is stressful	Contact	0.010 (0.038)	0.027 (0.101)	0.192 (0.106)
Right now I feel happy	Closeness	0.161 (0.014)***	0.068 (0.032)*	0.012 (0.036)
Negative affect index	Closeness	-0.059 (0.010)***	-0.076 (0.026)**	-0.006 (0.023)
Right now I feel that others care about me	Closeness	0.144 (0.016)***	0.028 (0.038)	0.094 (0.046)*
Right now I feel good about myself	Closeness	0.072 (0.013)***	0.045 (0.029)	0.051 (0.035)
Right now I can cope	Closeness	0.061 (0.013)***	0.095 (0.038)*	-0.002 (0.032)
Right now prefer to be alone	Closeness	-0.268 (0.020)***	-0.118 (0.050)*	-0.084 (0.058)
My current situation is positive	Closeness	0.120 (0.014)***	0.127 (0.040)**	0.050 (0.037)
My current situation is stressful	Closeness	-0.139 (0.017)***	-0.123 (0.047)**	-0.029 (0.050)

[@]Cross-level interaction of the association of the attachment groups with the slope of the level 1 predictor and criterion

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

Figure 1

Cross-level interaction of attachment style with social closeness and affective experiences in daily life

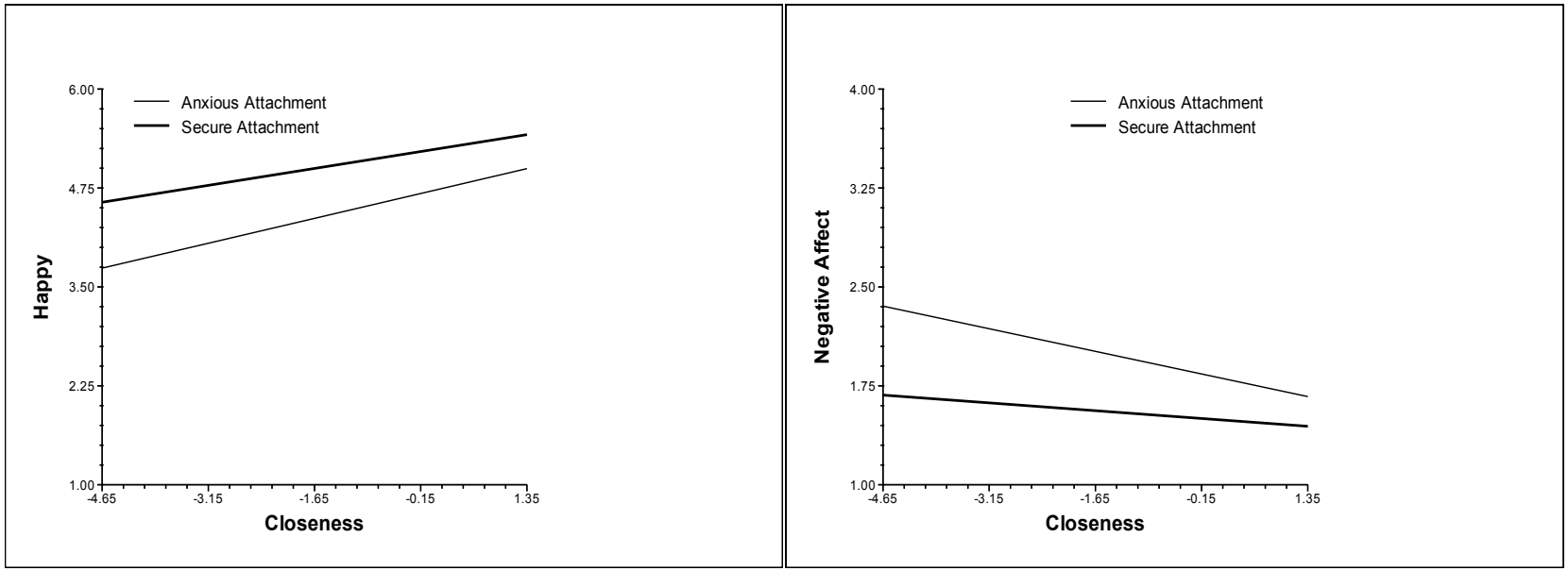


Figure 2

Cross-level interaction of attachment style with social closeness and situation appraisals in daily life

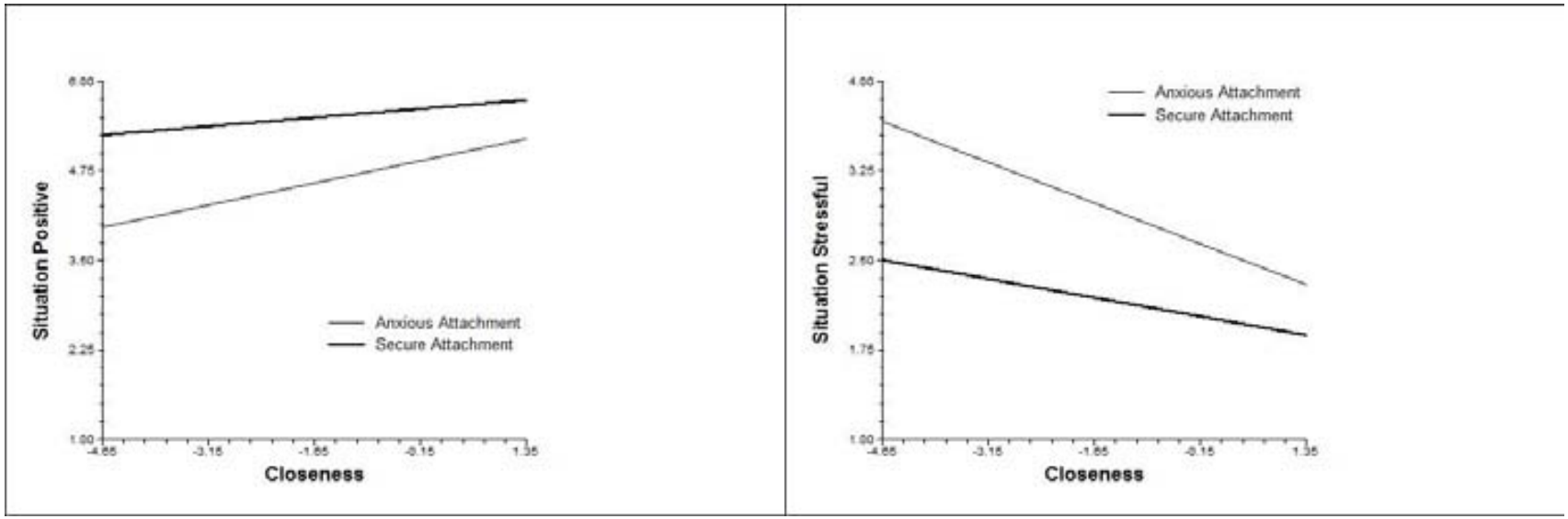
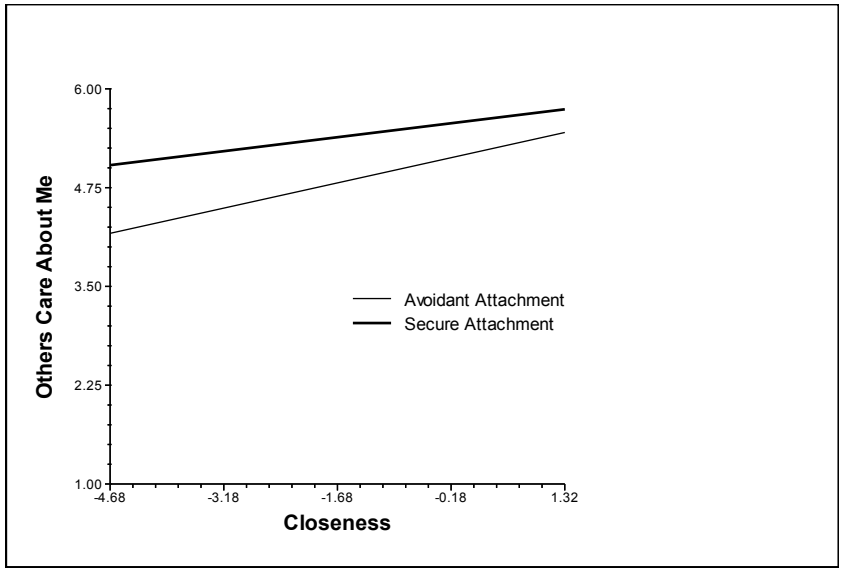


Figure 3

Cross-level interaction of attachment style with social closeness and feeling cared for by others in daily life



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SECTION 2

SCHIZOTYPY

Chapter 3

Positive and negative schizotypy are associated with prodromal and schizophrenia-spectrum symptoms

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Abstract

The present study examined the validity of psychometrically assessed positive and negative schizotypy in a study of 214 Spanish young adults using interview and questionnaire measures of impairment and psychopathology. Schizotypy provides a useful construct for understanding the etiology and development of schizophrenia and related disorders. Recent interview, laboratory, and experience sampling studies have supported the validity of psychometrically assessed positive and negative symptom dimensions. The present study expands on previous findings by examining the validity of these dimensions in a Spanish sample and employing a widely used interview measure of the schizophrenia prodrome. As hypothesized, the positive schizotypy dimension predicted CAARMS ultra high-risk or psychosis threshold status, and both dimensions uniquely predicted the presence of schizophrenia-spectrum personality disorders. Furthermore, positive schizotypy was associated with psychotic-like, paranoid, schizotypal, and mood symptoms, whereas negative schizotypy was associated with interview ratings of negative and schizoid symptoms. The schizotypy dimensions were also distinguished by their associations with self and other schemas. Positive schizotypy was associated with increased negative self and other schemas, whereas negative schizotypy was associated with decreased positive self and other schemas. The findings provide further construct validation of positive and negative schizotypy and support these dimensions as universal constructs.

Keywords: schizotypy; schizophrenia; prodrome; dimension

1. Introduction

Recent conceptualizations indicate that the underlying vulnerability for schizophrenia is expressed across a dynamic continuum of symptoms and impairment referred to as schizotypy (e.g., Claridge et al., 1997; Kwapil and Barrantes-Vidal, 2012; Lenzenweger, 2010). Rather than viewing schizotypy and schizophrenia as qualitatively distinct, schizophrenia, related spectrum disorders, and the prodrome represent the most extreme manifestations of the schizotypy continuum. The reliable assessment of schizotypy should enhance identification of relevant etiological factors and endophenotypes, facilitate understanding of developmental trajectories (including risk and protective factors), and is essential for developing prophylactic interventions.

Schizotypy, and by extension schizophrenia, is conceptualized as multidimensional, with positive and negative schizotypy the most consistently replicated factors. Positive schizotypy is characterized by odd beliefs, unusual perceptual experiences, negative affect, and affective dysregulation, whereas negative schizotypy involves avolition, asociality, diminished positive affect, and anergia (e.g., Vollema and van den Bosch, 1995). The conceptualization and measurement of schizotypy and schizophrenia as multidimensional are essential for advancing our understanding of these constructs. Studies that treat them as homogenous often produce mixed, equivocal, or non-replicable results because these dimensions are associated with distinct etiologies, presentations, and treatment responses.

The psychometric assessment of schizotypy offers unique benefits such as being relatively inexpensive, noninvasive, and useful for screening large samples of the general population, as well as clinical samples (Kwapil et al., 2008). The Wisconsin Schizotypy Scales (WSS), including the Perceptual Aberration (Chapman et al., 1978), Magical Ideation (Eckblad and Chapman, 1983), Physical Anhedonia (Chapman et al., 1976), and Revised Social Anhedonia (Eckblad et al., 1982) Scales, are widely used, exhibit sound psychometric properties, and are associated cross-sectionally with schizophrenic-like symptoms and

impairment, and longitudinally with development of schizophrenia-spectrum disorders (Chapman et al., 1994; Gooding et al., 2005; Kwapil, 1998).

Kwapil et al. (2008) conducted a series of confirmatory factor analyses to investigate the dimensional structure of the WSS and found support for a hypothesized two-factor model with positive and negative schizotypy dimensions that was invariant across gender and ethnicity. Preliminary construct validity for these dimensions was demonstrated through differential patterns of associations with psychopathology, personality, and impairment. As hypothesized, positive but not negative schizotypy was associated with psychotic-like experiences, substance abuse, mood disorders, and mental health treatment, whereas negative schizotypy was uniquely related to interview-based ratings of negative and schizoid symptoms. Both dimensions were associated with schizotypal and paranoid symptoms, and impairment in functioning. However, the study did not include criteria assessing prodromal symptoms or classifications.

Schizotypy and schizophrenia are presumed to be universal constructs; therefore Kwapil et al. (2012c) examined the factor invariance of the WSS in Spanish and American samples. As hypothesized, positive and negative schizotypy factors provided the best fit and this structure was invariant across the samples, consistent with findings in a Spanish sample by Fonseca-Pedrero et al. (2010), and supporting previous evidence of the cross-cultural consistency of schizotypy dimensions (Chen et al., 1997; Reynolds et al., 2000). However, studies assessing the cross-cultural construct validity of these dimensions are needed.

1.1. Goals and Hypotheses of the Present Study

The primary goal of the present study was to examine the validity of psychometrically assessed positive and negative schizotypy in a non-clinically ascertained sample of young adults. The study sought to replicate findings that positive and negative schizotypy were associated with differential patterns of symptoms and impairment. It also expanded upon earlier studies by employing a measure of the schizophrenia prodrome, assessing a broader range of personality disorders, increasing assessment of affective symptoms, and including measures of

self and other schemas and self-esteem. Both cognitive models of psychosis (e.g., Garety et al., 2007) and empirical evidence (Fowler et al., 2012; Stowkowy and Addington, 2012) implicate maladaptive schemas in the development and maintenance of psychotic symptoms. Furthermore, the study sought to examine the cross-cultural validity of the schizotypy dimensions by assessing a Spanish sample.

It was hypothesized that both schizotypy dimensions would be associated with schizotypal, paranoid, and avoidant personality traits, suspiciousness, and impaired functioning. Positive schizotypy was expected to be associated with psychotic-like symptoms and measures assessing negative affect, including anxiety, depression, borderline personality, low self-esteem, and negative schemas. In contrast, it was predicted that negative schizotypy would be associated with schizoid and negative symptoms, emotional blunting, and less positive views of self and others.

2. Methods

2.1. Participants

The present study is part of an ongoing longitudinal project examining risk for psychosis. The participants were drawn from a screening sample of 589 undergraduates at the Universitat Autónoma de Barcelona. Usable screening data was obtained from 547 participants (42 were excluded due to invalid protocols). The mean age was 20.6 years (SD=4.1) and 83% were female. A subset of 339 participants was invited to take part in an assessment including self-report, interview, and laboratory measures with the goal of assessing 200 individuals. We invited all 189 who had standard scores based upon sample norms of at least 1.0 on the positive or negative schizotypy dimension, the suspiciousness subscale of the Schizotypal Personality Questionnaire (SPQ; Raine, 1991), or the positive symptom subscale of the Community Assessment of Psychic Experiences (CAPE; Stefanis et al., 2002), and 150 randomly selected participants who had standard scores <1.0 on each of these measures. The

goal of the enrichment procedure was to ensure adequate representation of schizotypy in the sample. A total of 214 participants (78% females) with a mean age of 21.4 years (SD=2.4) completed the assessment. The sample included 123 participants with elevated schizotypy scores and 91 with standard scores below 1.0. Note that the four scales contributed approximately equal numbers of participants with elevated z-scores (ranging from 50 with elevated scores on WSS positive schizotypy to 57 with elevations on the SPQ suspiciousness).

2.2. Materials and Procedure

At the initial assessment, students completed a battery of self-report measures. At the second assessment, participants were administered diagnostic interviews and questionnaires (along with measures not used in this study). The interviews were conducted by psychologists and advanced graduate students in clinical psychology. All interviewers were extensively trained and were unaware of participants' scores on the screening questionnaires. Individuals were paid for their participation. Ethical approval for the study was granted by the University Ethics Committee and participants provided informed consent at both assessments.

2.2.1. Time 1 Measures

Participants were administered the WSS intermixed with an infrequency scale (Chapman and Chapman, 1983). The Perceptual Aberration Scale assesses psychotic-like bodily distortions and perceptual experiences, the Magical Ideation Scale taps belief in invalid causation, the Revised Social Anhedonia Scale measures schizoid asociality, and the Physical Anhedonia Scale assesses deficits in sensory and esthetic pleasure. The Spanish adaptation of the WSS was used (Ros-Morente et al., 2010), which has shown good reliability in college samples and external validity (e.g., Barrantes-Vidal et al., 2003). Participants were assigned positive and negative schizotypy factor scores based upon norms from 6,137 American young adults (Kwapil et al., 2008). Note that Kwapil et al. (2012c) demonstrated that the positive and negative schizotypy factor structure underlying the scales was invariant in Spanish and

American samples. Furthermore, the norm-based factor scores correlated .99 with factor scores generated from a principal components analysis with the Spanish sample of 547.

Participants completed the CAPE, which measures positive, negative, and depressive symptoms, as well as the suspiciousness subscale of the SPQ. The depression and anxiety subscales of the Symptom Checklist-90-Revised (SCL-90–R; Derogatis, 1977) were used to assess emotional state. Beliefs about the self and others were evaluated with the Brief Core Schema Scales (BCSS; Fowler et al., 2006), which yields subscale scores for negative-self, positive-self, negative-others, and positive-others. Participants took 1.5 to 2 hours to complete the time 1 assessment.

2.2.1. Time 2 Measures

The Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2005) is a structured interview that assesses the psychosis prodrome. Severity scores for seven CAARMS subscales were used. The CAARMS was also used to assess criteria for ultra high-risk status. The Structured Clinical Interview for DSM–IV Axis II Disorders (First et al., 1997) was used to assess schizophrenia-spectrum personality disorders and provide dimensional ratings. Depression was assessed with the Calgary Depression Scale (Addington et al., 1992) and the Beck Depression Inventory–II (Beck et al., 1996) and self-esteem with the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Functioning was rated using the Social and Occupational Functioning Assessment Scale (Goldman et al., 1992) and the Global Assessment of Functioning (American Psychiatric Association, 2000). Participants took 1.5 to 3 hours to complete the time 2 assessment.

3. Results

3.1. Descriptive Statistics

The mean for positive schizotypy was −.31 (SD=.89, range=−1.56 to 3.23) and for negative schizotypy was .01 (SD=1.05, range=−1.57 to 4.27). Both dimensions were unimodal

and positively skewed. The schizotypy dimensions were not significantly correlated (r=.11). Descriptive statistics for quantitative criteria measures are presented in Table 1.

3.2. Validity of the Schizotypy Dimensions

In order to assess the validity of the schizotypy dimensions, a series of hierarchical linear regressions were computed that examined the variance accounted for by positive and negative schizotypy and their interaction in measures of psychopathology, personality, and functioning. Positive and negative schizotypy dimension scores were entered simultaneously in the regression at the first step to examine their unique contribution. The interaction term was entered at the second step to assess its effect over-and-above the main effects. The standardized regression coefficient (β), semi-partial r^2, and effect size f^2 were reported for each predictor in the linear regressions. According to Cohen (1992), f^2 values above .15 are medium and above .35 are large effect sizes (however, note that designs that employ oversampling can lead to inflated estimates of effect sizes). Given that many of the continuous dependent variables were skewed (especially measures of psychopathology), maximum likelihood estimation and bootstrap procedures (with 2,000 samples) were employed. Given the large number of linear regressions, alpha level was set at .01 to minimize Type I error and reduce the likelihood of reporting statistically significant but inconsequential findings.

Table 2 presents the results of analyses examining the prediction of schizophrenia-spectrum, prodromal, and personality disorder symptoms. As expected, negative schizotypy was significantly associated with ratings of negative and schizoid symptoms, and with affective flattening. It was also associated with schizotypal and avoidant personality ratings and suspiciousness. Positive schizotypy was significantly associated with all of the outcome measures except for schizoid and motoric symptoms.

The finding that positive schizotypy was associated with CAPE and CAARMS ratings of negative symptoms is counterintuitive. However, both of these purported measures of negative symptoms appear to be saturated with depression and positive symptoms. The CAPE negative

symptom scale correlated highly with CAPE depression (*r*=.57), SCL-90 depression (*r*=.60), and CAPE positive symptoms (*r*=.41), but only modestly with schizoid personality symptoms (*r*=.32). Likewise, CAARMS negative symptom ratings correlated higher with CAARMS positive symptoms (*r*=.51) and depression (*r*=.46), than with schizoid symptoms (*r*=.29). As an exploratory analysis, we recomputed the regression predicting CAPE negative symptoms after partialling out CAPE positive and depression symptoms. The association with positive schizotypy was no longer significant, but the association with negative schizotypy remained significant (confirming concerns about the CAPE negative symptom scale). The schizoid dimensional score, which was associated with negative but not positive schizotypy, appears to provide a better measure of negative symptoms than the CAPE or CAARMS.

Table 3 presents the results of analyses assessing functioning, self, and mood. Both schizotypy dimensions were associated with impaired functioning. As hypothesized, positive schizotypy was associated with measures of anxiety and depression. In contrast, negative schizotypy was generally unassociated with anxiety and depression. Likewise, positive schizotypy was associated with low self-esteem and negative schemas of self and others; whereas, negative schizotypy was associated with diminished positive schemas.

In order to assess the prediction of diagnostic criteria by the schizotypy dimensions, binary logistic regressions were computed. Schizophrenia-spectrum personality disorders were reported by 10 participants: 5 with Avoidant, 2 with Schizotypal, 4 with Paranoid, and 3 with Borderline Personality Disorders (3 qualified for more than one disorder). Both positive (OR=1.96, 95%CI=1.08-3.58) and negative (OR=1.89, 95%CI=1.12-3.27) schizotypy significantly predicted schizophrenia-spectrum personality disorders. The interaction term was not significant (OR=1.00, 95%CI=0.60–1.65). Note that when we examined the association of the schizotypy dimensions with individual personality disorders, positive schizotypy significantly uniquely predicted schizotypal (OR=3.43, 95%CI=1.03-11.50) and paranoid (OR=2.68, 95%CI=1.14-6.36) personality disorders. Negative schizotypy predicted avoidant personality

disorder (OR=2.25, 95%CI=1.13-4.51). Thus, the schizotypy dimensions were associated with quantitative and categorical assessments of personality pathology.

Criteria for CAARMS ultra high-risk status or psychosis threshold were met by 9 of the participants: 2 met vulnerability criteria, 8 met attenuated psychosis criteria, and 1 met psychosis threshold criteria (2 met both vulnerability and attenuated criteria). Positive schizotypy (OR=2.16, 95%CI=1.17–4.00) significantly predicted CAARMS prodromal group membership. Neither negative schizotypy (OR=1.47, 95%CI=0.82–2.61) nor the schizotypy interaction (OR=0.76, 95%CI=0.44–1.31) was significant.

4. Discussion

Current approaches to understanding risk for psychopathology conceptualize schizotypy as the expression of underlying developmental vulnerability for schizophrenia. Psychometrically assessed positive and negative schizotypy provide a useful point of entry for understanding developmental trajectories, potential endophenotypes, and risk and protective factors. Further, schizotypy provides a unique framework for identifying points of intervention for preventative treatment. Numerous studies support the multidimensionality of schizophrenia, with positive, negative, and disorganized factors as the leading candidates. Consistent with the model that schizophrenia represents the most extreme manifestation of the schizotypy continuum, schizotypy and schizophrenia exhibit a similar factor structure. However, researchers frequently treat schizophrenia and schizotypy as homogenous constructs, thus ignoring within-group heterogeneity. This practice runs the risk of obscuring true endophenotypes and necessarily falls short in explaining the heterogeneity seen in the etiology, symptom presentation, and treatment responses in schizotypy and schizophrenia. This study provided further evidence for the validity of positive and negative schizotypy as distinct dimensions.

Consistent with previous work (e.g., Kwapil et al., 2008), the negative schizotypy dimension was associated with impaired functioning and with interview-based ratings of

negative, schizoid, and schizotypal symptoms. The present study extended these findings by indicating that negative schizotypy was associated with prodromal measures of emotional disturbance (consistent with reports of affective flattening in daily life by Kwapil et al., 2012a). Positive schizotypy was related to all outcome measures except schizoid and motoric symptoms. This study extended our previous findings by examining the association of the schizotypy dimensions with measures of the schizophrenia prodrome. It is important to keep in mind that positive and negative schizotypy were associated with the hypothesized pattern of symptoms and impairment in a non-clinically ascertained sample. As in Kwapil et al. (2008), positive and negative schizotypy were uniquely associated with schizophrenia-spectrum symptoms, despite the fact that the participants in the study were functioning well enough to enroll in a university.

The finding that the positive and negative schizotypy interaction term generally did not account for additional variance is consistent with our previous studies and suggests that the effects of the dimensions tend to be additive. This additive effect is supported by Barrantes-Vidal et al.'s (2010) findings of marked deviancy for a combined positive and negative schizotypy cluster.

This study was the first to investigate the validity of the positive and negative schizotypy dimensions in a non-North American sample using interview measures. Previous studies have indicated that the two-factor structure underlying the WSS is invariant across Spanish (Kwapil et al., 2012c) and French (Qunbar et al., 2012) samples, and the present findings supported the validity of these dimensions in a Spanish sample. The findings provide evidence that positive and negative schizotypy are global or cross-cultural constructs—although future studies should examine the validity of these dimensions in other cultures and languages.

Consistent with previous findings, positive schizotypy was associated with measures of anxiety and depression, and with low self-esteem and negative schemas. In contrast, negative schizotypy was associated with diminished positive self and other schemas. This pattern of

results highlights the differential role of affect, such that positive schizotypy tends to be characterized by affect dysregulation and high negative affect, whereas negative schizotypy is associated with diminished positive affect (Armando et al., 2010; Barrantes-Vidal et al., 2009; Krabbendam et al., 2002; Lewandowski et al., 2006). This distinction offers insight into the long-term trajectories of the dimensions, such as social anxiety for positive and schizoid withdrawal for negative schizotypy, and also has the potential to isolate specific mechanisms that can be targeted with treatment interventions.

Both positive and negative schizotypy significantly predicted ratings of Avoidant Personality Disorder; however, it appears that distinct mechanisms are involved. Specifically, those with primarily positive features may be more likely to avoid contact with others due to social anxiety, low self-esteem, and social rejection. This is consistent with experience sampling findings that positive schizotypy is associated with a desire to be alone when with others because of anxiety (Kwapil et al., 2012a). Those with negative schizotypy, on the other hand, likely avoid others due to diminished motivation for and pleasure from interacting with others. This is consistent with experience sampling findings that negative schizotypy was associated with a desire to be alone that was moderated by diminished positive affect, not increased negative affect.

The finding that the positive schizotypy dimension was associated with questionnaire (CAPE) and interview (CAARMS) measures of negative symptoms is inconsistent with our previous findings and contrary to our hypotheses. Note that Kwapil et al. (2008) reported that positive schizotypy was not significantly associated with interview-based ratings on the Negative Symptom Manual (Kwapil and Dickerson, 2001) or schizoid symptoms. Furthermore, previous studies using the Perceptual Aberration and Magical Ideation Scales (e.g., Kwapil et al., 2002), which account for the majority of the variance in the positive schizotypy dimension, found that these scales were unassociated with negative or schizoid symptoms. Consistent with previous findings, the positive schizotypy dimension was not associated with schizoid symptoms in the

present study. We suggest that the most likely explanation is that the CAPE and CAARMS negative symptom measures do not adequately measure the construct, as evidenced by their high correlations with positive symptoms and depression. Despite the fact that depressive symptoms are more strongly associated with positive schizotypy than with negative schizotypy, negative symptoms and depression share a number of phenomenological similarities. Therefore, it is essential that measures of negative symptoms are not confounded by variance associated with depression or by positive symptoms.

Negative symptoms of schizotypy and schizophrenia involve anhedonia, withdrawal, affective flattening, anergia, avolition, and diminished vitality and cognition. One possible concern about our schizotypy dimension is that it is based on measures of anhedonia and, to a lesser extent, social withdrawal. As a result, it may not fully capture the construct of negative symptoms. However, an increasing number of studies have demonstrated that this dimension is associated with interview ratings of negative and schizoid symptoms, but not depression. These findings provide striking evidence that trait anhedonia is a significant component of negative symptoms of schizotypy and schizophrenia.

The present findings provided further support for the construct validity of the positive and negative schizotypy dimensions. However, several other candidate dimensions have been proposed and require further study including cognitive and behavioral disorganization (Claridge et al., 1996; Reynolds et al.,2000; Vollema and Hoijtink, 2000), paranoia (Stefanis et al., 2004), and nonconformity (Claridge et al., 1996). The present findings are limited by being cross-sectional. Recent re-evaluation of the Chapmans' ten-year longitudinal study data indicates that the positive schizotypy dimension predicts the development of psychotic disorders, including non-mood and mood psychoses, in a sample of former college students and that both dimensions uniquely predict the development of schizophrenia-spectrum disorders, including Cluster A personality disorders (Kwapil et al., 2012b). Both dimensions were also associated with a differential pattern of impairment and psychotic-like and schizotypic symptoms, consistent

with the present findings. We are currently reassessing the present sample to examine the predictive validity of the positive and negative symptom dimensions.

Additional research is needed to address the limitations of the present study. Data from community samples with a representative distribution in terms of age and gender would enhance the generalizability of the current findings, which were based on a relatively high-functioning sample with a predominance of female participants and a narrow age range. However, the fact that the findings drawn from a college student sample supported the hypotheses and mirror those reported in clinical and community populations is especially striking. Future studies should continue to examine the cross-cultural validity of these dimensions in other Western and non-Western cultures and languages to increase our understanding of the universality of these dimensions.

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Contributors

Neus Barrantes-Vidal, Ph.D., was the principal investigator, designed the study, and contributed to writing of the manuscript.

Georgina M. Gross, M.S., contributed to the writing of the manuscript.

Tamara Sheinbaum, M.S., contributed to data collection, data management, and writing of the manuscript.

Mercè Mitjavila, Ph.D., contributed to data collection and data management.

Sergi Ballespí, Ph.D., contributed to data collection and data management.

Thomas R. Kwapil, PhD, designed the study, conducted the data analyses, and contributed to the writing of the manuscript.

Conflict of Interest

None of the authors had a conflict of interest.

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Table 1

Descriptive Statistics for Quantitative Dependent Measures of Symptoms, Impairment, and Personality

Measure	Mean	SD	Range	Alpha*
CAPE Positive Symptoms	8.39	4.84	0 – 23	.76
CAPE Negative Symptoms	10.59	5.80	0 – 35	.83
SPQ Suspiciousness	2.97	2.05	0 – 8	.71
CAARMS Positive Symptoms	1.21	2.69	0 – 24	--
CAARMS Negative Symptoms	1.51	2.39	0 – 11	--
CAARMS Cognitive Symptoms	0.91	1.50	0 – 8	--
CAARMS Emotional Disturbance	0.94	1.91	0 – 11	--
CAARMS Behavioral Symptoms	1.36	2.05	0 – 9	--
CAARMS Motor Symptoms	1.00	1.76	0 – 14	--
CAARMS General Psychopathology	3.69	3.85	0 – 21	--
Schizotypal Personality Rating	1.00	1.93	0 – 13	--
Schizoid Personality Rating	0.90	1.54	0 – 8	--
Paranoid Personality Rating	1.53	2.08	0 – 12	--
Avoidant Personality Rating	2.11	2.82	0 – 14	--
Borderline Personality Rating	1.43	2.27	0 – 12	--
Social and Occupational Functioning	86.5	8.4	40 – 100	--
Global Assessment of Functioning	85.5	10.3	51 – 100	--
Rosenberg Total	23.1	4.6	3 – 30	.87
BCSS Negative Self	2.68	3.00	0 – 16	.65
BCSS Negative Others	3.20	3.53	0 – 17	.77
BCSS Positive Self	12.42	4.73	2 – 24	.81
BCSS Positive Others	10.29	4.85	0 – 21	.84
SCL-90-R Anxiety	6.99	5.65	0 – 29	.81
SCL-90-R Depression	12.33	8.23	0 – 43	.86
Calgary Depression Scale	1.21	2.07	0 – 13	--
Beck Depression Inventory	5.33	5.33	0 – 29	.81
CAPE Depression	6.08	2.93	1 – 18	.75

*Coefficient alpha reported for questionnaire measures only

Table 2

Linear Regressions of Questionnaire and Interview Measures of Schizophrenia-spectrum and Prodromal Symptoms (n=214)

	Step 1 (df=1,211)						Step 2 (df=1,210)		
	Positive Schizotypy			Negative Schizotypy			Interaction		
Criterion	β	Δr^2	f^2	β	Δr^2	f^2	β	Δr^2	f^2
CAPE Positive Symptoms	.708*	.496	***.99***	.001	.000	.00	-.016	.000	.00
CAPE Negative Symptoms	.382*	.144	**.22**	.402*	.160	**.24**	.089	.008	.01
SPQ Suspiciousness	.554*	.304	***.50***	.237*	.056	.09	.021	.000	.00
CAARMS Positive Symptoms	.300*	.089	.10	.166	.027	.03	.089	.008	.01
CAARMS Negative Symptoms	.330*	.108	.13	.195*	.037	.05	.104	.011	.01
CAARMS Cognitive Symptoms	.181*	.032	.03	.136	.018	.02	-.087	.008	.01
CAARMS Emotional Disturbance	.206*	.042	.05	.347*	.119	**.15**	.065	.004	.01
CAARMS Behavioral Symptoms	.315*	.098	.11	.149	.022	.03	.066	.004	.00
CAARMS Motor Symptoms	.142	.020	.02	.154	.024	.03	-.057	.003	.00
CAARMS General Psychopathology	.248*	.061	.07	.189*	.035	.04	.091	.008	.01
Schizotypal Personality Rating	.309*	.094	.12	.285*	.080	.10	.102	.010	.01
Schizoid Personality Rating	.100	.010	.01	.473*	.221	**.29**	-.081	.006	.01
Paranoid Personality Rating	.356*	.125	**.15**	.145	.021	.02	.135	.018	.02
Avoidant Personality Rating	.322*	.102	.12	.246*	.060	.07	.130	.017	.02
Borderline Personality Rating	.347*	.119	.14	.109	.012	.01	.088	.008	.01

*$p < .01$ Medium effect sizes in bold, large effect sizes in bold and italics

Table 3

Linear Regressions of Interview Measures of Functioning, Self, and Mood (n=214)

	Step 1 (df=1,211)						Step 2 (df=1,210)		
	Positive Schizotypy			Negative Schizotypy			Interaction		
Criterion	β	Δr^2	f^2	β	Δr^2	f^2	β	Δr^2	f^2
Social and Occupational Functioning	-.247*	.060	.07	-.271*	.072	.09	-.072	.005	.01
Global Assessment of Functioning	-.271*	.072	.09	-.259*	.066	.08	-.035	.001	.00
Rosenberg Total	-.377*	.141	**.17**	-.191*	.036	.04	-.072	.005	.01
SCL-90-R Anxiety	.507*	.254	***.35***	.105	.011	.02	.024	.001	.00
SCL-90-R Depression	.447*	.198	**.25**	.183*	.033	.04	.175	.030	.04
Calgary Depression Scale	.201*	.043	.04	.088	.008	.01	.099	.010	.01
Beck Depression Inventory	.344*	.117	.14	.173	.029	.03	.111	.012	.01
CAPE Depression	.460*	.210	**.28**	.163	.026	.03	.189*	.035	.05
BCSS Negative Self	.226*	.050	.05	.174	.030	.03	.154	.023	.05
BCSS Negative Others	.416*	.171	**.21**	.053	.003	.00	.033	.001	.00
BCSS Positive Self	-.058	.003	.00	-.357*	.126	**.15**	-.027	.001	.00
BCSS Positive Others	-.140	.019	.02	-.405*	.162	**.20**	.008	.000	.00

*$p < .01$ Medium effect sizes in bold, large effect sizes in bold and italics

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SECTION 3

ATTACHMENT AND SCHIZOTYPY

Chapter 4

Association between attachment prototypes and schizotypy dimensions in two independent non-clinical samples of Spanish and American young adults

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Abstract

Attachment theory offers a powerful theoretical framework for elucidating the developmental pathway through which childhood interpersonal trauma confers vulnerability to psychosis. In the present study, the association between attachment and schizotypy was explored in two independent non-clinical samples of Spanish (n=547) and American (n=1425) young adults. Participants completed the Relationship Questionnaire and the Wisconsin Schizotypy Scales. Following attachment theory and cognitive accounts of psychosis, it was hypothesized that preoccupied attachment would be associated with positive schizotypy, dismissing attachment with negative schizotypy, and fearful attachment with both schizotypy dimensions. Results confirmed these predictions, thus supporting the theoretical frameworks invoked. Also, the associations found in these non-clinical samples are consistent with those in clinical psychosis, supporting the continuum model of schizotypy and schizophrenia. Finally, there was cross-cultural consistency of these associations. Overall, the findings support the application of attachment theory for furthering our understanding of whether different insecure styles, characterized by different self and other representations and affect regulation strategies, play a role in the pathways to positive and negative symptoms.

Keywords: attachment styles; positive schizotypy; negative schizotypy; psychosis; cross-cultural

1. Introduction

There is presently considerable interest in understanding the role that psychosocial environmental factors play in the vulnerability, onset, expression, and course of psychosis (Garety et al., 2001; van Os et al., 2010). In particular, increasing attention has been devoted to elucidating the mechanisms through which childhood interpersonal trauma exacerbates the risk for developing psychosis (Read et al., 2005; Fisher et al., 2012; Read and Bentall, 2012). Attachment theory provides a powerful theoretical framework to understand the impact of distressing or traumatic early interpersonal relationships through the distortion of mental schemas, affective dysregulation, and altered interpersonal patterns (Platts et al., 2002; Berry et al., 2007; Read and Gumley, 2008). Demonstrating that insecure forms of attachment are meaningfully associated with the subclinical psychosis phenotype is an important intermediate step towards examining whether they play a role in the developmental pathway from early relational adversity to psychosis.

Attachment theory was proposed by Bowlby (e.g., 1988), who conceptualized attachment as the "propensity to make intimate emotional bonds to particular individuals as a basic component of human nature" (pp. 120-121). The theory suggests that early experiences with caregivers become internalized in the form of cognitive-affective representations or internal working models of the self and others; these models serve as templates for future relationships and are thought to be the mechanism of continuity of attachment dynamics across the life course (Collins and Read, 1990; Bifulco and Thomas, 2013).

Bartholomew (1990) developed a model of individual differences in adult attachment that defines four attachment prototypes on the basis of two underlying dimensions — model of self (also termed attachment anxiety) and model of others (also termed attachment avoidance). The negative model of self, or high anxiety, is characterized by a judgment of the self as unworthy of support, an excessive desire for closeness and approval, as well as a fear of being rejected by

significant others. The negative model of others, or high avoidance, is characterized by a judgment of others as unavailable and unsupportive, a strong preference for self-reliance, and discomfort with interpersonal closeness (Bartholomew and Horowitz, 1991; Griffin and Bartholomew, 1994a, 1994b; Brennan et al., 1998). The intersection of these two dimensions results in four prototypical attachment patterns: secure (positive self/positive others), preoccupied (negative self/positive others), dismissing (positive self/negative others), and fearful (negative self/negative others).

A parsimonious approach to examine the association between attachment and psychosis is to focus on schizotypy in non-clinical populations; this makes it possible to avoid the confounding factors associated with clinical status, such as symptom severity, medication, hospitalization, and social stigma. The fully dimensional view of psychosis suggests that schizotypy traits constitute the non-pathological endpoint of the phenomenological and etiological spectrum that culminates with clinical schizophrenia, with quantitative variation and qualitative changes accounting for the wide phenotypic variation (Claridge and Beech, 1995; Kwapil and Barrantes-Vidal, 2012). Consistent with the dimensional conceptualization, research has found a comparable dimensional structure between schizotypy and schizophrenia. Although the exact number of factors is yet unclear, epidemiological and clinical studies have provided strong support for the construct validity of the positive and negative schizotypy dimensions (Peralta et al., 1992; Kwapil et al., 2008; Barrantes-Vidal et al., 2013). Positive schizotypy is characterized by unusual perceptual experiences, odd thinking, and negative affect, whereas negative schizotypy is characterized by social disinterest, affective flattening, anhedonia, and diminution of cognitive functioning (Kwapil and Barrantes-Vidal, 2012).

A key component of attachment theory is that it delineates the distress regulation strategies that characterize each insecure attachment style. Therefore, this information should be useful for predicting how attachment relates to positive and negative schizotypy. People with high anxiety (i.e., preoccupied attachment) employ hyperactivating strategies that lead to an

impaired ability to regulate negative emotions as well as a tendency to detect threats and exaggerate distress (Mikulincer and Shaver, 2007, 2008). Accordingly, preoccupied attachment is expected to be associated with positive schizotypy and schizophrenia. Research indicates that the positive dimension is associated with high emotional reactivity and affective dysregulation (Lewandowski et al., 2006; Myin-Germeys and van Os, 2007; Barrantes-Vidal et al., 2009). By contrast, individuals with high avoidance (i.e., dismissing attachment) engage in deactivating strategies that lead to the dismissal of potential threats, a tendency to block conscious access to emotions, and the maintenance of psychological distance from others (Mikulincer and Shaver, 2007, 2008). Hence, dismissing attachment is expected to be associated with negative schizotypy and schizophrenia. Research suggests that the negative dimension is associated with diminished affective experiences (Kerns, 2006) and interpersonal withdrawal (Kwapil et al., 2012a). Finally, fearful attachment, which is characterized by an oscillation between hyperactivating and deactivating tendencies and thus lacks a coherent strategy of affect regulation (Simpson and Rholes, 2002; Mikulincer and Shaver, 2007), would be expected to relate to both schizotypy dimensions.

The majority of empirical studies on the link between attachment and psychosis report that patients with schizophrenia-spectrum disorders tend to have insecure attachment styles (Dozier and Lee, 1995; Mickelson et al., 1997); however, there have been conflicting findings regarding the differential association between attachment and symptom profiles. For example, in a sample of patients with clinical psychosis, Ponizovsky et al. (2007) reported associations between avoidant attachment and both symptom dimensions, as well as between anxious attachment and positive symptoms. Berry et al. (2008) found that avoidance was related to positive and negative symptoms, while anxiety did not yield significant results. In contrast, Ponizovsky et al. (2013) found preoccupied and fearful attachment to be related to positive symptoms, while no associations were found with the dismissing style.

In studies carried out with non-clinical samples, results have been equally mixed. Wilson and Costanzo (1996) found a relation between anxious attachment and positive schizotypy, and between avoidant attachment and both schizotypy dimensions. Berry et al. (2006) reported that anxiety was most strongly associated with positive schizotypy and avoidance with negative schizotypy. Meins et al. (2008) found that anxiety predicted suspiciousness/paranoia, whereas both anxiety and avoidance predicted negative schizotypal traits. Moreover, Tiliopoulos and Goodall (2009) found avoidance to be related only to negative schizotypy, while anxiety was associated with both dimensions.

It should be noted that several studies were conducted with relatively small sample sizes (e.g., N=154 in Meins et al., 2008; N=161 in Tiliopoulos and Goodall, 2009) and used different instruments to measure attachment and schizotypy, which probably accounts for the disparity in the findings. With respect to schizotypy, the questionnaires have varied in regards to the particular features that comprise the positive and negative dimensions. For example, for the assessment of negative schizotypy, Wilson and Costanzo (1996) used a shortened version of the Survey of Attitudes and Experiences (Venables et al., 1990), Berry et al. (2006) employed the Revised Social Anhedonia Scale (Eckblad et al., 1982), and both Meins et al. (2008) and Tiliopoulos and Goodall (2009) used the Schizotypal Personality Questionnaire (Raine et al., 1991). In regards to attachment, the instruments used in both clinical and non-clinical samples have differed in terms of measurement approach (continuous or categorical) and in the number of insecure styles assessed. Further, most studies conducted with continuous attachment measures considered the anxiety and avoidance dimensions independently, and thus did not investigate the characteristics associated with being simultaneously high on both (i.e., fearful prototype). Although taxometric research suggested that individual differences in adult attachment are best conceptualized in dimensional terms (Fraley and Waller, 1998), the prototypes might add interpretational power because each one is associated with a unique profile of affective and interpersonal functioning (Griffin and Bartholomew, 1994a). Moreover,

typological approaches may be more useful for identifying and differentiating people who are at heightened risk for psychopathology (Bifulco et al., 2003).

The aim of the present study was to explore the association between adult attachment prototypes and schizotypy dimensions in two independent large non-clinical samples of Spanish and American young adults. Consistent with the reviewed theoretical formulations, it was hypothesized that preoccupied attachment (negative self/positive others) would be positively associated with positive schizotypy, dismissing attachment (positive self/negative others) with negative schizotypy, and fearful attachment (negative self/negative others) with both schizotypy dimensions. Additionally, since an individual's language and socio-cultural environment may influence the expression of psychopathology, the cross-cultural invariance of these associations was explored in order to examine whether the findings generalize across the two samples. We focused on two countries that differ in terms of language and cultural values (such as individualism-collectivism; Hofstede, 2001) and expected to find a consistent pattern across both samples.

2. Methods

2.1 Participants and procedure

A total of 1972 unselected non-clinical young adults participated voluntarily in the study, completing several self-administered questionnaires. The Spanish sample was drawn from a screening sample of 589 undergraduate students from the Universitat Autònoma de Barcelona (UAB), 42 of whom were dropped due to invalid protocols, leaving a total of 547 participants (455 female; 92 male). The mean age of the Spanish sample was 20.60 years (S.D.=4.11). The American participants were drawn from a screening sample of 1622 undergraduate students from the University of North Carolina at Greensboro (UNCG), 197 of whom were excluded due to invalid or incomplete protocols, leaving a total of 1425 participants (1090 female; 335 male). The mean age of the American sample was 19.8 years (S.D.=3.93). The UAB Ethics Committee

approved the research carried out in Barcelona and the UNCG Institutional Review Board approved the research conducted in Greensboro. At both research sites the questionnaires were administered in classroom settings and participants provided written informed consent.

2.2 Measures

Attachment was measured with the Relationship Questionnaire (RQ; Bartholomew and Horowitz, 1991), which contains four statements describing each of the attachment prototypes (secure, dismissing, preoccupied, and fearful). As an example, the statement describing the preoccupied prototype is: “I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don’t value me as much as I value them”. Respondents were asked to score each statement on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree) and to choose the statement that best describes how they approach close relationships. The participants in Barcelona completed the Spanish version (Schmitt et al., 2004). The RQ has been validated against interview measures and has been shown to have acceptable test–retest reliability (Griffin and Bartholomew, 1994a; Scharfe and Bartholomew, 1994). As recommended by the authors, rather than categorizing participants into one of the four attachment patterns, the continuous ratings of each attachment prototype were used for analyses.

Schizotypy was measured with the Wisconsin Schizotypy Scales, composed of the Perceptual Aberration Scale (Chapman et al., 1978) that contains 35 items tapping schizophrenic-like perceptual and bodily distortions; the Magical Ideation Scale (Eckblad and Chapman, 1983) comprised of 30 items tapping a belief in implausible or invalid causality; the Physical Anhedonia Scale (Chapman et al., 1976) that includes 61 items tapping deficits in sensory and esthetic pleasure; and the Revised Social Anhedonia Scale (Eckblad et al., 1982), which consists of 40 items tapping asociality and indifference to others. The participants in Barcelona completed the Spanish version of the scales (Ros-Morente et al., 2010). Participants

were assigned positive and negative schizotypy dimensional scores based upon factor loadings derived from a sample of 6137 college students (Kwapil et al., 2008). Note that Kwapil et al. (2012b) indicated that the factor structure of the schizotypy scales was invariant in Spanish and American student samples.

In both samples, the items on the schizotypy scales were intermixed with a 13-item Infrequency Scale (Chapman and Chapman, 1983), that was included to screen out participants who responded in a random or "fake-bad" manner (e.g., "I cannot remember a time when I talked with someone who wore glasses"). Consistent with the recommendations of Chapman and Chapman, participants who endorsed more than two infrequency items were dropped from further study. Therefore, the reported sample consists only of careful respondents.

3. Results

For the sake of completeness, Table 1 contains the descriptive statistics for each of the attachment prototypes and schizotypy dimensions in both samples. Note that the alpha level was set at 0.001 for all analyses due to the large sample size and number of analyses computed, in order to minimize Type I error and reduce the likelihood of reporting statistically significant but inconsequential findings. *T*-test comparisons indicated that secure and dismissing attachment scores and the schizotypy scores were higher in the American sample than in the Spanish sample. Following Cohen (1992), the differences in dismissing attachment and negative schizotypy represented small effect sizes, whereas the differences in secure attachment and positive schizotypy were medium-sized effects.

Table 2 displays Pearson's correlations between the attachment prototypes and schizotypy dimensions in the two samples. The correlations among attachment prototypes are shown for descriptive purposes. Consistent with the descriptions in Bartholomew's model, in both samples the secure and fearful prototypes were negatively correlated, as were the preoccupied and dismissing prototypes. Regarding the associations between attachment and

schizotypy, the secure prototype was negatively correlated with negative schizotypy in both samples and with positive schizotypy in the American sample. As expected, in both samples dismissing attachment significantly correlated with negative schizotypy, preoccupied attachment with positive schizotypy, and fearful attachment with both schizotypy dimensions.

In order to examine the unique association of positive and negative schizotypy with the attachment prototypes and to test the invariance of the associations between attachment and schizotypy across the two samples, linear regressions were computed for each of the four attachment prototypes. For the sake of completeness, the positive and negative schizotypy dimensions were entered as predictors at the first step, site (Spain vs. USA) was entered at the second step, and the positive schizotypy×site and negative schizotypy×site interaction terms were entered at the third step (Table 3). The beta values and significance levels obtained in the first two steps (the unique contribution of positive and negative schizotypy and the effect of site over-and-above the schizotypy dimensions) yielded the same pattern of results described in Tables 1 and 2. The relation of schizotypy and insecure attachment prototypes did not differ between sites (as can be seen from the non-significant interaction terms) therefore indicating that the pattern of associations is cross-culturally comparable.[1]

4. Discussion

The main purpose of the present study was to examine the association between attachment prototypes and schizotypy dimensions in two non-clinical samples of Spanish and American young adults. Results supported the hypothesized relation between preoccupied attachment and positive schizotypy, dismissing attachment with negative schizotypy, and fearful

[1] In response to a reviewer's recommendation, we examined whether there were sex differences in attachment and schizotypy, and whether attachment and schizotypy remained associated after partialling out variance associated with sex. Consistent with previous findings (Miettunen and Jääskeläinen, 2010) men had significantly higher scores than women on negative schizotypy in both the Spanish and American samples. There were no sex differences in attachment. The analyses displayed in Table 2 were repeated after partialling out the effects of sex, and those in Table 3 were repeated partialling out sex at the first step in the regression models. The statistical significance of the results was unchanged by partialling out the effects of sex.

attachment with both positive and negative schizotypy. A comparable pattern of meaningful associations emerged in both samples, thus supporting the expected cross-cultural consistency of the findings.

The relation between preoccupied attachment and positive schizotypy suggests that having a negative model of the self is relevant for the endorsement of this schizotypy dimension. This finding concurs with previous studies that have reported relations between positive schizotypal traits and attachment anxiety (Wilson and Costanzo, 1996; Berry et al., 2006; Meins et al., 2008). Moreover, this association resonates with existing empirical evidence indicating that negative self-esteem, which is a marker variable for the model of self (Griffin and Bartholomew, 1994b), is strongly related to positive symptoms in clinical and analogue samples (Krabbendam et al., 2002; Barrowclough et al., 2003). Given that preoccupied attachment is characterized by hyperactivation of the attachment system, the findings support the notion that characteristics such as an inability to regulate negative emotions, the continuous vigilance of threat-related cues, and the amplification of distress (Mikulincer and Shaver, 2007), are associated with the features of positive schizotypy. Indeed, recent epidemiological research has shown that affective dysregulation impacts on the risk for reality distortion (van Rossum et al., 2011).

The present findings also supported the hypothesized association between negative schizotypy and dismissing attachment, which points to the relevance of a negative model of others in the endorsement of negative schizotypy. This finding is consistent with the results of previous studies that reported negative schizotypal traits were related to attachment avoidance (Berry et al., 2006; Meins et al., 2008). This association fits with the contention that the characteristics of deactivating the attachment system, such as interpersonal disengagement and reduced emotional reactivity and expressiveness (Mikulincer and Shaver, 2008), share important similarities with negative schizotypy (i.e., affective blunting and social withdrawal) and suggest the possible contribution of these mechanisms in the ontogeny of negative features.

The present study hypothesized that the fearful prototype, characterized by simultaneous negative models of the self and others, would be associated with both schizotypy dimensions. Our findings confirmed this expectation and bolster the view that the lack of a coherent strategy of affect regulation may place fearful individuals at a greater risk of psychopathology. This result cannot be directly contrasted with research conducted in non-clinical samples because previous studies have not performed analyses relating the four attachment prototypes to schizotypy dimensions. This finding, however, is in line with cognitive models of psychosis, which suggest that negative beliefs about the self and others contribute to the vulnerability and persistence of psychotic symptoms (Garety et al., 2001).

To the best of our knowledge, only Ponizovsky et al. (2013) have used the prototypes in Bartholomew's model to examine the association between attachment and symptom profiles in a clinical sample. This study found that the preoccupied and fearful prototypes were associated with higher scores in positive symptoms, whereas they did not find any association between attachment and negative symptoms. Their findings with the preoccupied and fearful prototypes parallel the results obtained in the current study and might be interpreted to suggest that the association of attachment with schizotypy and schizophrenia is more robust for the positive dimension. Alternatively, because Ponizovsky et al. split the sample into the RQ groups in order to test the associations of attachment with positive and negative symptom items, the null findings with the dismissing prototype could be attributable to a lack of statistical power for this group (which was only composed of 10 patients).

Our results differed from previous studies that found associations between avoidant attachment and the positive symptom dimension and between anxious attachment and the negative symptom dimension. Differences in the assessment instruments employed may account for these discrepancies. For example, Tiliopoulos and Goodall (2009) used the Schizotypal Personality Questionnaire (SPQ; Raine, 1991) and found that attachment anxiety was associated with negative schizotypy and particularly with the social anxiety component.

Research indicates that social anxiety is more strongly associated with positive rather than negative schizotypy (Brown et al., 2008). Moreover, there could be a specific association between avoidant attachment and paranoid ideation that does not apply to the unusual perceptual experiences and magical beliefs measured in the current study. Additionally, it should be noted that the two previous studies that used Hazan and Shaver's (1987) three-category attachment measure found that avoidant attachment was associated with both positive and negative schizotypy (Wilson and Costanzo, 1996) and schizophrenia (Ponizovsky et al., 2007), whereas anxious attachment was uniquely associated with the positive dimension. It has been pointed out that the avoidant style in this measure converges closely with the fearful prototype in Bartholomew's scheme (Bartholomew and Shaver, 1998; Mikulincer and Shaver, 2007), and thus our results seem to be consistent with the findings obtained in these previous investigations.

The fact that psychometrically assessed schizotypy and attachment prototypes were associated in a theoretically predicted fashion in both samples provides increased confidence in the validity of our findings. Note that these results are comparable to those obtained in clinical psychosis, which provides support to the continuum model of schizotypy and schizophrenia and lends further evidence to the contention that schizotypy is a promising construct for furthering our understanding of the cross-cultural expression of psychosis (Kwapil et al., 2012b).

The results of this study should be interpreted in light of its limitations. The use of university student samples with a predominance of female participants may limit the generalizability of the findings. Future work should investigate these associations in community samples with a representative distribution in terms of gender and age. Additionally, the present study used country as a proxy for culture. Further studies investigating cultural differences would benefit from including measures of cultural values and beliefs in their assessments. It is also important to take into consideration that the cross sectional design of this study limits the conclusions that can be drawn in terms of causality. It is attractive to interpret the findings from

a developmental perspective in line with theoretical propositions from the attachment and psychosis fields, and because robust epidemiological findings point to a protracted interplay between psychosocial environmental factors and the development and expression of the extended psychosis phenotype. However, longitudinal designs are required to determine whether attachment plays a causal role in the pathway leading to the development of schizotypy. Note that the effect sizes were relatively small, but we think that they are noteworthy given the fact that the study found predicted associations using a non-clinical sample and using one-item measures of attachment style (resulting in a rather conservative test of the hypotheses).

In closing, the results from the present study add to the current efforts in trying to elucidate the mechanisms implicated in the expression of psychosis by showing a differential association of positive and negative schizotypy with each pattern of attachment insecurity. Our findings also point to the value of highlighting the potential protective role of secure attachment, which previous studies have found it confers a form of resilience for psychopathology, even in the presence of adverse childhood experiences (Sroufe, 2005; Bifulco and Thomas, 2013). We believe further investigation into the mechanisms underlying the relation between attachment and schizotypy may help to elucidate etiological pathways and could guide future work in tailoring psychological interventions according to attachment styles and their respective affect regulation strategies.

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Table 1

Descriptive statistics for the attachment prototypes and schizotypy dimensions in the Spanish (n=547) and American (n=1425) samples

Measure	Spanish sample			American sample			*t*-value	Cohen's *d*
	Mean	S.D.	Range	Mean	S.D.	Range		
Attachment								
Secure	4.2	1.5	1 to 7	4.9	1.7	1 to 7	9.19*	0.45
Dismissing	3.6	1.6	1 to 7	3.9	1.8	1 to 7	3.94*	0.19
Preoccupied	3.4	1.7	1 to 7	3.6	1.9	1 to 7	2.18	0.11
Fearful	3.5	1.8	1 to 7	3.6	2.0	1 to 7	1.21	0.06
Schizotypy								
Positive	-0.55	0.75	-1.7 to 3.2	-0.02	1.0	-1.7 to 4.4	12.67*	0.60
Negative	-0.18	0.86	-1.8 to 4.3	0.01	1.0	-1.8 to 5.7	4.14*	0.20

*$p < 0.001$.

Table 2

Pearson correlations of schizotypy and attachment in the Spanish (n=547) and American (n=1425) samples

	Positive Schizotypy	Negative Schizotypy	Attachment			
			Secure	Dismissing	Preoccupied	Fearful
Spanish Sample						
Attachment						
Secure	0.06	-0.21*	—			
Dismissing	0.05	0.22*	-0.04	—		
Preoccupied	0.26*	0.05	-0.03	-0.16*	—	
Fearful	0.18*	0.25*	-0.17*	0.25*	0.18*	—
American Sample						
Attachment						
Secure	-0.10*	-0.34*	—			
Dismissing	0.04	0.28*	-0.18*	—		
Preoccupied	0.18*	0.03	0.04	-0.12*	—	
Fearful	0.20*	0.28*	-0.36*	0.22*	0.20*	—

*$p < 0.001$ (two-tailed).

Table 3

Regression analyses examining main and interaction effects of the standardized schizotypy and site variables as predictors of attachment prototypes (N=1972)

Criterion	Step 1		Step 2	Step 3		Total R^2
				Site × Schizotypy Interaction		
	Positive Schizotypy β	Negative Schizotypy β	Site β	Positive β	Negative β	
Attachment						
Secure	0.01	-0.29*	0.23*	-0.07	-0.04	0.14*
Dismissing	0.03	0.27*	0.06	-0.01	0.03	0.08*
Preoccupied	0.20*	0.01	0.00	-0.06	0.00	0.04*
Fearful	0.17*	0.26*	-0.04	0.00	0.02	0.11*

* $p < 0.001$.

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SECTION 4

MEDIATING MECHANISMS IN THE LINK BETWEEN CHILDHOOD INTERPERSONAL ADVERSITY AND THE SUBCLINICAL PSYCHOSIS PHENOTYPE: THE ROLE OF ATTACHMENT STYLE

Chapter 5

Mechanisms mediating the pathway from environmental adversity to psychosis proneness

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Abstract

Although a range of psychosocial environmental exposures have been linked to psychosis proneness, little is known about how these exposures impact upon the brain-mind system in leading to increased levels of reality distortion, disorganization or negative-like features. This chapter provides an overview of the major macro- and micro-environmental factors that have been associated with psychosis proneness and presents theoretical and empirical research on the plausible mechanisms that may explain these associations. Key challenges in the field are highlighted as well as the need for longitudinal studies that trace developmental pathways to psychosis proneness utilizing multifactorial and multilevel approaches.

1. Introduction

A fast growing field of research investigating the effects of psychosocial adversity on the brain is challenging the view that the endophenotypic abnormalities found in schizotypy and schizotypal personality disorder (SPD) only derive from genetic and biological insults. For instance, early life maltreatment impairs brain structure and physiology (e.g., Teicher, Anderson, Ohashi, & Polcari, 2013) and, of note, animal models (e.g., maternal separation), where causation of effects can be elucidated, support that these exposures cause brain and behavioral phenotypes that are analogous to those observed in individuals with schizophrenia (Brown, 2011).

Epidemiological research has recently shown an association of psychosocial factors both at macro (i.e., social) and micro (i.e., personal) environmental levels with clinical and nonclinical psychosis, particularly for the dimension of reality distortion (reviews in Bentall & Fernyhough, 2008; Brown, 2011; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). Some studies are conflicting, but there is an increasing consensus that psychosocial adversity is not merely a trigger of a genetically-based "psychosis proneness", but rather a co-participating factor in the make-up of the diathesis to psychosis.

Velikonja et al. (this volume) have reviewed in depth the relation of schizotypy with maltreatment, parental loss, and bullying. In this chapter we will first provide a brief overview of the array of candidate psychosocial factors that have been associated with schizotypy[1] to then focus on the mediating mechanisms that have received most attention in accounting for the adversity-schizotypy connection.

[1] As discussed in Chapter 1 (this volume), there is a highly heterogeneous conceptualization of the nature and boundaries of schizotypy, which translates into a varied terminology in the literature. This chapter reviews studies focusing on schizotypy traits, psychotic-like experiences (PLEs), schizotypal personality disorder and dimensional psychotic symptom ratings (i.e., nonclinical psychosis).

2. Candidate Environmental Factors

Macro-environmental Risk Factors

Urbanicity

An increasing body of evidence indicates that early exposure to an urban environment is associated with both subclinical and clinical psychosis (Krabendam & van Os, 2005). Studies have demonstrated a dose-response effect of urbanicity on psychotic-like experiences (PLEs) (van Os, Hanssen, Bijl, & Vollebergh, 2001) and that the persistence of PLEs is greater among those living in an urban as opposed to a rural area (Spauwen, Krabbendam, Lieb, Wittchen, & van Os, 2006).

Poverty

Poverty seems to be more strongly related to psychosis than to other psychiatric conditions (Read, 2010). A Swiss general population survey that assessed all DSM-IV personality disorders found that poverty was uniquely associated with SPD ratings (Hengartner, Ajdacic-Gross, Rodgers, Müller & Rössler, 2013). Additionally, other general population studies have provided evidence that socioeconomic disadvantage (variously defined) is associated with a greater likelihood of reporting PLEs (e.g., Saha, Scott, Varghese, & McGrath, 2013).

Minority status

Research indicates that both first- and second-generation immigrants have an increased risk for developing psychosis (Bourque, van der Ven, & Malla, 2011), and that migrant status is associated with a greater prevalence of PLEs (van Os et al., 2009). According to van Os (2012), several pieces of evidence (including the fact that the risk for psychosis persists into the second generation and is also found in ethnic minorities without recent history of migration) suggest that it is not migration in itself what elevates psychosis proneness, but rather certain features of the

greater social context in the host country, particularly the situation of being an exception to the norm. In this respect, research examining the rates of psychotic disorders among ethnic minority individuals has shown that the rates increase as the proportion of the own ethnic group in the neighborhood of residence decreases (e.g., Boydell et al., 2001). Although studies focusing on ethnic density and psychosis proneness are scarcer, a nationally representative study in the UK indicated that, as a whole, ethnic minorities living in a lower own-group density neighborhood were more likely to endorse PLEs (Das-Munshi et al., 2012).

Micro-environmental Risk Factors

Family environment

There is evidence linking family environment variables, such as parental communication deviance and expressed emotion, with the risk and course of psychotic disorders. Certain aspects of the family milieu have been associated with PLEs. For example, children with psychotic symptoms are more likely to have mothers with negative expressed emotion, but not decreased warmth (Polanczyk et al., 2010), and individuals high on social anhedonia report less cohesive and more conflictive family environments than controls (Blanchard, Collins, Aghevli, Leung, & Cohen, 2011).

Childhood interpersonal adversity: abuse and neglect, bullying, parental separation

Childhood interpersonal adversity shows associations with clinical and nonclinical psychotic phenomena (e.g., Varese et al., 2012). Different types of abuse and/or neglect have been linked to PLEs and to both the positive and negative dimensions of schizotypy, with evidence appearing to be stronger for the positive dimension (see Velikonja et al., this volume). Bullying has also been associated with PLEs. For example, a recent prospective study found that, after controlling for a range of potential confounders, experiences of bullying in childhood were associated with PLEs at age 18 years (Wolke, Lereya, Fisher, Lewis, & Zammit, 2013).

Additionally, the duration of early maternal separation has been associated with elevated levels of SPD symptoms later in life in children with an angry temperament (Anglin, Cohen, & Chen, 2008).

3. Mediating Mechanisms

Overall, the meta-analytic evidence available in psychosis and the systematic review conducted in schizotypy by Velikonja et al. (this volume) seem to indicate that there is a robust association between adversity and nonclinical and clinical psychosis. However, such *statistical association* does not necessarily involve *causation*, a demonstration that remains a critical challenge in the field. The accumulating evidence, though, favors the interpretation of a causal link: the magnitude of the association in psychosis is considerable (OR=2.8) and actually comparable to that of most genetic risk factors, and several population studies indicate a dose-response relationship (Varese et al., 2012).

A critical issue is whether adversity is the cause *or* the consequence of schizotypy. Although prospective studies have shown that the risk factor (adversity) temporally precedes the outcome (PLEs or psychosis), there is still the possibility that schizotypy or PLEs might be present before the adversity and increase the likelihood of trauma exposure, what is known as reverse causation. A likely possibility would be a complex scenario of bidirectional effects. In this regard, a prospective population sample study with early adolescents showed that trauma predicted PLEs over time and vice-versa and, importantly, trauma predicted new incident PLEs even when controlling for the presence of baseline PLEs (Kelleher et al., 2013). Another possible, non-mutually exclusive, explanation for the association between trauma and schizotypy might be genetic confounding or gene-environment correlation, which poses that a genetic diathesis is responsible for both schizotypy traits and increased probability of trauma exposure, meaning that trauma does not participate in the genesis of schizotypy (van Winkel, van Nierop, Myin-Germeys, & van Os, 2013). This seems to be particularly relevant when

considering the potentially causal role of adversity in the development of schizotypy, probably even more so than when considering psychosis as an outcome; given the trait-like nature of schizotypy features, these would be expected to be present early in life (e.g., social awkwardness, cognitive peculiarities) and condition the odds of exposure to a differential treatment in the family and social environment. The investigation of this possibility is challenging; however, the fact that the association between trauma and PLEs remains significant when controlling for familial liability to psychosis seems to support that exposure to trauma in itself further enhances psychosis proneness, suggesting a partial genetic mediation of environmental effects (van Winkel et al., 2013).

Another critical point for assuming causality is the existence of plausible mechanisms to account for the statistical association. Nowadays there are promising biological and psychosocial models, even though empirical research testing the validity of candidate mediators is still scarce. Some of these models favor the search for unifying mechanisms underlying the wide array of disparate psychosocial risk factors. They assume that psychosocial factors present in very different forms but eventually come down to exert their pathogenic effect through dysregulation of the stress-regulating systems, which in turn hits on both unspecific and schizotypy relevant psychobiological mechanisms—such as dopamine dysregulation (e.g., Collip, Myin-Germeys, & van Os, 2008). Meanwhile, other models focus on the specific impact that diverse adversity exposures may have. For instance, Bentall, Wickham, Shevlin, and Varese (2012) have argued that different forms of adversity may exert differential influences upon cognitive and emotional processes and, as such, certain degree of symptom specificity would be expected. They suggest that disrupted attachment and experiences of victimization are more likely to give rise to paranoid thinking, whereas severe early-life trauma, particularly sexual abuse, is more likely to lead to hallucinatory experiences. Indeed, their study found that once the co-occurrence of paranoia and hallucinations had been controlled for, sexual abuse

was specifically associated with hallucinatory experiences, whereas institutional care (as a proxy for attachment disruptions) was associated with paranoia.

Most likely both approaches are necessary to satisfactorily account for both the unspecific effects of adversity on cognitive and emotional development and the relatively specific impact of certain experiences in shaping particular traits or yielding the need for certain (mal)adaptive strategies that pave the risk for psychosis. The remaining of this section will present a summary of such models.

Traumagenic Neurodevelopment and Psychobiological Sensitization Hypotheses

The accumulating knowledge of the neurobiology of childhood trauma, and the appreciation of its significant overlap with neurochemical and neuroanatomical impairments in schizophrenia, have fuelled the suggestion of a causal role of childhood adversity in the development of spectrum disorders. Studies of early trauma have shown that stress exposure during critical developmental stages may result in structural and functional changes within the brain and a lowered threshold for neurobiological stress responses (e.g., Teicher et al., 2003). The traumagenic neurodevelopmental model of psychosis draws on these and other research findings and postulates that the increased stress-sensitivity found in people with psychotic disorders may result from the neurodevelopmental brain changes caused by prolonged or severe early-life adversity exposure (Read, Fosse, Moskowitz, & Perry, 2014). Thus, vulnerability to spectrum disorders could be acquired through developmental experience and not only inherited; both acquired (biological and psychosocial) and genetic risks would interact to originate the vulnerability towards psychotic features. Support for this model comes from evidence of shared biological alterations between childhood trauma and psychosis (e.g., over-reactivity of the hypothalamic-pituitary-adrenal (HPA) axis, hippocampal damage, alterations in dopaminergic and glucocorticoid release), and animal and human studies indicating that severe

early social adversity may trigger long-term disturbances of the HPA system and an increased dopaminergic response to stress (Read et al., 2014).

There is increasing acceptance that these disparate neurobiological factors related to psychosocial adversity exposure may act via a final common pathway of impaired stress-regulation mechanisms that would sensitize the dopaminergic system (e.g., van Winkel, Stefanis, & Myin-Germeys, 2008). Such sensitization would entail an exaggerated dopaminergic response in front of exposure to subsequent environmental stressors. Some findings at the behavioral level are compatible with the notion of increased stress-sensitivity in individuals exposed to early trauma. Using experience sampling methodology (a diary method to assess symptoms, thoughts, emotions and context in the flow of daily life), Barrantes-Vidal et al. (unpublished findings) found that childhood trauma and daily-life momentary stress interacted to predict paranoid ideation (but not PLEs) in daily life in nonclinical young adults. Furthermore, consistent with the hypothesis that stress-sensitivity would be a relevant pathway specifically for reality distortion, Barrantes-Vidal, Chun, Myin-Germeys, & Kwapil (2013) found that daily-life stressful situations and social stress were associated with momentary PLEs and paranoia for those high in positive schizotypy, and the experience of stress temporally preceded the onset of PLEs only for those with high positive schizotypy (whereas stress preceded the onset of paranoid symptoms in general).

The mesolimbic dopaminergic system is crucial in the attribution of salience, a process whereby thoughts and events are motivationally invested and influence goal-directed behavior given their association with punishment or reward (Berridge & Robinson, 1998). Hyperdopaminergia, which has long been linked to reality distortion, might alter the attribution of emotional or incentive salience to internal representations and external stimuli at a mind level, which would lead to cognitive and perceptual oddities (Kapur, 2003). Also, the increased levels of tonic mesolimbic dopamine might increase the noise in the reward system, “drowning out” dopaminergic signals associated with stimuli indicating reward, resulting in a reduced

motivational drive and thus in the negative features of withdrawal and avolition (Howes & Kapur, 2009; Roiser et al., 2009). On the other hand, Raine (2006) suggests that physical and emotional neglect may result in environmental deprivation, which is also known to affect brain development (e.g., Teicher et al., 2013).

The Social Defeat Hypothesis

The social defeat (SD) hypothesis holds that a wide range of environmental factors share a common feature of exclusion from the majority group, that is, a subordinate or outsider position, and induce decreased self-value (Selten, van der Ven, Rutten, & Cantor-Graae, 2013). Drawing on findings from animal studies indicating that SD stress (e.g., repeated attacks of a stronger intruding animal) induce dopaminergic abnormalities, Selten et al. suggested that enduring exposure to SD might induce sensitization of the mesolimbic dopaminergic system, thereby resulting in a greater vulnerability for developing psychosis. The authors propose that SD may serve as a unifying explanatory mechanism linking some of the established psychosocial risk factors with the psychosis phenotype. A recent review concluded that the evidence that a state of SD contributes to dopamine dysregulation in humans is still scarce, but that the evidence for SD as a "common denominator" of the risk-conferring effects of certain psychosocial factors supports a causal effect, especially for migrant status and childhood trauma (Selten et al., 2013).

In relation to the nonclinical phenotype, there is preliminary evidence consistent with the SD hypothesis. The study by Das-Mushi et al. (2013) found that, in general, ethnic minorities residing in neighborhoods of lower own-group density were more likely to report social adversity factors such as increased discrimination and decreased practical social support—both regarded as potential markers of SD according to Selten et al. (2013), which in turn were related to endorsement of PLEs. In addition, a Dutch general population study found that SD (operationalized as feelings of worthlessness, hopelessness, and self-devaluation), as well as

affective dysregulation, mediated the association between childhood trauma and PLEs (van Nierop et al., 2013). Interestingly, SD uniquely explained the association between trauma and symptoms in the subgroup of individuals with psychotic disorder, suggesting that SD may be more crucially involved in the trajectory leading to core clinical psychosis (van Nierop et al., 2013).

Social Capital

The term social capital subsumes many components and has often been conceptualized as referring to "features of social organization, such as networks, norms, and trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1993, p. 35; see Whitley & McKenzie, 2005 for a review of definitions). It has been proposed that components of social capital could help explain the risk for psychotic features conveyed by area-level factors such as urbanicity and low ethnic density (e.g., Brown, 2011; Krabbendam & van Os, 2005). Low social capital has been associated with incidence of psychotic disorders (Brown, 2011), but whether social capital mediates the effects of macro-environmental factors on schizotypy and psychosis has been scarcely investigated. Kirkbride et al. (2007) suggested that social capital might act as a buffer of the social stress linked to certain macro-environmental risk factors. Specifically, they proposed that in areas with high social capital, perceived or real access to support networks might foster resilience by mitigating social stress, whereas low social cohesion may stimulate biases such as paranoid attributions, which in turn would increase the risk for psychotic features in vulnerable individuals.

Research in this domain seems to have been hampered by the complexity of operationalizing social capital and different proxies have been used across studies. Furthermore, social capital can be approached at both the individual and ecological level—and each of these may capture distinct processes (Whitley & McKenzie, 2005). Although the

heuristic value of social capital has been widely proposed, further research is needed to assert whether it plays a role in the pathway to psychosis proneness.

Psychological Mechanisms

Negative cognitive schemas, insecure attachment styles, and impaired social cognition are interrelated psychological constructs that have been proposed to be involved in the developmental trajectory from childhood adversity to psychotic phenomena. The literature in this area is at a nascent stage and, therefore, the conceptual boundaries between these constructs, as well as the incremental value that each one can offer to our understanding of the development of schizotypy, are not yet clear and require further elucidation.

Negative cognitive schemas

Cognitive accounts of psychosis implicate enduring negative schemas of oneself (e.g., as worthless or vulnerable) and others (e.g., as untrustworthy or devious) in the pathway from adversity to positive symptoms (e.g., Garety, Bebbington, Fowler, Freeman, & Kuipers, 2007). Such negative schemas built upon negative interpersonal experiences are thought to convey vulnerability to psychotic features by shaping (or biasing) the subsequent interpretation of anomalous or unusual experiences in a schema-consistent manner. In support of the notion that negative schemas are specifically relevant to positive psychotic phenomena, Barrantes-Vidal et al. (2013) showed that increased negative self- and other-schemas were associated with positive, but not negative, psychometric schizotypy.

It has been proposed that negative schematic beliefs may be particularly involved in the pathway to paranoia following childhood adversity and a few cross-sectional studies have tested this prediction in nonclinical samples. Fisher, Appiah-Kusi, and Grant (2012) found that negative self-schemas and anxiety levels were mediators of the association of physical or emotional abuse with paranoia. Ashford, Ashcroft, and Maguire (2012) tested potential mediators of an

association between forms of bullying and paranoia. They found that the association of indirect aggression with paranoia was mediated by negative self-schemas and depression, whereas the association of direct verbal aggression with paranoia was mediated by negative other-schemas. The authors reasoned that different forms of aggression (i.e., direct/overt versus indirect/covert) might be differentially attributed to the self and others and thereby lead to specific negative beliefs. The study by Freeman and Fowler (2009) did not find support for mediation by negative self-schemas (only anxiety emerged as a mediator); this study did not include negative other-schemas and the measure of trauma was not restricted to childhood. It might be that negative self- and other-schemas operate differently as a function of type or timing of trauma. Although not yet conclusive, the evidence appears to support cognitive models regarding the interplay between negative schemas and emotional factors in the route to paranoid thinking.

Insecure attachment

Attachment theory stands as an integrative framework of several of the hypothesized psychological mechanisms through which early interpersonal adversity may confer risk for developing schizotypy and psychosis (Read & Gumley, 2008). The theory suggests that early caregiving experiences provide the building blocks for the formation of cognitive/affective representations of the self and others (or "internal working models") and characteristic affect regulation strategies —which are reflected in a person's attachment style (Mikulincer & Shaver, 2007). Individual differences in attachment style have been broadly conceptualized as being of a secure or insecure nature, and different forms of attachment insecurity have been identified.

Previous research has provided support for an association of insecure attachment styles with positive and negative features across the psychosis continuum (Korver-Nieberg, Berry, Meijer, & de Haan, 2013; Sheinbaum, Bedoya, Ros-Morente, Kwapil, & Barrantes-Vidal, 2013); however, the mediating effect of insecure attachment in the association of trauma with the psychosis phenotype has been scarcely investigated. Preliminary evidence comes from a cross-

sectional study from our group in which fearful attachment, a style characterized by negative self and other views as well as high anxiety and avoidance in relationships, mediated the association of physical/emotional childhood trauma with positive and negative schizotypy, suspiciousness, and PLEs (Sheinbaum, Kwapil, & Barrantes-Vidal, 2014). Current psychological models indicate that insecure attachment may be more strongly linked to paranoia than to other psychotic traits (e.g., Bentall & Fernyhough, 2008). Although this may be the case, our findings would seem to suggest that if relational adversity is internalized in the form of fearful attachment, this might contribute nonspecifically to psychosis proneness. Insecure attachment as a mediating mechanism requires replication and should be investigated in the context of longitudinal research designs. In addition, it is unclear to what extent it may act as a mediating and/or moderating factor in the face of adversity.

Social cognition

Social cognition is a multifaceted umbrella concept referring to a range of mental operations that are important in navigating social interactions, including, among others, attributional processes and mentalizing/theory of mind (ToM) skills. As regards to attributional processes, it has been suggested that adverse experiences could result in a tendency to appraise negative experiences as externally caused (an external attributional style), potentially facilitating positive symptoms (Garety et al., 2007). Bentall and Fernyhough (2008) proposed a model of paranoia in which experiences of victimization (particularly in insecurely-attached people) would lead to diminished self-esteem and increased likelihood of externalizing explanatory biases, thereby resulting in greater social threat anticipation and consequently paranoid thinking. The authors suggest that diminished ToM capacities may contribute to an external explanatory style, as this would further complicate attributing negative actions of other people to situational factors. In the nonclinical domain, evidence for the role of external attributions comes from a recent prospective study in the UK that measured the related

construct of external locus of control (LoC). This study found that external LoC (as well as depression, anxiety, and low self-esteem) mediated the pathway from three forms of childhood adversity (bullying, harsh parenting, and domestic violence) to PLEs (Fisher et al., 2013).

As regards to mentalizing, we are not aware of research examining its mediating effects in the link between adversity and schizotypy. It has been suggested, however, that exposure to early adversity/deprivation could result in mentalizing deficits that in turn would confer risk for psychotic symptoms (van Os, Kenis, & Rutten, 2010). This is supported by independent strands of work showing an association between childhood maltreatment and diminished ToM abilities (e.g., Pears & Fisher, 2005), and between diminished ToM abilities and schizotypy (e.g., Morrison, Brown, & Cohen, 2013). Given that the capacity for mentalizing is thought to develop within the context of early attachment relationships (Fonagy & Target, 2006), the interplay between attachment and mentalization, and how this impacts upon schizotypy, looks to be a fruitful avenue for future investigation.

Dissociation

Dissociation involves a disruption in certain mental functions that are usually integrated, such as memory, identity, and consciousness. Early traumatic experiences have been consistently linked to dissociation (Carlson, Yates, & Sroufe, 2009) and research has shown that dissociation is associated with psychotic symptoms, particularly hallucinations (Moskowitz & Corstens, 2007), and schizotypy (Moskowitz, Barker-Collo, & Ellson, 2005). It has been proposed that dissociative tendencies that result from overwhelming negative experiences could be involved in the pathway to hallucinatory experiences (e.g., Moskowitz & Corstens, 2007).

In a sample of individuals with psychosis, Perona-Garcelán et al. (2012) found that dissociation (specifically depersonalization) mediated the link between childhood trauma and hallucinations, but not the link between trauma and delusions. Similarly, Varese, Barkus, and Bentall (2012) showed that the association of childhood trauma with hallucination-proneness

was mediated by dissociation in both a subgroup of people with psychotic disorders and in the aggregated sample comprising clinical and nonclinical participants. In a sample of university students, Perona-Garcelán et al. (2014) reported that dissociative experiences of depersonalization and absorption mediated the link between childhood trauma and hallucination-proneness. Taken together, the evidence seems to support a role of dissociative tendencies in the route to hallucinatory experiences. It will be the task of longitudinal studies to provide clues into whether and how dissociative tendencies, which may begin as an adaptive or protective response to trauma, interact with other vulnerabilities (such as source monitoring deficits) in leading to hallucinatory experiences.

4. Conclusions and Future Directions

The present chapter has provided an overview of some of the environmental factors that have been associated with schizotypy as well as some of the plausible mechanisms that may account for such observed associations. The accumulating work on these risk factors and mediators seems to support the suggested etiological continuity between schizotypy and schizophrenia. However, it should be highlighted that, in most cases, the empirical evidence as regards to mediators remains scarce (and is mostly cross-sectional) and therefore cannot yet provide conclusive answers as to whether the mechanisms reviewed herein contribute to explaining the putative causal links.

It should be noted that although each of the potential mediators have been presented separately for ease of exposition, the processes whereby environmental exposures contribute to psychosis proneness are likely to be mediated by multiple mechanisms acting at different levels and, in many cases, interacting with each other. As such, the field has much to gain by investigating the dynamic interplay of these mechanisms from a developmental psychopathology framework. This would provide insights into the trajectories through which

potentially initiating conditions (e.g., trauma) may move the individual along a path of atypical biological, psychological, and/or social development that eventually leads to schizotypy features. Equally, this would allow for the appreciation of the processes underpinning resilient adaptation over the life course.

Another important issue that merits attention is that of specificity, as some of the environmental factors reviewed in this chapter, as well as the potential mediators, are not specific to schizotypy. Although this may be considered as a downside of this line of enquiry, the lack of narrowly defined pathways between specific risk factors, mechanisms and phenotypes in the realm of psychology and psychiatry seems to be the norm rather than the exception. It is likely that future research conducted from a broader conceptualization of the continuity from personality to psychopathology and across seemingly distinct disorders may be better able to delineate the commonalities and specificities of environmental factors.

A major challenge in this field concerns the fact that environmental exposures do not necessarily lead to schizotypy traits or psychosis, which suggests that they are neither necessary nor sufficient causes of psychosis proneness. Current research aims at identifying the plethora of factors contributing to determine the outcome of such exposures. Psychosocial factors such as the developmental timing of the exposure, severity, duration, presence of support and qualitative aspects of the trauma (e.g., intra- versus extra-familial abuse) are likely to greatly influence the impact of adversity (Read et al., 2014). In addition, genetic vulnerability to psychosis may be a critical moderating factor in shaping whether these exposures translate into a schizotypy phenotype.

Genetic variation in DNA sequence would entail differences in biological functionality that may be problematic or advantageous in particular environments; gene-environment interaction would occur when the functional impact of gene variation and a given environmental exposure would take place in common biological mechanisms and their combined is greater than their added effects (van Winkel et al., 2010). So far very few studies have tested gene-

environment interaction in schizotypy, particularly with molecular studies. For instance, Savitz, van der Merwe, Newman, Stein, and Ramesar (2010) reported that the COMT Val allele was associated with positive schizotypy only in individuals exposed to high levels of childhood trauma, suggesting that genetically driven variation in COMT-Val may interact with trauma in the causal pathway to schizotypal traits. More recently, epigenetic mechanisms have been proposed as another pathway by which gene-environment interaction may occur. Epigenetics allude to the reversible regulation of various genomic functions by means of changes in DNA methylation and chromatin structure, which take place independently of DNA sequence (van Winkel et al., 2013). Epigenetic mechanisms might mediate environmental effects on gene function by 'switching' on and off gene transcription throughout development. Many enzymatic, hormonal, and second-messenger cascades connect the external environment with the chromatin to modulate gene activity in front of psychosocial exposures. Therefore, epigenetic regulation of DNA activity in response to changes or pathogens in the environment constitutes a mechanism for rapid genome adaptations to the environment; at the same time, it also entails that adverse environments can impact adversely on the genome by altering epigenetic states that can impair biological functions (Svrakic, Zorumski, Svrakic, Zwir, & Cloninger, 2013).

Another line of endeavour is the refinement of environmental measures. Currently, there is a growing focus on the micro-environment of real life by means of momentary assessment techniques, such as the experience sampling methodology (ESM) mentioned earlier. The repeated assessment of the person – momentary environment interplay over time allows unravelling dynamic processes and variability over time, as well as identifying contextual determinants and patterns of reactivity of experiences. Therefore, this approach is a valuable addition to conventional cross-sectional measurements (Myin-Germeys et al., 2009), and it has already been shown that it is a feasible method to study the phenomenology and environmental stress-reactivity dynamics of the schizotypy dimensions (Barrantes-Vidal et al., 2013). Furthermore, the mixed nomothetic and idiographic nature of ESM can empower the

challenging empirical study of subjective phenomenology. It would be very useful to ascertain what specific qualities of environmental stressors, beyond the recollection of their occurrence, may be specifically relevant for or have causal efficiency in schizotypy. For instance, the appraisal of intentionality in interpersonal trauma seems to be a critical pathogenic element, but it is still poorly understood how this element of subjective meaning translates into the fuelling of, for instance, paranoid attributions. In this sense, the richness of intense idiographic and qualitative studies would probably have more explanatory power than large-scale quantitative studies to examine such a meaning system, but these approaches have been traditionally overlooked as methodologically weak and unreliable, even if they would be an appropriate tool for such specific explanatory level (Barrantes-Vidal, 2013). Finally, ESM is beginning to prove a useful tool in the field of gene-environment interaction studies. Unlike retrospective measures of distal exposures, ESM prospectively collects repeated measures of proximal environmental factors; this allows the detection of subtle and varied common environmental pathogens, their possible cumulative effects, and chains of effects rather than the impact of a single factor in one exposure (Myin-Germeys et al., 2009). These features should enhance the likelihood of understanding how genes amplify the likelihood of displaying specific psychological responses to the environment.

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Chapter 6

Fearful attachment mediates the association of childhood trauma with schizotypy and psychotic-like experiences

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Abstract

We examined whether insecure attachment styles mediate the association between childhood trauma and nonclinical psychotic phenomena in 546 young adults. Fearful attachment mediated the associations of physical/emotional trauma with schizotypy, suspiciousness, and psychotic-like experiences. Results support theoretical accounts implicating attachment disruptions in the pathway from childhood adversity to psychosis.

Keywords: childhood trauma; attachment styles; psychotic-like experiences

1. Introduction

Mounting evidence indicates that childhood adversity is associated with psychotic phenomena in clinical and nonclinical populations (see meta-analysis by Varese et al., 2012). Among the psychological mechanisms that have been suggested to underlie this association, insecure attachment styles have received increasing theoretical attention (e.g., Read and Gumley, 2008). Attachment styles initially develop within the context of the early relational environment and reflect habitual cognitive-affective representations ("internal working models") of the self and others and strategies for regulating distress (Mikulincer and Shaver, 2007). Bartholomew and Horowitz (1991) defined four (one secure and three insecure) adult attachment styles based on different combinations of positive versus negative self and other representations: secure (positive self/positive others), preoccupied (negative self/positive others), dismissing (positive self/negative others), and fearful (negative self/negative others).

Previous work has demonstrated associations of insecure attachment with psychotic phenomena in clinical and nonclinical samples (for a review, see Korver-Nieberg et al., 2014). However, to our knowledge, only one empirical study has directly examined (and found) insecure attachment styles as mediators of links between childhood adversities and positive psychotic phenomena (Sitko et al., 2014). Whilst that study had the strength of a large sample size, the attachment measure used is based on a three-category model that does not distinguish between the dismissing and fearful styles, a distinction that has been consistently shown to be theoretically and empirically relevant (Bartholomew and Horowitz, 1991; Mikulincer and Shaver, 2007). Furthermore, we are not aware of studies investigating whether insecure attachment mediates associations of trauma with the negative dimension.

Research suggests that the psychosis phenotype is expressed across a continuum of nonclinical and clinical manifestations (van Os et al., 2009). Focusing on the subclinical manifestations minimizes the confounding factors associated with clinical status and provides a "cleaner laboratory" for investigating etiological mechanisms (Kwapil and Barrantes-Vidal,

2012). The aim of the current study was to examine whether insecure attachment styles mediate the associations of childhood trauma with positive and negative schizotypy, suspiciousness, and psychotic-like experiences (PLEs) in a nonclinical sample of young adults.

2. Methods

2.1. Participants

Participants were 546 undergraduates from the Universitat Autònoma de Barcelona, who were recruited out of a candidate pool of approximately 750 participants (73%). The mean age was 20.6 years (SD=4.1) and 83.2% were female. The University Ethics Committee approved the study and participants provided informed consent.

2.2 Measures

Childhood trauma was assessed with the Childhood Trauma Questionnaire (CTQ; Bernstein and Fink, 1998), which measures emotional, physical, and sexual abuse and emotional and physical neglect during childhood and adolescence. Given that modest to high correlations (ranging from 0.21 to 0.56) were observed among the non-sexual trauma subscales, we performed a principal components analysis (PCA) to produce a single physical/emotional trauma factor. The PCA yielded one factor that explained 56% of the variance. The physical/emotional trauma factor and the sexual abuse subscale were used for analyses (note that they were only modestly correlated, r=0.18). Attachment style was measured with the Relationship Questionnaire (RQ; Bartholomew and Horowitz, 1991), which yields continuous ratings of the four attachment styles.

PLEs were measured with the positive symptom subscale of the Community Assessment of Psychic Experiences (CAPE; Stefanis et al., 2002) and paranoid beliefs with the suspiciousness subscale of the Schizotypal Personality Questionnaire (SPQ; Raine, 1991). Schizotypy was assessed with the Wisconsin Schizotypy Scales (WSS), composed of the Perceptual Aberration (Chapman et al., 1978), Magical Ideation (Eckblad and Chapman, 1983),

Physical Anhedonia (Chapman et al., 1976), and Revised Social Anhedonia (Eckblad et al., 1982) Scales. The WSS reliably produce two factors, positive and negative schizotypy, that account for 80% of their variance. Participants were assigned positive and negative schizotypy factor scores based upon norms from 6,137 American young adults (Kwapil et al., 2008). Note that Kwapil et al. (2012) indicated that the factor structure underlying the WSS was invariant in Spanish and American samples.

3. Results

Pearson's correlations indicated that physical/emotional trauma was significantly associated with PLEs (r=0.22, p<0.001), suspiciousness (r=0.27, p<0.001), positive schizotypy (r=0.22, p<0.001), and negative schizotypy (r=0.25, p<0.001). Following Cohen (1992), effect sizes were of a small magnitude. Sexual abuse was not associated with these outcomes (PLEs: r=0.07, suspiciousness: r=0.02, positive schizotypy: r=0.09, negative schizotypy: r=-0.02), so it was not examined in the mediation analyses.

Mediation was tested using Hayes (2013) method for assessing indirect pathways. Mediation of the association of trauma and the psychosis phenotype by attachment is demonstrated by significant indirect coefficients. Parallel multiple mediation analyses were performed using PROCESS (Hayes, 2013). Four models were tested (one for each of the nonclinical psychosis phenotype variables) with physical/emotional trauma as the independent variable and the three insecure attachment ratings entered simultaneously as mediators. Bias-corrected confidence intervals were generated using bootstrapping with 10,000 resamples. The total, direct, and indirect effects are displayed in Table 1. The specific indirect effect of fearful attachment (with the other mediators entered) was significant in all models. Preoccupied and dismissing attachment were not significant mediators.

4. Discussion

The current study tested theoretical models that insecure attachment provides a pathway from childhood adversity to psychosis. Results indicated that physical/emotional trauma was associated with positive and negative nonclinical psychotic phenomena and that fearful attachment significantly mediated these associations. This study did not replicate the association between sexual abuse and psychotic phenomena obtained in previous studies (Varese et al., 2012), which may be due in part to a low prevalence of sexual abuse in our sample (low, moderate, and severe sexual abuse were reported by 5.1%, 1.8% and 2% of the sample, respectively).

Fearfully attached individuals have been conceptualized as having a disorganized attachment system with negative internal working models of both self and others and opposing approach/avoidance tendencies (Fonagy and Luyten, 2012)[1]. By contrast, preoccupied and dismissing individuals, although insecure, have at least one positive working model and more consistent affect-regulation strategies (hyperactivation and deactivation, respectively). Although the cross-sectional nature of this study precludes conclusions about causality, it could be hypothesized that the disorganizing effect of adverse relational experiences on the attachment system is what carries most risk for developing psychotic phenomena.

It should be noted that although different forms of interpersonal childhood adversities tend to co-occur, and that physical and emotional abuse and neglect clustered together in our data, the dynamics and effects of each form of adversity may be different (Bifulco and Thomas, 2013) and future studies may consider separately assessing the effects of each trauma subtype. Another consideration is that there could be a slight overlap between insecure attachment and the paranoid feature of nonclinical positive psychotic-like variables, as both may involve a

[1] Note, however, that there is currently not a universally agreed upon conceptualization of the fearful or disorganized forms of attachment in adulthood (e.g., for other formulations *see* Bifulco and Thomas, 2013; Hesse and Main, 2000).

mistrust component. This, however, would not apply to positive schizotypy as measured by the WSS, given that it taps perceptual distortions and magical but not paranoid ideation.

Although the effect sizes in this study were relatively small, we think that they are noteworthy given that we found theoretically meaningful results using a nonclinical sample and with a one-item measure of attachment style. Given that the pathway to psychosis following childhood adversity is likely to involve multiple and multilevel factors, future studies should investigate the effects of insecure attachment in conjunction with other risk and protective factors that are likely to shape developmental trajectories towards the extended psychosis phenotype. In closing, our findings indicate that relational experiences play a role in psychosis proneness and further emphasize the relevance of assessing early-life trauma and attachment style when working with individuals with, or at risk for, psychosis.

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Table 1

Parallel multiple mediation analyses examining indirect effects of physical/emotional trauma on nonclinical psychotic phenomena via dismissing, preoccupied, and fearful attachment (N=546)

			95% Bias-corrected Confidence Interval	
	Raw Parameter Estimate	SE	Lower	Upper
Psychotic-like Experiences				
Total effect	0.965*	0.181	0.609	1.320
Direct effect	0.822*	0.178	0.474	1.171
Indirect total effect	0.142*	0.066	0.030	0.293
Indirect effect via dismissing	0.002	0.016	-0.024	0.046
Indirect effect via preoccupied	0.077	0.051	-0.007	0.196
Indirect effect via fearful	0.063*	0.034	0.015	0.151
Suspiciousness				
Total effect	0.514*	0.078	0.361	0.666
Direct effect	0.420*	0.073	0.277	0.564
Indirect total effect	0.093*	0.035	0.030	0.167
Indirect effect via dismissing	-0.001	0.007	-0.019	0.011
Indirect effect via preoccupied	0.038	0.024	-0.002	0.093
Indirect effect via fearful	0.056*	0.023	0.019	0.110
Positive Schizotypy				
Total effect	0.168*	0.032	0.106	0.230
Direct effect	0.140*	0.031	0.080	0.201
Indirect total effect	0.028*	0.012	0.008	0.054
Indirect effect via dismissing	0.003	0.003	-0.001	0.013
Indirect effect via preoccupied	0.015	0.010	-0.001	0.037
Indirect effect via fearful	0.010*	0.006	0.002	0.025
Negative Schizotypy				
Total effect	0.216*	0.036	0.146	0.286
Direct effect	0.185*	0.035	0.117	0.254
Indirect total effect	0.031*	0.012	0.011	0.057
Indirect effect via dismissing	0.010	0.007	-0.001	0.028
Indirect effect via preoccupied	0.002	0.004	-0.003	0.013
Indirect effect via fearful	0.019*	0.009	0.006	0.040

Note. Results based on 10,000 bias-corrected bootstrap samples. *p<0.05

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Chapter 7

Interview investigation of insecure attachment styles mediating between poor childhood care and schizophrenia-spectrum psychopathology

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Abstract

Objective: This study investigated (i) whether two forms of poor childhood care, namely parental antipathy and role reversal, were associated with subclinical positive and negative symptoms and schizophrenia-spectrum personality disorder (PD) traits, and (ii) whether such associations were mediated by specific insecure attachment styles.

Method: A total of 214 nonclinical young adults were interviewed for subclinical symptoms (Comprehensive Assessment of At-Risk Mental States), schizophrenia-spectrum PDs (Structured Clinical Interview for DSM-IV Axis II Disorders), poor childhood care (Childhood Experience of Care and Abuse Interview), and attachment style (Attachment Style Interview).

Results: Both parental antipathy and role reversal were associated with subclinical positive and negative symptoms and with paranoid and schizotypal PD traits. Neither type of poor care was associated with schizoid PD traits. Angry-dismissive attachment mediated associations between antipathy and subclinical symptoms and both angry-dismissive and enmeshed attachment mediated associations of antipathy with paranoid and schizotypal PD traits. Enmeshed attachment mediated associations of role reversal with paranoid and schizotypal PD traits.

Conclusion: Attachment theory can inform lifespan models of how adverse developmental environments may increase the risk for psychosis. Insecure attachment provides a promising mechanism for understanding the development of schizophrenia-spectrum phenomenology and may offer a useful target for prophylactic intervention.

Keywords: psychosis; schizophrenia; schizotypy; childhood adversity; insecure attachment

Introduction

Childhood interpersonal adversities are associated with an increased risk for psychotic disorders and subclinical psychotic phenomena (1–5). In recent years, increasing research efforts have been devoted to identifying the underlying mechanisms that may account for such associations (6–8). In this regard, insecure attachment styles have received theoretical attention (9) as well as some initial empirical support (10–12) as mediators between childhood adverse experiences and both positive and negative psychotic features, but further specificity needs investigating.

Previous work examining whether insecure attachment styles mediate the adversity–psychosis link has not specifically focused on adverse relational experiences with significant caregiving figures. This is a relevant domain of investigation given that attachment theory suggests that attachment styles are first formed in the context of the early caregiving environment (13). Research focusing on parent-child relationships has provided evidence linking perceived lack of parental care, as well as sub-optimal parenting behaviors, with an increased likelihood of psychotic-like and schizophrenia-spectrum features (e.g., 14–17). However, a limitation of prior studies is that most relied on self-report measures that have potential shortcomings for researching objective aspects of early life (18).

In the present study we used the Childhood Experience of Care and Abuse (CECA) (18), an interview measure that assesses relevant context and provides objective accounts of childhood experiences, to investigate two parental behaviors within the lack of care domain: antipathy and role reversal. Antipathy reflects the extent to which the parent shows hostility, criticism, rejection or coldness towards the child. Role reversal reflects the extent to which a child assumes parental responsibilities in terms of household duties and providing emotional support to the parent (19). A prior study using the parallel CECA questionnaire (20) reported that maternal antipathy was approximately twice as common among individuals with psychotic disorder as compared with controls (21). To our knowledge, associations of role reversal with

the extended psychosis phenotype have not been previously examined by either interview or questionnaire.

Elucidating whether there exists specificity of type of attachment style in mediating between different childhood experiences and different phenotypic expressions of psychosis should advance theory development and may ultimately inform the design of preventative and treatment strategies. Earlier studies on the role of attachment in pathways between adversity and psychotic phenomena (10-12) have relied on self-report attachment measures. Such measures are restricted in their capacity to capture the content and context of attitudinal and behavioral information. Therefore research in the field would benefit from the use of a contextually-sensitive narrative interview that provides greater specificity than questionnaire approaches for examining vulnerability to psychopathology (22, 23). The Attachment Style Interview (ASI) (22) overcomes limitations of self-reports by using objective assessments of attachment attitudes and behaviors to identify specific attachment style profiles (encompassing secure and varieties of insecure attachment) as well as the degree of severity of the insecure styles.

Research indicates that the psychosis phenotype exists on a broad continuum that extends from schizotypic personality variation to minimal impairment to full-blown psychotic disorder and that etiological continuity appears to exist across clinical and subclinical manifestations (24, 25). In this context, subclinical symptoms of psychosis and schizophrenia-spectrum personality disorder (PD) traits in nonclinical populations are presumed to reflect different expressions of liability to schizophrenia and help to delineate etiological processes as they avoid many of the confounds typically present in schizophrenia samples (25, 26).

Aims of the study

The goals of the present study were (i) to investigate whether childhood parental antipathy and role reversal are associated with subclinical positive and negative symptoms and

schizophrenia-spectrum personality disorder traits, and (ii) to examine whether such associations are mediated by specific insecure attachment styles.

Material and methods

Participants

The data for the present study were collected as part of an ongoing longitudinal investigation examining psychosis risk and expression. The participants were drawn from a sample of 589 undergraduate students from the Universitat Autònoma de Barcelona who completed self-report questionnaires as part of mass-screening sessions. Usable screening data were obtained from 547 participants (42 were dropped due to invalid protocols). Of these, a subset of 339 was invited to participate in an interview study with the aim of assessing 200 individuals. Those invited to take part included 189 who had elevated scores (standard scores based upon sample norms of at least 1.0) on the positive or negative schizotypy factors derived from the Wisconsin Schizotypy Scales (27-30), the positive symptom subscale of the Community Assessment of Psychic Experiences (31), or the suspiciousness subscale of the Schizotypal Personality Questionnaire (32), and 150 randomly selected participants who had standard scores below 1.0 on each of these measures. This enrichment procedure was employed to ensure adequate representation of psychosis-proneness in the sample. A total of 214 participants completed the interview study. The mean age was 21.4 years (SD=2.4) and 78% were women. Of the participants, 123 had elevated scores in one or more of the psychosis-proneness measures and 91 had standard scores below 1.0.

Procedure

Participants were administered the interview measures described below along with other measures not used in the present study. The interviews were conducted by psychologists and advanced graduate students in clinical psychology who were trained in the administration of the measures and were unaware of participants' scores on the screening questionnaires.

Consensus meetings to discuss ratings were held regularly throughout the data collection period. Ethical approval for the study was granted by the University Ethics Committee. Participants provided written informed consent and were paid for their participation.

Measures

Schizophrenia-spectrum phenomenology. Subclinical symptoms were measured with the Comprehensive Assessment of At-Risk Mental States (CAARMS) (33), which includes subscales assessing seven domains of the psychosis prodrome. Severity and frequency/duration for each subscale are rated from 0 to 6. The severity of subclinical positive and negative symptoms was calculated by summing the individual severity subscales within each symptom domain. Schizophrenia-spectrum PDs were assessed with the Structured Clinical Interview for DSM–IV Axis II Disorders (SCID–II) (34). Items correspond to DSM–IV diagnostic criteria and are scored on a 3-point scale from "absent/false" to "threshold/true". Dimensional scores were computed by summing individual item ratings for each PD.

Parental antipathy and role reversal. The CECA interview was used to assess antipathy and role reversal. These scales involve questioning participants about their experience with (and behavior from) parent figures or substitute parent figures prior to the age of 17. The severity of each experience is rated on a 4-point scale ranging from "marked" to "little/none", based on specific rating rules and benchmarked thresholds. The ratings rely on objective aspects of experience rather than the individual's subjective attitudes or emotional responses. Overall antipathy and role reversal ratings were obtained (i.e., peak rating taking into account behavior of both mother and father figure). The analyses used the continuous severity ratings of each childhood experience.

Attachment style. Attachment style was measured with the ASI, a semi-structured interview that assesses current attachment style based on detailed questioning of a person's behavior and attitudes in close relationships. The interview consists of two parts that together determine the individual's attachment profile: First, a rating of the ability to make and maintain

relationships is made based on the overall quality of ongoing relationships with up to three supportive figures (including partner if applicable). Second, ratings are obtained on seven attitudinal attachment scales denoting avoidance (e.g., mistrust, constraints on closeness, self-reliance) and anxiety (e.g., fear of separation, fear of rejection, desire for company) in relationships. Further details of the ASI scoring procedure can be found elsewhere (19, 22). The attachment profile encompasses the specific attachment style, including one secure, two anxious (enmeshed and fearful), and two avoidant (withdrawn and angry-dismissive) styles, as well as the degree to which the insecure styles are dysfunctional along a continuum of severity. For the present study, four attachment-style variables representing the levels of insecurity (i.e., markedly, moderately, or mildly insecure) of each of the four insecure styles were used for analyses. Due to low frequencies of marked and moderate insecure styles, these two scores were grouped together. Thus, each insecure attachment-style variable was scored 0 (not present), 1 (mildly insecure) or 2 (moderate-markedly insecure).

Statistical analyses

All analyses were performed using the Statistical Package for Social Sciences (SPSS), Version 19.0. Pearson correlations were calculated to examine the associations of antipathy and role reversal with subclinical symptoms and schizophrenia-spectrum PD traits, as well as associations of these variables with the attachment styles. Two-tailed *p*-values of less than 0.05 were considered statistically significant and the effect size of the correlations was interpreted following Cohen's (35) guidelines (correlations of 0.10 indicate small effect sizes, 0.30 indicate medium effect sizes, and 0.50 indicate large effect sizes). Hayes' (36) method for assessing indirect pathways was used to examine the unique abilities of each insecure attachment style to account for the significant associations found between the childhood experiences and the psychosis phenotype variables. Parallel multiple mediation analyses were performed using PROCESS (36). For each model, the four insecure attachment-style variables were entered simultaneously as mediators. The 95% and 99% bias-corrected confidence intervals were

generated using bootstrapping with 10,000 resamples. Indirect effects were considered significant when the 95% bias-corrected confidence intervals did not include zero.

Results

Table 1 provides descriptive data for the childhood experiences and schizophrenia-spectrum phenomenology variables. Regarding the prevalence of antipathy and role reversal, 35.5% of the sample experienced antipathy from parental figures (17.8% mild, 11.2% moderate, and 6.5% marked) and 43.9% experienced role reversal (22.4% mild, 16.4% moderate, and 5.1% marked). In terms of the prevalence of the attachment styles, 57.5% of the participants exhibited a secure attachment style, 35.0% a mildly insecure style, and 7.5% a highly insecure style. With regard to the type of insecure style, 5.6% exhibited an enmeshed style (0.9% highly and 4.7% mildly enmeshed), 15.9% a fearful style (3.3% highly and 12.6% mildly fearful), 6.5% an angry-dismissive style (2.3% highly and 4.2% mildly angry-dismissive), and 14.5% a withdrawn style (0.9% highly and 13.6% mildly withdrawn).

Table 2 displays the Pearson correlations of antipathy and role reversal with schizophrenia-spectrum phenomenology. Both antipathy and role reversal were significantly associated with subclinical positive and negative symptoms and with paranoid and schizotypal PD traits. Neither antipathy nor role reversal were associated with schizoid PD traits. For the sake of completeness, Table 3 shows the Pearson correlations of the insecure attachment styles with antipathy, role reversal, and the schizophrenia-spectrum phenomenology variables. The enmeshed style was associated with antipathy, role reversal, subclinical positive and negative symptoms, and paranoid and schizotypal PD traits. Both the angry-dismissive and fearful styles were associated with all the schizophrenia-spectrum phenomenology variables and the angry-dismissive style was also associated with antipathy. Withdrawn attachment was only associated with schizoid PD traits.

Table 4 displays the results of the parallel multiple mediation analyses using antipathy as the independent variable. Four models were tested (one for each of the dependent variables significantly associated with antipathy). The specific indirect effect of angry-dismissive attachment was significant in all models and the specific indirect effect of enmeshed attachment was significant in the models for paranoid and schizotypal PD traits. Table 5 presents the multiple mediator models with role reversal as the independent variable. As with antipathy, four models were tested (one for each of the dependent variables significantly associated with role reversal). Although the total indirect effect of role reversal on subclinical positive and negative symptoms was significant, none of the attachment styles were significant mediators. The specific indirect effect of role reversal via enmeshed attachment was significant in the models for paranoid and schizotypal PD traits.

Discussion

The present study showed that parental antipathy and role reversal were associated with subclinical symptoms of psychosis as well as with paranoid and schizotypal PD traits. Although there is robust evidence linking interpersonal childhood adversities with psychotic features, the effects of antipathy and role reversal have been scarcely investigated. Our findings point to the relevance of considering their potential etiological significance alongside other forms of maltreatment. The current study also showed that particular insecure attachment styles served as mediators of associations of antipathy and role reversal with subclinical symptoms and personality pathology. This suggests the existence of specific indirect pathways linking each childhood experience with subclinical psychotic phenomena and, more broadly, underscores the value of examining the role of attachment styles for understanding how different kinds of relational adversities might impact upon the risk and expression of schizophrenia-spectrum phenotypes.

Research indicates that the positive and negative features of psychosis may be associated with distinct etiologies (25). It is noteworthy that in the present study antipathy and role reversal were related to negative symptoms but not to schizoid PD traits. We have previously suggested that the CAARMS does not successfully tap negative features in nonclinical participants (based on findings that it shows high associations with depression and positive symptoms) and that schizoid ratings appear to provide a better measure of the construct (37). In light of this observation, further investigation of the associations of antipathy and role reversal with negative symptoms should be conducted with measures that are not confounded by variance associated with depression or positive symptoms.

Before discussing the mediation findings it is important to highlight that the cross-sectional nature of this study limits the conclusions that can be drawn in terms of causality. The study provides useful information for the identification of potential explanatory mechanisms and we interpret the findings in accordance with the attachment literature, which has consistently identified adverse experiences with early caregiving figures as precursors to later attachment difficulties [for reviews, see (13, 38)]. However, only longitudinal data can determine whether attachment processes are causally implicated in pathways between childhood experience and the development of psychotic phenomena.

Our results indicated that antipathy had an indirect effect on subclinical symptoms through angry-dismissive attachment and an indirect effect on paranoid and schizotypal PD traits through both angry-dismissive and enmeshed attachment. The angry-dismissive style is characterized by mistrust, self-reliance, and anger in relationships and has been associated with a coping style involving blame of others (19). The enmeshed style is characterized by fear of separation and dependency in relationships and has been associated with a coping style involving blame of self (19). Drawing from previous research, our findings could be interpreted to suggest that continued disapproval, rejection or hostility from parental figures might operate in at least two ways: First, it might foster an externalization of blame and projection of anger and

hostility onto others (angry-dismissive pathway), which could potentially contribute to anomalies in the interpretation of others' intentions, exacerbate attributional biases, and increase social avoidance. Second, antipathy might foster an internalization of blame as well as representations of the self as unworthy and likely to be abandoned (enmeshed pathway), which together with the anxiety and reliance on hyperactivating modes of stress regulation that characterize this style, may facilitate the emergence of paranoid and schizotypal features.

The study also showed that role reversal had an indirect effect on paranoid and schizotypal PD traits through enmeshed attachment. Previous work has conceptualized role reversal in childhood as an experience that, among other things, inhibits the development of autonomy, interferes with the differentiation of boundaries, and increases preoccupation with relationships (39-41). Indeed, lack of autonomy, diffuse boundaries, and excessive preoccupation are elements of an enmeshed attachment. Although the exact way through which the enmeshed style links poor childhood care with paranoid and schizotypal PD traits remains to be fully clarified, we speculate that the relational ambivalence, self-regulatory deficits, and chronic hypervigilance associated with enmeshed/preoccupied forms of attachment (13) are likely to play a prominent role.

The fact that fearful and withdrawn attachment did not emerge as mediators does not preclude their role in the adversity–psychosis link; rather, it suggest that these styles might not be involved in pathways following from the childhood experiences measured in the current study. For example, previous self-report findings indicated that fearful attachment mediated associations between childhood trauma (a composite including emotional and physical forms of maltreatment) and psychosis-proneness (12). It may be the case that this style is relevant in linking more severe forms of maltreatment with the psychosis phenotype, but this possibility should be examined in future studies. Another consideration that is pertinent to the issue of specificity is that our findings demonstrate the utility of distinguishing angry-dismissive from withdrawn attachment, a distinction that to our knowledge is only made by the ASI. Angry-

dismissive and withdrawn are both avoidant styles that share in common features such as high self-reliance and high constraints on closeness, but are differentiated by the anger and mistrust of the former. This distinction has been previously found to be relevant for vulnerability profiling in relation to risk for affective disorders (42).

The strengths of the current study include the fact that all the constructs were assessed using validated interview measures. In particular, our use of intensive interviews of childhood experience and attachment style allowed obtaining contextualized in-depth information that is not easily afforded through questionnaire approaches (and serves to minimize biases associated with subjective responding). As regards to limitations, in addition to the study's cross-sectional nature, the use of a university student sample with a predominance of female participants may limit generalizability. Data from community samples with a more representative distribution of gender and age would enhance the generalizability of the findings. Research is also required in prodromal and clinical populations in order to determine whether these mechanisms operate across the psychosis continuum.

As for clinical implications, our results support previous suggestions that assessing childhood adverse experience and attachment style might inform service provision for individuals with psychosis (10, 43, 44). Attachment-informed interventions have already been developed (e.g., the mentalization-based treatment for psychosis) (45), and might prove to be useful for ameliorating disturbances in those who have experienced poor childhood care from parental figures. In closing, given that attachment style is likely to be just one of the mechanisms through which adverse relational experiences might make the development of psychotic phenomena more likely, further research should consider examining whether and how specific attachment styles converge with other biological, psychological, and contextual characteristics in perpetuating risk for psychosis.

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Table 1

Descriptive data for antipathy, role reversal, and schizophrenia-spectrum phenomenology

	Mean	SD	Range
Childhood Experiences			
Antipathy	1.60	0.93	1 — 4
Role Reversal	1.71	0.92	1 — 4
Subclinical Symptoms			
Positive Symptoms	1.21	2.69	0 — 24
Negative Symptoms	1.51	2.39	0 — 11
PD Dimensional Scores			
Paranoid Ratings	1.53	2.08	0 — 12
Schizotypal Ratings	1.00	1.93	0 — 13
Schizoid Ratings	0.90	1.54	0 — 8

Note. PDs = Personality Disorders

Table 2

Pearson correlations of antipathy and role reversal with schizophrenia-spectrum phenomenology

	Positive Symptoms	Negative Symptoms	Paranoid Ratings	Schizotypal Ratings	Schizoid Ratings
Antipathy	0.26***	0.17*	**0.31*** **	**0.30*** **	0.12
Role Reversal	0.17*	0.28***	0.19**	0.21**	0.08

***p < 0.001, **p < 0.01, *p < 0.05. Medium effect sizes in bold.

Table 3

Pearson correlations of levels of insecurity of attachment style with antipathy, role reversal, and schizophrenia-spectrum phenomenology

	Enmeshed	Fearful	Angry-Dismissive	Withdrawn
Childhood Experiences				
Antipathy	0.24***	0.13	0.26***	-0.06
Role Reversal	0.18**	0.07	0.11	-0.04
Subclinical Symptoms				
Positive Symptoms	0.15*	0.14*	0.17*	0.07
Negative Symptoms	0.14*	0.20**	0.19**	-0.02
PD Dimensional Scores				
Paranoid Ratings	0.24**	0.27***	**0.31*** **	0.00
Schizotypal Ratings	0.28***	**0.31*** **	0.18**	0.13
Schizoid Ratings	0.04	0.27***	0.26***	**0.34*** **

Note. PD = Personality Disorder. ***p <0.001, **p < 0.01, *p < 0.05. Medium effect sizes in bold.

Table 4

Mediation analyses examining indirect effects of antipathy on schizophrenia-spectrum phenomenology via enmeshed, fearful, angry-dismissive, and withdrawn attachment styles

			95% Bias-corrected Confidence Interval		99% Bias-corrected Confidence Interval	
	Raw Parameter Estimate	SE	Lower	Upper	Lower	Upper
Positive Symptoms						
Total effect	0.739**	0.193	0.359	1.118	0.238	1.239
Direct effect	0.466*	0.207	0.058	0.874	-0.072	1.004
Total indirect effect	0.272*	0.131	0.059	0.589	-0.023	0.702
Indirect effect via enmeshed	0.104	0.105	-0.019	0.434	-0.050	0.568
Indirect effect via fearful	0.066	0.062	-0.002	0.250	-0.017	0.343
Indirect effect via angry-dismissive	0.127*	0.069	0.021	0.307	-0.012	0.359
Indirect effect via withdrawn	-0.024	0.038	-0.160	0.010	-0.234	0.033
Negative Symptoms						
Total effect	0.443*	0.175	0.099	0.787	-0.011	0.896
Direct effect	0.115	0.184	-0.248	0.479	-0.364	0.595
Total indirect effect	0.327**	0.124	0.124	0.625	0.053	0.712
Indirect effect via enmeshed	0.105	0.089	-0.007	0.369	-0.029	0.471
Indirect effect via fearful	0.085	0.066	-0.007	0.261	-0.038	0.340
Indirect effect via angry-dismissive	0.147**	0.081	0.031	0.365	0.001	0.445
Indirect effect via withdrawn	-0.010	0.016	-0.065	0.007	-0.080	0.016
Paranoid PD Ratings						
Total effect	0.691**	0.146	0.403	0.980	0.311	1.071
Direct effect	0.261	0.143	-0.022	0.544	-0.112	0.634
Total indirect effect	0.430**	0.141	0.198	0.769	0.136	0.935
Indirect effect via enmeshed	0.147**	0.116	0.012	0.493	0.000	0.651
Indirect effect via fearful	0.100	0.070	-0.005	0.289	-0.045	0.345
Indirect effect via angry-dismissive	0.200**	0.094	0.057	0.452	0.027	0.540
Indirect effect via withdrawn	-0.017	0.023	-0.086	0.010	-0.109	0.025
Schizotypal PD Ratings						
Total effect	0.613**	0.136	0.344	0.881	0.259	0.967
Direct effect	0.241	0.130	-0.016	0.498	-0.097	0.580
Total indirect effect	0.371**	0.136	0.161	0.702	0.100	0.830
Indirect effect via enmeshed	0.166**	0.123	0.022	0.533	0.005	0.683
Indirect effect via fearful	0.109	0.091	-0.010	0.355	-0.032	0.449
Indirect effect via angry-dismissive	0.129**	0.060	0.038	0.291	0.017	0.351
Indirect effect via withdrawn	-0.032	0.037	-0.117	0.029	-0.154	0.052

Note. PDs = Personality Disorders
Results based on 10,000 bias-corrected bootstrap samples. The SE for indirect effects corresponds to the 95% Confidence Interval. *95% CI does not include zero; **99% CI does not include zero.

Table 5

Mediation analyses examining indirect effects of role reversal on schizophrenia-spectrum phenomenology via enmeshed, fearful, angry-dismissive, and withdrawn attachment styles

			95% Bias-corrected Confidence Interval		99% Bias-corrected Confidence Interval	
	Raw Parameter Estimate	SE	Lower	Upper	Lower	Upper
Positive Symptoms						
Total effect	0.502*	0.198	0.112	0.892	-0.012	1.016
Direct effect	0.329	0.197	-0.058	0.716	-0.182	0.840
Total indirect effect	0.173*	0.105	0.008	0.437	-0.043	0.532
Indirect effect via enmeshed	0.090	0.085	-0.011	0.360	-0.031	0.463
Indirect effect via fearful	0.037	0.048	-0.017	0.183	-0.039	0.263
Indirect effect via angry-dismissive	0.064	0.047	-0.005	0.186	-0.031	0.234
Indirect effect via withdrawn	-0.018	0.035	-0.153	0.014	-0.209	0.039
Negative Symptoms						
Total effect	0.717**	0.172	0.379	1.055	0.271	1.163
Direct effect	0.562**	0.170	0.228	0.897	0.121	1.004
Total indirect effect	0.155*	0.083	0.022	0.365	-0.027	0.424
Indirect effect via enmeshed	0.065	0.062	-0.016	0.253	-0.042	0.309
Indirect effect via fearful	0.040	0.048	-0.029	0.171	-0.053	0.218
Indirect effect via angry-dismissive	0.057	0.044	-0.003	0.179	-0.027	0.223
Indirect effect via withdrawn	-0.007	0.014	-0.052	0.008	-0.072	0.020
Paranoid PD Ratings						
Total effect	0.435**	0.152	0.136	0.735	0.040	0.831
Direct effect	0.189	0.136	-0.078	0.457	-0.164	0.542
Total indirect effect	0.246**	0.115	0.067	0.545	0.020	0.655
Indirect effect via enmeshed	0.118*	0.089	0.009	0.396	-0.011	0.482
Indirect effect via fearful	0.052	0.058	-0.039	0.195	-0.072	0.258
Indirect effect via angry-dismissive	0.089	0.068	-0.003	0.290	-0.041	0.347
Indirect effect via withdrawn	-0.012	0.019	-0.057	0.019	-0.084	0.039
Schizotypal PD Ratings						
Total effect	0.439**	0.141	0.162	0.717	0.074	0.805
Direct effect	0.219	0.123	-0.024	0.461	-0.101	0.539
Total indirect effect	0.221*	0.113	0.041	0.493	-0.002	0.580
Indirect effect via enmeshed	0.130*	0.096	0.013	0.422	-0.010	0.501
Indirect effect via fearful	0.055	0.066	-0.036	0.242	-0.067	0.309
Indirect effect via angry-dismissive	0.058	0.047	-0.005	0.186	-0.029	0.234
Indirect effect via withdrawn	-0.023	0.032	-0.086	0.043	-0.111	0.072

Note. PDs = Personality Disorders.
Results based on 10,000 bias-corrected bootstrap samples. The SE for indirect effects corresponds to the 95% Confidence Interval. *95% CI does not include zero; **99% CI does not include zero.

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5. GENERAL DISCUSSION

The main aim of this thesis was to examine the role of childhood interpersonal adversity and attachment styles in relation to schizotypy and other schizophrenia-spectrum phenotypes in nonclinical young adults. In the process of working toward this aim, the thesis first sought to provide independent contributions to the attachment and psychosis fields by investigating issues related to the measurement and validity of the attachment style and schizotypy constructs. Thereafter, the thesis focused on the associations between attachment styles and schizotypy dimensions and closed with investigations into the role of insecure attachment styles as mediators of associations between childhood interpersonal adversities and a spectrum of subclinical psychotic phenomena. The key results of the work presented in each section of the thesis are summarized below, followed by a consideration of their implications for theory and intervention. Finally, the limitations of the thesis and directions for further research are discussed.

5.1. Summary of Findings

Section one presented two studies related to the assessment and validity of adult attachment. The work presented in *Chapter 1* described the adaptation process and preliminary psychometric properties of the Spanish version of the PAM. The translation and cultural adaptation of the PAM followed a comprehensive multi-step process that ensured the quality of the instrument. The Spanish PAM was found to be appropriate for use with individuals experiencing psychotic symptoms and its psychometric properties, as assessed in a sample of university students, were shown be comparable to those reported for the English version of the scale. *Chapter 2* described a study that investigated the way in which attachment styles are

expressed in real-world instances in terms of affect, cognitive appraisals, and social functioning. The findings showed that the main features that theoretically characterize the secure, anxious, and avoidant styles were manifested in participants' real-life environments. Moreover, by investigating whether attachment styles moderated the associations of social contact and social closeness with momentary experiences, the study showed that the differential expression of attachment styles in social contexts was dependent upon the subjective appraisal, and not the mere presence, of social contacts. The results of this study provided support to the ecological validity of attachment styles as well as to the person-by-situation nature of attachment theory.

Section two was dedicated to examining the validity of the multidimensional structure of schizotypy. Specifically, *Chapter 3* presented a study in which the validity of the schizotypy dimensions was examined in a Spanish sample. It was shown that positive schizotypy predicted the ultra high-risk or psychosis threshold status and that both dimensions predicted the presence of schizophrenia-spectrum personality disorders. Other main findings included a unique association of positive schizotypy with psychotic-like experiences, positive and paranoid symptoms, and negative self- and other-schemas; and a unique association of negative schizotypy with schizoid symptoms as well as with diminished positive self- and other-schemas. The findings provided further evidence of the construct validity of the positive and negative schizotypy dimensions.

Section three was dedicated to examining the association of the attachment styles with positive and negative schizotypy. *Chapter 4* presented a study that examined these associations in two independent samples of Spanish and American young adults. As predicted, it was found that preoccupied attachment was associated with positive schizotypy, dismissing attachment with negative schizotypy, and fearful attachment with both schizotypy dimensions. The same pattern of associations emerged in both samples, thus supporting the cross-cultural consistency of the findings.

Section four was aimed at increasing our understanding of the mechanisms underlying the adversity—psychosis link. *Chapter 5* presented an overview of the environmental factors that have been associated with psychosis proneness and reviewed research on the plausible mechanisms that may explain these associations. It concluded by highlighting the current challenges and future perspectives for research in the field. The last two chapters of the thesis presented research investigating the hypothesis that insecure attachment provides a pathway from childhood adversity to psychosis. In *Chapter 6*, a study was described that examined whether insecure attachment styles mediated the association between childhood trauma and psychosis proneness. The results showed that physical/emotional childhood trauma was associated with schizotypy, suspiciousness, and psychotic-like experiences and that these associations were mediated by the fearful attachment style. *Chapter 7* described an interview study investigating whether the associations of two forms of poor childhood care (parental antipathy and role reversal) with schizophrenia-spectrum phenomenology were mediated by specific insecure attachment styles. The findings showed that antipathy and role-reversal were associated with subclinical symptoms of psychosis as well as with paranoid and schizotypal personality disorder traits. Both the angry-dismissive and enmeshed attachment styles were mediators of associations of antipathy with schizophrenia-spectrum phenomenology, and the enmeshed style was a mediator of associations of role reversal with paranoid and schizotypal personality disorder traits.

5.2. Integration and Theoretical Implications

The findings of this thesis contribute to a growing body of evidence highlighting the utility of attachment theory for increasing our understanding of schizophrenia-spectrum phenomenology (Berry, Barrowclough, & Wearden, 2007; Gumley, Taylor, Schwannauer, &

MacBeth, 2014; Korver-Nieberg, Berry, Meijer, & de Haan, 2014; Read & Gumley, 2008). The results of the study investigating the daily-life expression of attachment (Chapter 2) indicated that attachment styles exerted pervasive effects on individual's momentary appraisals (of affect, cognition, and social functioning), not just in particular situations, but as they navigated through their daily lives. This finding is relevant when considering how attachment styles may contribute to schizophrenia-spectrum psychopathology—particularly in light of the crucial role that appraisal processes are thought to play in the development and maintenance of psychotic features (Garety, Bebbington, Fowler, Freeman, & Kuipers, 2007).

In the study presented in Chapter 4, the hypotheses regarding the associations between attachment styles and schizotypy dimensions were largely formulated on the basis of the characteristics of the hyperactivating and deactivating attachment strategies. The predictions in this study were confirmed and found to be comparable cross-nationally/cross-linguistically. Although of course the cross-sectional nature of the data employed in this thesis precludes establishing temporal order, it is proposed here that the findings from the study described in Chapter 2 can provide clues to possible daily-life processes through which different insecure styles might confer vulnerability toward different symptom dimensions. More specifically, preoccupied attachment was associated with positive schizotypy. It might be suggested that, in individuals with high attachment anxiety, the hyperactivating modes of distress regulation (e.g., increased stress, amplification of negative affect, fear of losing control) along with the hyper-vigilance to interpersonal sources of threat (e.g., feeling mistreated, unwanted, suspicious), might be daily-life processes involved in shaping a disposition toward reality distortion. By contrast, dismissing attachment was associated with negative schizotypy. It might be suggested that, in individuals with high attachment avoidance, the lack of interest in social contact (e.g., decreased desire to be with others when alone) along with the reduced experience of positive affect, but not amplification of negative affect, might be daily-life processes involved in shaping a disposition towards negative features.

Another finding that converges with the descriptions provided above relates to the associations of positive and negative schizotypy with cognitive schemas of the self and others. Note that the self and other schemas described in cognitive models overlap with the internal working models invoked by attachment theory. According to attachment researchers, the differences include that working models are construed in relational terms; they reflect more dynamic and motivated processes; and have a much stronger affective component (Berry et al., 2007; Mikulincer & Shaver, 2007; Pietromonaco & Barrett, 2000). In the study presented in Chapter 3, the schema construct was of interest in regards to the construct validity of positive and negative schizotypy given that negative schemas are suggested in cognitive models of psychosis to be specifically relevant for the development and maintenance of positive symptoms (Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001). It was found that positive schizotypy was associated with negative self- and other-schemas (thus supporting cognitive accounts), whereas negative schizotypy was associated with low positive self- and other-schemas. This finding is in line with the negative affect associated with positive schizotypy and the diminished positive affect associated with negative schizotypy and further suggests that, in both the affective and cognitive domains, the difference between the "presence of negative" and the "absence of positive" might be relevant for distinguishing pathways to positive and negative features. Taken together, the studies in this thesis lend further cross-cultural evidence to the multidimensional model of schizotypy and appear to support the notion that the positive and negative dimensions involve distinct mechanisms and pathways (Barrantes-Vidal, Grant, & Kwapil, in press; Kwapil & Barrantes-Vidal, in press).

The findings from the current thesis also add to the current literature by highlighting the vulnerability associated with the fearful attachment style. Although an early review of the literature suggested the importance of researching fearful attachment in relation to psychosis (Berry et al., 2007), investigation of this style has remained somewhat limited, probably due to the fact that most self-reports only measure the attachment anxiety and avoidance dimensions.

Fearfully attached individuals have been described as representing a combined failure of interpersonal relatedness and self-definition (Allen, 2013). The results from this thesis show that this style is indeed most disadvantaged, as it appears to be important in driving vulnerability towards both the positive and negative symptom dimensions and, as will be discussed below, in linking physical and emotional maltreatment with psychosis proneness in general.

The current thesis expanded previous findings by investigating the hypothesis that insecure attachment styles provide a pathway from early adversity to psychotic phenomena. The results were consistent with the interpretation that relational adversities may be internalized and carried forward through specific insecure attachment styles that, in turn, confer risk for a spectrum of subclinical expressions along the schizotypy continuum. Across two studies, specific attachment styles emerged as mediators. In the self-report study (Chapter 6), fearful attachment mediated associations of physical/emotional childhood trauma with measures of psychosis proneness. In the interview study (Chapter 7), the angry-dismissive and enmeshed styles were both important in accounting for associations of poor parental care with schizophrenia-spectrum phenomenology. It was interesting that in the interview study the fearful attachment style did not act as a mediator, although note that this style was significantly associated with all the schizophrenia-spectrum variables. While further research is necessary, a possible interpretation based on the attachment literature is that fearful attachment is more likely to spring from more severe experiences (e.g., frightening caregiving behavior) than those related to poor parental care. Overall, the results from these studies indicate that specific forms of attachment insecurity may be important in explaining the risk-conferring effects of different kinds of relational adversities and, therefore, highlight the relevance of investigating the contribution of specific insecure styles rather than just insecurity of attachment *per se*.

5.3. Implications for Intervention Initiatives and Clinical Work

Some implications related to intervention initiatives and clinical work can be derived from the present results. Firstly, and in agreement with a vast number of studies, the findings underscore the importance of developing and implementing primary prevention programs aimed at reducing child and adolescent exposure to interpersonal adversities. Secondly, the results suggest the possibility that utilizing relationally oriented interventions aimed at addressing the negative effects of maltreatment on attachment-system functioning early in life may be a useful approach. For example, there exist relational interventions such as the Child-Parent Psychotherapy (e.g., Lieberman & Van Horn, 2008) and the Attachment and Biobehavioral Catch-up (e.g., Bernard et al., 2012) that are grounded in attachment theory and have been shown to be effective in enhancing attachment security among maltreated children (for review, see Toth, Gravener-Davis, Guild, & Cicchetti, 2013). Given that research indicates that insecure attachment patterns in children exposed to maltreatment tend to remain stable over time (Toth et al., 2013), the findings of enhanced attachment security are particularly encouraging and offer the hope that such interventions may ultimately contribute to reducing the risk for later psychopathology among those who have experienced early relational adversity.

Finally, in relation to clinical work, the thesis supports previous calls for clinicians to routinely ask about childhood adversity in mental health services. Guidelines on how and when to ask about adverse experiences have already been developed (e.g., Read, Hammersley, & Rudegeair, 2007) and may be helpful for clinicians who work with individuals presenting with schizophrenia-spectrum psychopathology. The findings also appear to support previous suggestions that knowledge of an individual's attachment style may be helpful in tailoring psychological treatment and service engagement strategies for individuals with psychosis (Gumley et al., 2014; Owens, Haddock, & Berry, 2013). Bowlby (1988) suggested that

attachment theory could be applied in the therapeutic context to explore the meaning of experience and to work towards disconfirming and recalibrating insecure working models (transforming them into more secure representations). Attachment-informed interventions for the treatment of psychosis have been developed and may be useful for ameliorating affect regulation and interpersonal difficulties as well as for increasing self and other understanding (e.g., Benamer, 2010; Brent, Holt, Keshavan, Seidman, & Fonagy, 2014).

5.4. Limitations

The studies presented in this thesis have a number of limitations. As previously mentioned, the cross-sectional nature of the data is a limitation that warrants caution in drawing any causal conclusions. Although the interpretations of the results that have been provided throughout this thesis are consistent with attachment theory predictions, only prospective data will allow uncovering the timing and sequence of developmental processes leading to schizophrenia-spectrum psychopathology. Furthermore, although research indicates that retrospective assessments of childhood experience tend to be accurate as long as care is taken and standardized procedures are used (Bifulco & Thomas, 2013), the possibility that bias in memory might have affected responses cannot be ruled out. Relatedly, although attachment styles initially develop in early life and a moderate degree of stability has been found between infant and adult attachment patterns (Fonagy et al., 2010; Fraley, 2002; Waters, Hamilton, & Weinfield, 2000), the possibility that susceptibility toward psychosis may influence the development of insecure attachment cannot be ruled out. An additional limitation is that the studies in this thesis were conducted with university student samples and thus the result may not generalize into other population groups. However, given that university students are relatively high functioning and are expected to have increased protective factors, the use of

such samples may be considered a more conservative test of the hypotheses (Kwapil & Barrantes-Vidal, in press).

Another limitation is that the measurement of schizotypy was restricted to its positive and negative dimensions. This does not mean that schizotypy is only composed of two dimensions; it simply reflects the nature of the instruments employed. A disorganized factor has also been found to underlie schizotypy and schizophrenia, and, although it has been pointed out that questionnaire approaches may be less suitable and reliable for the assessment of mild disorganization (Kwapil, Barrantes-Vidal, & Silvia, 2008; Stefanis et al., 2002), it would be relevant to examine how adverse experiences and attachment relate to disorganized features. Finally, the use of the RQ to examine self-reported attachment may also be considered a limitation given that, compared with multi-item instruments, single-item measures are limited in terms of how fully they can represent a complex construct and they are more impacted by measurement error (Nunnally & Bernstein, 1994). However, in spite of these shortcomings, the RQ offers a quick assessment that is practical for use in large-scale surveys, it has been validated against interview measures, and its test-retest reliability estimates are adequate (e.g., Bartholomew & Horowitz, 1991; Scharfe & Bartholomew, 1994). Moreover, the fact that the results obtained with the RQ appear to converge with those obtained with the ASI (e.g., the RQ dismissing style was uniquely associated with negative schizotypy and the ASI withdrawn style was uniquely associated with schizoid symptoms) provides further confidence in the validity of the findings.

5.5. Future Directions

In addition to the need for further research in order to address the limitations described above (e.g., by using data from community samples with a more representative distribution of

age and gender as well as by utilizing prospective designs), the findings from the studies presented in this thesis, together with the reflections that arose in the process of conducting them, point to several avenues for future investigation.

For example, it would be important for research to examine whether attachment processes are relevant in triggering the onset of clinical psychosis. The sample employed in the current thesis is being investigated longitudinally and this might offer the opportunity to address this question. Additionally, although this thesis has focused more attention on the vulnerability associated with insecure attachment styles, the protective role of secure attachment is of equal importance (Read & Gumley, 2008). Optimal functioning of the attachment system generally conveys protection for psychopathology—which is why the attachment system has been described as being the psychological equivalent to the immune system (Lyons-Ruth, Melnick, Bronfman, Sherry, & Llanas, 2004). Assessing whether secure attachment is protective in the presence of other risk factors associated with psychosis (e.g., urbanicity or minority status) would be a valuable avenue of exploration.

Additionally, with respect to attachment, the present thesis focused exclusively on the psychological domain. However, as recently reviewed by Gumley, Braehler, and MacBeth (2014), accumulating research on the neurobiology of attachment shows that the oxytocinergic and dopaminergic systems play a critical role in attachment behaviors (Fonagy, Luyten, & Strathearn, 2011; Strathearn, Fonagy, Janet, & Montague, 2009), and these systems are also implicated in understanding psychotic phenomena. Therefore, a fruitful area of research might be to combine biological and psychological paradigms in order to obtain a more comprehensive picture of how attachment processes may be involved in schizotypy and schizophrenia.

Additionally, it has been proposed that mentalizing ability may be important in mediating associations between attachment and psychosis (e.g., Korver-Nieberg et al., 2014). Indeed, attachment has been conceptualized as the “evolutionary instrument” for the capacity to mentalize (Fonagy, Bateman, Lorenzini, & Campbell, 2014). As such, future studies should

consider examining how the interplay between relational trauma, attachment, and mentalization might impact upon the development and expression of different symptom phenotypes.

Finally, as previously mentioned in Chapter 5, childhood interpersonal adversities and insecure attachment styles are not specific risk factors for psychosis (they are shared across different conditions) and they do not exert their effects in isolation from other mechanisms. Therefore, an important area that merits attention is the identification of how adversity and attachment might interact with other factors in leading to different outcomes. In this sense, taking a developmental psychopathology approach (e.g., Supkoff, Puig, & Sroufe, 2012; Thompson & Raikes, 2003; Toth & Cicchetti, 2010) to study the interplay between normality and psychopathology and utilizing the developmental principles of equifinality (multiple pathways can lead to a similar outcome) and multifinality (similar initiating pathways can lead to different outcomes) is likely to be greatly relevant in pursuing this line of inquiry.

5.6. Conclusion

The studies presented in this thesis provide new insights into the way childhood interpersonal adversities and attachment styles are related to the expression of positive and negative schizotypy and other schizophrenia-spectrum phenotypes in nonclinical young adults. Collectively, the findings indicate that focusing on relational experiences and the ways they are internalized is important for refining our understanding of the vulnerability for schizophrenia-spectrum psychopathology and, moreover, support the notion that studying subclinical expressions may facilitate the identification of risk factors and mechanistic pathways relevant to clinical psychosis. Continued investigation of interpersonal adversity and attachment styles will enhance our understanding of their potential etiological significance to schizotypy and

schizophrenia and it is hoped that this program of research will contribute to informing prophylactic and treatment interventions across the lifespan.

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2007. Six-month internship (providing psychological evaluation and counseling) at the Instituto Mexicano del Seguro Social (IMSS). Tijuana, Mexico.
Supervisor: Dr. Claudio Mendez

AWARDS AND FELLOWSHIPS

2014. SIRS Travel Award. Awarded by the Schizophrenia International Research Society to participate in the 4th Biennial Schizophrenia International Research Society Conference held in Florence, Italy (April, 2014).

2012. Best Oral Presentation Award. EPA-EU GEI Conference: Closing in on the Envirome in Mental Health. Maastricht, The Netherlands (June, 2012).

2010-2014. International Fellowship from the National Council of Science and Technology in Mexico (CONACyT) to pursue a PhD at Universitat Autònoma de Barcelona (Spain).

2009-2010. International Fellowship from the National Council of Science and Technology in Mexico (CONACyT) to pursue an MSc at University College London (UK).

2007. Awarded 1st place at a national level in the exam CENEVAL "Egel-Psicología Clínica". CENEVAL in Mexico is the National Evaluation Center for Higher Education. The "Egel-Psicología Clínica" is the General Exam for Bachelor Graduates of Clinical Psychology.

PARTICIPATION IN RESEARCH PROJECTS

Project Title: Consolidated Research Group: Person-Environment Interaction in Psychopathology. Suport als Grups de Recerca Consolidats.
Project Reference: 2014SGR1070
Financial Entity: Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR) — Generalitat de Catalunya
Duration: 2014 to 2016
Amount Funded: 15 000 € (from a maximum of 24 000 €, according to group size)
Principal Investigator: Dr. Neus Barrantes-Vidal

Project Title: Emerging Research Group: Person-Environment Interaction in Psychopathology. Suport als Grups de Recerca Emergents.
Project Reference: 2009SGR672
Financial Entity: Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR) — Generalitat de Catalunya
Duration: 2009 to 2013
Incorporation: December 19th, 2011
Amount Funded: 41, 600 €
Principal Investigator: Dr. Neus Barrantes-Vidal

Project Title: Association between early environmental adversity and schizotypy: Mechanisms of attachment, stress-sensitivity, cognition, and role of genetic variability in non-clinical individuals.
Project Reference: PSI2008-04178
Financial Entity: Ministerio de Ciencia e Innovación, Plan Nacional de I+D+i
Duration: 2009 to 2012
Incorporation: January 1st, 2011

Amount Funded: 46, 815 €
Principal Investigator: Dr. Neus Barrantes-Vidal

PUBLICATIONS

Research articles:

DeLisi, L. E., Abayomi, O., Amato, D., Bailey, C., Bitanihirwe, B., Bowen, L., Burshtein, S., Cullen, A., Fuste, M., Herrmann, A. P., Khodaie, B., Kilian, S., Lang, Q., Massuda, R., Nurjono, M., Sadiq, S., Sánchez-Gutiérrez, T., **Sheinbaum, T.**, Shivakumar, V., Simon, N., Spiteri-Staines, A., Suttajit, S., Toftdahl, N. G., Wadehra, S., Wang, Y., Wigton, R., Wright, S., Yagoda, S., Zaytseva, Y., & O'Shea, A. (in press). The 4th Schizophrenia International Research Society Conference, 5-9 April 2014, Florence, Italy: Summaries of oral sessions. *Schizophrenia Research*.

Sheinbaum, T., Kwapil, T. R., & Barrantes-Vidal, N. (2014). Fearful attachment mediates the association of childhood trauma with schizotypy and psychotic-like experiences. *Psychiatry Research.* doi: 10.1016/j.psychres.2014.07.030

Sheinbaum, T., Bedoya, E., Ros-Morente, A., Kwapil, T. R., & Barrantes-Vidal, N. (2013). Association between attachment prototypes and schizotypy dimensions in two independent non-clinical samples of Spanish and American young adults. *Psychiatry Research*, *210*, 408-413.

Sheinbaum, T., Berry, K., & Barrantes-Vidal, N. (2013). Spanish version of the Psychosis Attachment Measure: Adaptation process and psychometric properties. *Salud Mental, 36*, 403-409.

Sheinbaum, T., Bedoya, E., Kwapil, T. R., & Barrantes-Vidal, N. (2013). Comparison of self-reported attachment in young adults from Spain and the United States. *Psicothema*, *25*, 514-519.

Barrantes-Vidal, N., Gross, G. M., **Sheinbaum, T.**, Mitjavila, M., Ballespí, S., & Kwapil, T. R. (2013). Positive and negative schizotypy are associated with prodromal and schizophrenia-spectrum symptoms. *Schizophrenia Research*, *145*, 50-55.

Book chapters:

Sheinbaum, T., & Barrantes-Vidal, N. (in press). Mechanisms mediating the pathway from environmental adversity to psychosis proneness. In O. Mason & G. Claridge (Eds.), *Schizotypy: New Dimensions*. Oxford: Routledge.

Quijada, Y., **Sheinbaum, T.**, & Barrantes-Vidal, N. (2014). Papel de los factores psicosociales en el riesgo, inicio y vinculación en la psicosis. In J. E. Obiols & N. Barrantes-Vidal (Eds.), *Signos de Riesgo y Detección Precoz de Psicosis* (pp. 69-84). Madrid: Editorial Síntesis.

Book translation:

Schultze-Lutter, F., Addington, J., Ruhrmann, S., & Klosterkötter, J. (2012). *Instrumento de Vulnerabilidad a la Esquizofrenia. Versión para Adultos (SPI-A)*. [Schizophrenia Proneness Instrument. Adult Version (SPI-A)]. C. Medina-Pradas, **T. Sheinbaum**, N. Barrantes-Vidal, Trans. Rome: Giovanni Fioriti Editore (original work published in 2007).

Abstracts:

Sheinbaum, T., Kwapil, T. R., Ballespí, S., & Barrantes-Vidal, N. (April, 2014). Negative self and other schemas and insecure attachment mediate the association between childhood interpersonal adversity and the nonclinical psychosis phenotype. *Schizophrenia Research*, *153* (Suppl. 1), S191.

Domínguez-Martínez, T., Cristobal, P., **Sheinbaum, T.**, Kwapil, T. R., & Barrantes-Vidal, N. (April, 2014). Gender differences in the effect of childhood trauma experiences on prodromal symptoms and personality disorder traits in young adults at high-risk for psychosis. *Schizophrenia Research*, *153* (Suppl. 1), S89.

Cristóbal- Narváez, P., Rosa, A., Castro-Català, M., **Sheinbaum, T.**, Kwapil, T. R., & Barrantes-Vidal, N. (April, 2014). COMT moderation of the association between momentary stress

and psychotic-like experiences in daily life. *Schizophrenia Research*, *153* (Suppl. 1), S307.

Barrantes-Vidal, N., **Sheinbaum, T.**, Ballespí, S., Chun, C. A., Myin-Germeys, I., & Kwapil, T. R. (April, 2014). Ecological validity of the schizotypy dimensions and stress-reactivity model of psychotic-like experiences. *Schizophrenia Research*, *153* (Suppl. 1), S267.

Sheinbaum, T., Kwapil, T. R., Mitjavila, M., Ballespí, S., & Barrantes-Vidal, N. (April, 2014). The real-life expression of adult attachment styles. *Personality and Individual Differences*, *60* (Supplement), S6.

Ballespí, S., **Sheinbaum, T.**, Mitjavila, M., Kwapil, T. R., & Barrantes-Vidal, N. (April, 2014). The association of implicit and explicit self-esteem and trait paranoia. *Personality and Individual Differences*, *60* (Supplement), S6-S7.

Kwapil, T. R., Barrantes-Vidal, N., Gross, G. M., **Sheinbaum, T.**, Mitjavila, M., & Ballespí, S. (April, 2014). Positive and negative schizotypy are associated with prodromal symptoms, schizophrenia-spectrum symptoms and personalities, and self and other schemas. *Personality and Individual Differences*, *60* (Supplement), S7.

Barrantes-Vidal, N., **Sheinbaum, T.**, Dominguez-Martínez, T., & Kwapil, T. R. (May, 2013). The expression and underlying psychological mechanisms of positive and negative schizotypal personality dimensions. *Schizophrenia Bulletin*, *39* (Suppl. 1), S13.

Sheinbaum, T., Ros, A., Kwapil, T. R., Ballespí, S., Mitjavila, M., & Barrantes-Vidal, N. (April, 2012). Insecure attachment style mediates the association between childhood adversity and subclinical psychotic symptoms in a non-clinical sample. *Schizophrenia Research*, *136* (Suppl. 1), S185.

Sheinbaum, T., Bedoya, E., Ros, A., Kwapil, T. R., & Barrantes-Vidal, N. (April, 2012). Relationship between attachment and schizotypy dimensions in Spanish and American samples. *Schizophrenia Research, 136* (Suppl. 1), S92.

Barrantes, N., **Sheinbaum, T.**, Ballespí, S., Bedoya, E., Ros, A., Mitjavila, M., & Kwapil, T. R. (April, 2012). Trauma and psychotic-like experiences: Mediating psychological mechanisms. *Schizophrenia Research*, *136* (Suppl. 1), S91-S92.

Manuscripts submitted for publication:

Sheinbaum, T., Kwapil, T. R., Ballespí, S., Mitjavila, M., Chun, C. A., Silvia, P. J., & Barrantes-Vidal, N. (2014). *Real-life expression of adult attachment styles.* Manuscript submitted for publication.

De Castro-Català, Barrantes-Vidal, N., **Sheinbaum, T.**, Moreno-Fortuny, A., Kwapil, T. R., & Rosa, A. (2014). *COMT-by sex interaction effect on psychosis-proneness in nonclinical young adults.* Manuscript submitted for publication.

Sheinbaum, T., Bifulco, A., Ballespí, S., Mitjavila, M., Kwapil, T. R., & Barrantes-Vidal, N. (2014). *Interview investigation of insecure attachment styles mediating between poor childhood care and schizophrenia-spectrum psychopathology.* Manuscript submitted for publication.

CONFERENCE PRESENTATIONS

Chun, C. A., Barrantes-Vidal, N., **Sheinbaum, T.**, & Kwapil, T. R. (2014). *Expression of schizophrenia-spectrum personality traits in daily life*. Poster presentation at the Twenty Eighth Annual Meeting of the Society for Research in Psychopathology. Evanston, Illinois, United States (September 18-21, 2014).

Barrantes-Vidal, N., **Sheinbaum, T.**, Ballespí, S., Chun, C. A., Myin-Germeys, I., & Kwapil, T. R. (2014). *Ecological validity of the schizotypy dimensions and stress-reactivity model of psychotic-like experiences*. Presented as part of a Symposium at the 17th European Conference on Personality. Lausanne, Switzerland (July 15-19, 2014).

Kwapil, T. R., Gross, G. M., **Sheinbaum, T.**, Silvia, P. J., & Barrantes-Vidal, N. (2014). *Capturing the multidimensional structure of schizotypy.* Presented as part of a Symposium

at the 17th European Conference on Personality. Lausanne, Switzerland (July 15-19, 2014).

Sheinbaum, T., Kwapil, T. R., Ballespí, S., & Barrantes-Vidal, N. (2014). *Negative self and other schemas and insecure attachment mediate the association between childhood interpersonal adversity and the nonclinical psychosis phenotype.* Poster presentation at the 4th Biennial Schizophrenia International Research Conference. Florence, Italy (April 5-9, 2014).

Domínguez-Martínez, T., Cristobal, P., **Sheinbaum, T.**, Kwapil, T. R., & Barrantes-Vidal, N. (2014). *Gender differences in the effect of childhood trauma experiences on prodromal symptoms and personality disorder traits in young adults at high-risk for psychosis.* Poster presentation at the 4th Biennial Schizophrenia International Research Conference. Florence, Italy (April 5-9, 2014).

Cristóbal- Narváez, P., Rosa, A., Castro-Català, M., **Sheinbaum, T.**, Kwapil, T. R., & Barrantes-Vidal, N. (2014). *COMT moderation of the association between momentary stress and psychotic-like experiences in daily life.* Poster presentation at the 4th Biennial Schizophrenia International Research Conference. Florence, Italy (April 5-9, 2014).

Sheinbaum, T., Kwapil, T. R., Mitjavila, M., Ballespí, S., & Barrantes-Vidal, N. (2013). *The real-life expression of adult attachment styles*. Presented as part of a Symposium at the meeting of the International Society for the Study of Individual Differences. Barcelona, Spain (July 22-25, 2013).

Kwapil, T. R., Gross, G. M., **Sheinbaum, T.**, Mitjavila, M., Ballespí, S., & Barrantes-Vidal, N. (2013). *Positive and negative schizotypy are associated with prodromal symptoms, schizophrenia-spectrum symptoms and personalities, and self and other schemas*. Presented as part of a Symposium at the meeting of the International Society for the Study of Individual Differences. Barcelona, Spain (July 22-25, 2013).

Ballespí, S., **Sheinbaum, T.**, Mitjavila, M., Kwapil, T. R., & Barrantes-Vidal, N. (2013). *The association of implicit and explicit self-esteem and trait paranoia*. Presented as part of a

Symposium at the meeting of the International Society for the Study of Individual Differences. Barcelona, Spain (July 22-25, 2013).

Sheinbaum, T., Kwapil T. R., & Barrantes-Vidal, N. (2012). *Childhood interpersonal trauma is associated with psychotic phenomena in a non-clinical sample: The mediating role of negative schemas and insecure attachment style.* Oral presentation at the joint meeting of the European Psychiatric Association (EPA) and the European Union Gene-Environment Interaction (EU GEI) project: Closing in on the Envirome in Mental Health. Maastricht, The Netherlands (June 14-16, 2012).

Sheinbaum, T., Kwapil, T. R., Ros, A., Ballespí, S., Mitjavila, M., & Barrantes-Vidal, N. (2012). *Insecure attachment style mediates the association between childhood adversity and subclinical psychotic symptoms in a nonclinical sample*. Poster presentation at the 3rd Biennial Schizophrenia International Research Conference. Florence, Italy (April 14-18, 2012).

Sheinbaum, T., Kwapil, T. R., Bedoya, E., Ros, A., & Barrantes-Vidal, N. (2012). *Relationship between attachment and schizotypy dimensions in Spanish and American samples*. Poster presentation at the 3rd Biennial Schizophrenia International Research Conference. Florence, Italy (April 14-18, 2012).

Barrantes-Vidal, N., **Sheinbaum, T.**, Ballespí, S., Bedoya, E., Ros, A., Mitjavila, M., & Kwapil, T. R. (2012). *Trauma and psychotic-like experiences: Mediating psychological mechanisms*. Poster presentation at the 3rd Biennial Schizophrenia International Research Conference. Florence, Italy (April 14-18, 2012).

Barrantes-Vidal, N., Ros, A., Ballespí, S., **Sheinbaum, T.**, Bedoya, E., Mitjavila, M., & Kwapil, T. R. (2011). *Mediating factors in the pathway from adversity to schizotypy in nonclinical young adults*. Presented as part of a Symposium at the meeting of the International Society for the Study of Individual Differences. London, UK (July 25-28, 2011).