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# Decoding Psychosis: Personality Traits and Mentalization in Risk Prediction

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Summary

*Abstract* ..... *5*

*Chapter 1* ..... *7*

*Conceptualization of Psychotic Vulnerability: At-risk Mental States and Schizotypal Personality* *7*

**1.1 Defining At-Risk Mental States (ARMS) Concept** ..... **7**

**1.2 Protective and Risk Factors in At-Risk Mental States** ..... **9**

**1.3 The Importance of Functioning** ..... **12**

**1.4 The Role of Personality Traits** ..... **15**

**1.5 Schizotypal Features and Psychosis Proneness** ..... **18**

**1.6 Mentalizing in Individuals with State and Trait Risk for Psychosis: A Systematic Review** **20**

*Chapter 2* ..... *39*

*Study 1 – At-Risk Mental States and Personality Traits: A Cluster Analysis Approach on a Group of Help-Seeking Young Adults* ..... *39*

**2.1 Introduction** ..... **39**

**2.2 Materials and Methods** ..... **41**

*Participants* ..... 41

*Procedures* ..... 41

*Measures* ..... 42

**2.3 Data analyses** ..... **43**

**2.4 Results** ..... **45**

*Descriptive Statistics* ..... 45

*Differences in Personality Domains* ..... 46

**2.5 Discussion** ..... **50**

*Chapter 3* ..... *53*

*Study 2 - Personality Traits and Transition to Psychosis One Year After the First Assessment...* *53*

**3.1 Introduction** ..... **53**

**3.2 Materials and Methods** ..... **55**

*Participants* ..... 55

*Procedures* ..... 55

Measures ..... 55

**3.3 Data Analyses** ..... **57**

**3.4 Results** ..... **59**

**3.5 Discussion** ..... **61**

**3.6 Conclusion** ..... **63**

*Chapter 4* ..... *64*

*Study 3 - Psychometric Evaluation and Predictive Modeling of the Certainty About Mental States Questionnaire* ..... *64*

**4.1 Introduction** ..... **64**
**4.2 Materials and Method** ..... **65**
*Participants* ..... 65
*Procedure* ..... 65
*Instruments* ..... 65
**4.3 Data Analyses** ..... **67**
**4.4 Results: Factor Structure** ..... **68**
**4.5 Results: Is the Two-Factor Structure Stable?** ..... **69**
**4.6 Convergent and Discriminant Validity** ..... **71**
*Results of Convergent and Divergent Validity* ..... 71
**4.7 Discussion** ..... **72**
*Chapter 5* ..... *73*
*Study 4 - Does Self and Other-Certainty About Mental States Influence Psychoticism and Schizotypal Features?* ..... *73*
**5.1 Introduction** ..... **73**
**5.2 Instruments and Methods** ..... **73**
**5.3 Data Analyses** ..... **74**
**5.4 Results** ..... **75**
**5.5 Discussion** ..... **78**
*Discussion: Studies 3 and 4* ..... *81*
**Limitations and Future Research: Studies 3 and 4** ..... **82**
*General Discussion and Conclusions* ..... *84*
*References* ..... *90*
*Supplementary material* ..... *114*

# Abstract

Psychotic vulnerability encompasses both state and trait risk factors for psychosis, with At-Risk Mental States (ARMS) and schizotypal personality traits representing these dimensions, respectively. Mentalization, defined as the ability to interpret and understand one's own and others' mental states, serves as a critical protective factor against the development of psychopathology. Prior research suggests that mentalization significantly moderates the likelihood of developing psychotic disorders in individuals with both state and trait risk factors, highlighting its potential protective role in psychosis prevention. This thesis aims to investigate the role of personality traits and mentalization in contributing to psychosis risk, identifying vulnerability and resilience factors to inform early intervention strategies.

The aim is achieved through the investigation of 4 studies: study 1 (chapter 2) employs a cluster analysis approach to identify personality traits and social functioning patterns in help-seeking young adults aged 18-25. The study, conducted with 169 participants, reveals three distinct clusters: “not at psychotic risk”, “at intermediate risk”, and “with psychotic onset”. The findings highlight significant differences in negative affect, detachment, and disinhibition among these groups, suggesting that these traits may distinguish varying levels of psychotic risk. Study 2 (chapter 3) investigates the transition to psychosis one year after the first assessment. With a sample of 97 young adults, this research examines the evolution of initial diagnoses, social and occupational functioning, and common personality traits associated with psychotic risk. The results indicate that the Ultra-High Risk (UHR) group had the lowest functioning scores and was predominantly diagnosed with psychosis. The study underscores the significance of detachment and disinhibition in identifying at-risk individuals. Study 3 (chapter 4) focuses on the psychometric evaluation and predictive modeling of the Certainty About Mental States Questionnaire (CAMSQ). The internal structure, reliability, and validity of the Italian version of the CAMSQ were confirmed. Study 4 (chapter 5) explores the association of CAMSQ with psychopathology, particularly psychoticism and schizotypal features. Findings reveal that self-certainty negatively predicts psychoticism and schizotypal features, while Other-Certainty positively predicts these traits.

These findings advance the understanding of psychotic vulnerability by integrating theoretical insights with empirical data. It emphasizes the critical role of personality traits and mentalization in identifying and managing psychotic risk among young adults. The validation of the CAMSQ

adds a valuable instrument for assessing mentalizing capacities, bridging the gap between research and clinical application. The results support early, tailored interventions informed by comprehensive assessments.
**Keywords:** At-Risk Mental States; Schizotypy; Personality traits; Psychosis; Mentalization

# Chapter 1

# Conceptualization of Psychotic Vulnerability: At-risk Mental States and Schizotypal Personality

## 1.1 Defining At-Risk Mental States (ARMS) Concept

The term At-Risk Mental States (ARMS) refers to a condition where an individual has a heightened risk of developing a psychotic disorder over their lifetime (Yung et al., 2005). Psychosis is characterized by a loss of contact with reality, manifesting through symptoms such as hallucinations (perceptions of things that are not present in reality) and delusions (irrational or false beliefs). While psychotic conditions are fundamental to schizophrenia, it is crucial to recognize that psychotic states can also occur in other mental disorders (van Os & Reininghaus, 2016). Therefore, in clinical practice, psychosis is essentially a trans-diagnostic concept. This implies that alongside the classic symptoms of schizophrenia – positive, negative, and disorganized behavior (Sullivan, 1927) – it is essential to consider additional symptom clusters: depressive, manic, cognitive alterations, impulsivity and hostility/aggressiveness.

Thus, it becomes important to interpret and/or associate these mental states with other risk factors, such as genetic predispositions. In this context, it is useful to consider what Gerd Huber eloquently summarized as basic symptoms, particularly as potential prodromal elements (Huber et al., 1980; Gross, 1989). In terms of the continuity of mental life: from schizotypal personality traits to a predisposition for altered or dissociative states of consciousness, from experiences of emotionally neutral thought interference to the development of a tendency towards self-reference; or more generally, a progressive loss of interest in daily activities, social isolation, concentration difficulties, alterations in thinking or communication, persistent suspicion and paranoia, feelings of strangeness or detachment from reality, and unusual perceptual experiences (Fusar-Poli et al., 2017). These mental states or behavioral patterns must be considered by clinicians when evaluating ARMS.

In ARMS, age plays a crucial role. The age range of particular interest spans from fifteen to twenty-five years, thus including a significant portion of adolescence and emerging adulthood. These developmental phases are characterized by numerous changes across multiple dimensions, including physical, cognitive-emotional, social, relational, and, importantly, identity and autonomy

aspects. These changes, inherent to every individual during this life stage, can coincide with the previously outlined risk factors. Therefore, it is essential to consider the interaction between individual development and the presence of mental health risk conditions during this transitional period. This approach allows for a more comprehensive understanding of the complexity of ARMS and the adoption of targeted preventive and intervention strategies, duly considering the challenges and opportunities that arise during this life phase.

Moreover, early recognition of ARMS is crucial as it allows for timely intervention and the initiation of appropriate treatment. The goal is to prevent or minimize the onset of full-blown psychosis. Early interventions include individual therapy, family therapy, pharmacotherapy, and social support (Davies et al., 2018). Early recognition and intervention can improve recovery prospects and mitigate psychotic symptoms in the long term. It is important to note that, fortunately, not all young individuals with an at-risk mental state will develop psychosis.

## 1.2 Protective and Risk Factors in At-Risk Mental States

When discussing mental health, it is essential to introduce and describe the elements that can sustain and perpetuate this condition. But what do we mean by mental health? The World Health Organization (2004) defines mental health as "*a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, work productively and fruitfully, and is able to make a contribution to their community*." As observed in this definition, health is not merely the absence of disorder, and this broader perspective calls for a discussion of the elements that can contribute both positively and negatively to its maintenance: risk factors and protective factors.

Protective factors are any elements or conditions that can reduce the risk of developing a mental disorder. They are positive resources that can help promote and preserve health and well-being (Solano, 2001, pp. 105-122). These factors can be diverse, and the most relevant ones are outlined below. It is well known that positive family relationships, such as a warm and supportive family environment with stable relationships and emotional support, can provide a solid foundation for healthy development. An indispensable factor is social support, which involves having a broad network of friends, colleagues, and trusted individuals who offer support, understanding, and encouragement. Personal skills, including managing stress, solving problems effectively, and maintaining good self-esteem, also play a significant role. These skills contribute to greater resilience and protection against difficulties. Among social and community protective factors, access to resources – including material resources such as good education, healthcare services, support services, and job opportunities – and exposure to a positive social environment are crucial. Living in a community that promotes positive values, social inclusion, cohesion, and participation can contribute to psychological well-being and a sense of belonging. Protective factors can act as a counterbalance to negative influences or stressful life events, reducing the likelihood of developing mental or behavioral health problems. Hence, it is necessary to promote and enhance these factors.

Conversely, risk factors refer to elements or conditions that increase the likelihood of developing mental disorders or experiencing compromised psychological well-being. These factors can be diverse and interact in complex ways, contributing to the development

of various forms of psychopathology (Solano, 2001, pp. 105-122). Mental health risk factors can be broadly categorized into four main groups: Biological factors include genetic predisposition, neurochemical or neurophysiological abnormalities, brain development issues, or physical illnesses that affect brain function. For example, a family history of mental disorders can increase the risk of developing them. Environmental factors encompass a wide range of traumatic experiences, including exposure to violence, physical or sexual abuse, lack of social support, chronic stress, disadvantaged socioeconomic conditions, or exposure to toxic substances. Psychological factors include personal characteristics such as low self-esteem, poor stress management skills, negative attitudes, or dysfunctional thinking styles. Lifestyle factors involve behaviors that can negatively affect mental health, such as alcohol or substance abuse, an unhealthy diet, lack of physical exercise, or sleep disorders.

It is important to emphasize that the presence of one or more risk factors does not necessarily mean the development of a mental disorder, but it increases the probability of its possible onset. At the same time, the absence of risk factors does not guarantee immunity from mental disorders. In fact, mental health is influenced by a complex combination of the aforementioned elements and can be promoted through prevention interventions, social support, counseling, and appropriate treatments (Prince, 2007).

The concept of At-Risk Mental States (ARMS) emerges from the attempt to identify early interventions aimed at minimizing the onset of full-blown psychosis in young people aged 15-25 who exhibit specific characteristics. The Australian group at the PACE clinic in Melbourne introduced this concept (Yung & McGorry, 1996). This group did not limit themselves to identifying genetic risk factors and subjective characteristics but also proposed useful methods for intervention (Percudani, Barbera, Meliante, 2019, pp. 4-5). With the growing need to prevent the onset of psychosis, the Ultra High Risk (UHR) criteria were established. The UHR criteria identify four groups at risk of psychotic onset: (a) the genetic risk group, including individuals with schizotypal personality disorder and/or a first-degree relative with a history of psychosis; (b) the group with attenuated psychotic symptoms in terms of frequency and/or intensity (Attenuated Psychotic Symptoms, APS); (c) the group characterized by brief, limited, intermittent psychotic symptoms (Brief Limited Intermittent Psychotic Symptoms, BLIPS) lasting less than 7

days and resolving spontaneously without any treatment. Finally, (d) the fourth criterion refers to the fact that all UHR individuals, regardless of group affiliation, share marked social functioning impairment, are help-seeking, and are aged between 15 and 25 years.

## 1.3 The Importance of Functioning

The term "global functioning" refers to the comprehensive description of an individual's performance across various areas of life (Aas, 2010). It represents an integrated assessment of cognitive, emotional, social, and behavioral capacities. This includes various factors that influence an individual's well-being and adaptation, such as cognitive abilities (attention, memory, planning), emotional capabilities (emotion regulation, self-esteem), social relationships (e.g., interaction with others, empathy), and behaviors (e.g., autonomy, time management). The evaluation of global functioning is typically conducted using psychometric methods, including structured interviews, questionnaires, and clinical observations.

One of the most used tools to assess global functioning is the Global Assessment of Functioning (GAF) scale. This scale was included in the Diagnostic and Statistical Manual of Mental Disorders until the DSM-IV-TR version and was later replaced in the DSM-5 by the WHO Disability Assessment Schedule (WHODAS). The WHODAS offers a detailed assessment, although it lacks the brevity that was a distinctive feature of the GAF. The concept of global functioning is crucial in clinical psychology and psychiatry because it provides a comprehensive overview of an individual's abilities and difficulties, enabling healthcare professionals to navigate the diagnostic process, plan interventions, and evaluate the effectiveness of treatments in improving an individual's overall functioning (Endicott et al., 1976).

Social and occupational functioning is a specific component of an individual's global functioning and refers to the ability to interact effectively with others and perform work or occupational activities. Social functioning involves the capacity to establish and maintain meaningful relationships, participate in social activities, and adapt to social and cultural norms. It includes effective communication, understanding and responding to others' emotions, resolving conflicts, and collaborating in groups (McGorry et al., 2008). These skills are essential for establishing and maintaining satisfying family, friendship, and intimate relationships, as well as for integration into society.

Occupational functioning, on the other hand, involves the ability to perform work or occupational activities productively. This includes competence in the specific skills required for a job or profession, time management, task organization, adaptability to job

demands, and coping with professional stress. It also involves the ability to maintain stable employment, fulfill job duties, and achieve professional satisfaction. Social and occupational functioning are closely interconnected and can influence each other. For instance, difficulties in social functioning can interfere with the ability to obtain and maintain employment, while challenges in occupational functioning can affect social interactions in the workplace or professional development opportunities.

The assessment of social and occupational functioning can be conducted through clinical interviews, structured assessments, field observations, and performance evaluations. This evaluation is important for understanding the specific challenges an individual faces in daily life and for providing targeted interventions to improve overall functioning in these areas. A young person is considered to have good social and occupational functioning when they demonstrate effective skills in both social interactions and work or occupational settings (Lee, 1994).

Good social and occupational functioning are closely related to cultural expectations, development opportunities, and individual preferences. Therefore, some young people may require additional support or specific training to develop the necessary skills for good social and occupational functioning. Within this context, young people with At-Risk Mental States, by definition, exhibit deficits in social and occupational functioning. Difficulties in this area typically drive them to seek mental health services. Hence, there is a need for tools capable of detecting these difficulties. To address this need, the Social and Occupational Functioning Scale (SOFAS; Morosini et al., 2000) was developed, aiming to provide an assessment of an individual's social and work functioning that is not influenced by symptom severity. The scale can be used to evaluate current functioning as well as retrospectively. Its versatility allows for obtaining a numerical score (ranging from 1 to 100) and/or a qualitative level of functioning. The first level includes the lowest scores (0 to 50), indicating impaired functioning; the second level (51 to 74) indicates moderate functioning; and the final level (>75) indicates good functioning (Morosini et al., 2000).

Leijdesdorff and colleagues (2022) argue that a significant decline in social and occupational functioning in young people—whose sample had an average age of 21 years—could serve as an important indicator of distress and even predict transdiagnostic

psychiatric symptoms. In line with this perspective, several studies on young people with At-risk Mental States demonstrate that lower levels of social functioning increase the risk of experiencing a full-blown psychotic episode (Mason et al., 2004; Fusar-Poli et al., 2013; Meliante et al., 2021; Fusar-Poli et al., 2017). Understanding these data undoubtedly enables the construction of personalized interventions tailored to the needs of these young individuals. Finally, assessment plays a crucial role in facilitating effective intervention. The Social and Occupational Functioning Scale (SOFAS; Morosini et al., 2000) and the Global Assessment of Functioning (GAF; Aas, 2010) are essential tools for detecting declines in social and occupational functioning.

## 1.4 The Role of Personality Traits

As previously noted, the decline in social and occupational functioning should be regarded as a nonspecific and transdiagnostic psychiatric symptom, insufficient by itself to indicate the presence of a psychotic risk. In the field of psychopathology, the presence of a single element is generally not enough to identify a potential deficit or disorder; rather, it is always a constellation of symptoms, combined with a specific personality structure, that guides clinicians toward a comprehensive understanding of an individual's distress.

Concerning personality, many authors have tried to create a clear, consistent, and widely accepted definition. Personality can be defined as "the dynamic organization of those psychophysical and social systems that determine an individual's characteristic thoughts and behaviors" (Allport, 1937). This definition proposes a broad and secular view of personality, aligning with contemporary empirical studies that conceive individual behavior as more complex than the sum of characteristic traits. It is worth noting that personal characteristics do not always manifest in behavior. The environment, stimuli to which one is exposed, and external conditioning play a central role (Tickett et al., 2009). The interaction among these elements captures what is essential, representative, and distinctive of a person, generally observable in their modes of action. An individual's way of being is thus a function of a series of interdependent elements; these include genetic, dispositional, and sociocultural factors, as well as learning outcomes and existential nature, along with unconscious mechanisms and cognitive processes.

How is personality related to the manifestation of psychopathology? Freud (1932) asserted that if we drop a crystal, it does not shatter randomly but along its lines of weakness. The term "lines of weakness" refers to points of vulnerability or past traumas, along which the personality organization can fragment. The origins of this view found (and continue to find today) both clinical and theoretical justification. Clinically, there was increasing attention to unexpected clinical phenomena, behaviors, and attitudes from some patients within the therapeutic relationship that could not be adequately explained symptomatically. Theoretically, there was growing dissatisfaction with the original distinction between neurosis and psychosis, which was often too limiting and reductive in its diagnostic framework. Hence, the need arose to understand psychosis along a continuum (Esterberg & Compton, 2009). A compelling aspect of this perspective is the possibility of

supplementing categorical diagnosis with a dimensional view, where the manifestation of psychopathology can be seen as the interplay between personality characteristics, events, and disturbing vulnerabilities. This perspective was reflected also in the alternative model proposed in Section III of the DSM-5 (APA, 2013) and as well in the following version (DSM-5- TR; APA, 2022, pp. 761-778). In this alternative model, personality disorders are characterized by (a) impairment in personality functioning and (b) pathological personality traits.

In this paragraph, the five pathological domains of personality traits, which are further divided into twenty-five facets, will be introduced. The reference model is the Big Five, one of the most widely used and culturally neutral frameworks. Krueger, in his paper explaining the origins of the PID-5 (Krueger et al., 2013), elucidates this model. The five dimensions are as follows:

*Negative Affectivity* – contrasted with Emotional Stability – involves the frequent and intense experience of a wide range of negative emotions and their behavioral and interpersonal manifestations.

*Detachment* – the opposite of Extraversion – defined as the avoidance of socio-emotional experience, encompassing both withdrawal from interpersonal relationships and reduced capacity to experience and express emotions, particularly pleasure.

*Antagonism* – opposed to Agreeableness – includes behaviors that place an individual at odds with others, such as an exaggerated sense of self-importance, expectations of special treatment, and lack of empathy, which manifests as unawareness of others' needs and the tendency to use others for personal gain.

*Disinhibition* – the opposite of Conscientiousness – involves seeking immediate gratification, leading to impulsive behaviors driven by thoughts, feelings, and external stimuli, with little regard for past experiences or future consequences.

*Psychoticism* – opposed to Lucidity – is characterized by culturally incongruent, bizarre, eccentric, or unusual behaviors and thoughts, both in processes and content.

After this brief theoretical overview of personality, we can ask: what is the relationship between pathological traits and at-risk mental states? What does the literature say on this topic? Premorbid personality disorders (PD) can represent a risk factor for psychotic transition, especially during the developmental phase between adolescence and young

adulthood (Cuesta et al., 2002). Dysfunctional personality traits are known to increase the risk of various psychopathological conditions that can lead to full-blown psychotic disorders (Heikkilä et al., 2004). Three different models can explain the relationship between personality and psychotic disorders (Widiger, 2011): (a) personality may alter the phenotypic expression of the disorder; (b) the interaction between etiological and genetic factors contributes to generating a clinical spectrum, where personality and psychotic disorders lie on a continuum (Esterberg & Compton, 2009; Debanné et al., 2015); (c) personality and psychotic disorders may have a causal relationship (etiological and possibly bidirectional), wherein individual patterns of thought, feeling, behavior, and relationship with others contribute to the onset of a mental disorder. In other words, a severe or chronic psychotic disorder can lead to significant changes in personality. However, it is also true that psychosis may not affect the core patterns of behavior and ways of being if these are ingrained in the "bedrock" of personality. The relationship between normal personality traits and psychosis (Ohi et al., 2016) has often been evaluated using the Five-Factor Model (FFM) to prevent or intervene early in patients' vulnerabilities (Andersen & Bienvenu, 2011; Bolinskey et al., 2001). A strong negative association has emerged between the trait "openness to experience" (positively associated with creativity, nonconformism, and originality, and negatively with conformism and lack of creativity and originality) and general psychopathology, predisposition to psychosis, and psychotic traits. Other research groups have examined the relationship between personality traits and psychosis using the alternative DSM-5 model (Bastiaens et al., 2019; Meliante et al., 2021). A recent meta-analysis (Boldrini et al., 2019) has shown that UHR patients can present heterogeneous personality traits, including social withdrawal and affective flattening (common among schizotypal patients), interpersonal instability, and emotional dysregulation (common among borderline patients). These characteristics find explanations in the following pathological traits: negative affectivity, detachment, psychoticism, and disinhibition, which are distinctive of young individuals with At-risk Mental States (Bastiaens et al., 2021; Fusar-Poli et al., 2017).

## 1.5 Schizotypal Features and Psychosis Proneness

Schizotypy is recognized as a significant dimension of psychosis-proneness, deriving from early observations by Kraepelin and Bleuler (Bleuler 1911; 1950; Kendler, 1985). These pioneering psychiatrists conceptualized schizophrenia as a developmental disorder and identified latent forms of the illness among the relatives of schizophrenia patients. Building on their work, Rado (1953) and Meehl (1962) developed the construct of schizotypy to represent a phenotypic expression of vulnerability to schizophrenia. This construct encompasses subtle yet clinically relevant abnormalities in thought processes, emotions, perception, and interpersonal functioning. Schizotypy can also be viewed as an aspect of normal personality that nonetheless provides a foundation for the development of psychotic illnesses (Debbané et al., 2015).

Mirroring the complexity of schizophrenia, schizotypy is a multidimensional construct comprising positive (cognitive-perceptual), negative (interpersonal), and disorganized domains (Fonseca-Pedrero et al., 2009; Nelson et al., 2013; Raine et al., 1994). A substantial body of literature suggests that schizotypy may act as a precursor to schizophrenia-spectrum disorders (Kotlicka-Antczak et al., 2019). In this context, schizotypal expressions during childhood or adolescence can be interpreted as “early and broadly-defined mental risk states” that may presage the future development of psychotic disorders (Keshavan et al., 2011).

However, a contribution by Debbané et al. (2015) has highlighted that the positive dimension of schizotypy offers limited clinically significant predictive value for the transition from clinical high-risk states to psychosis. Instead, the negative dimension, particularly physical anhedonia, appears to be a more reliable predictive conversion indicator. Other studies have found no significant link between baseline schizotypy levels and transition to psychosis (Debbané et al., 2015; Drvaric et al. 2018; Meliante et al., 2021). This indicates the necessity of distinguishing between clinical high-risk symptoms, which are characterized by recent onset or worsening, and stable schizotypal trait manifestations. As mentioned in previous paragraphs, current diagnostic approaches to "at-risk" states require symptom onset or substantial intensification within the preceding 12 months to meet the criteria for identification (Fusar-Poli, 2017; Yung et al., 2007).

Researchers examining schizotypy aim to understand it as a personality trait that confers liability for developing schizophrenia (Bang et al., 2017; Flückiger et al., 2016; Ruhrmann et al., 2010). Although schizotypy was formally defined as a liability trait 50 years ago, there has been a lack of explicit developmental frameworks in schizotypy research. The concept designates a developmental dimension to schizophrenia, yet investigations have rarely adopted a developmental perspective despite schizotypy being considered a stable, continuous trait indicating an increased probability of schizophrenia-spectrum disorders (Klosterkötter et al., 2001; Mason et al., 2004; Salokangas et al., 2013).

Contemporary research on prodromal syndromes and basic symptoms emphasizes preventive identification of high-risk states (McGorry et al., 2006; Yung et al., 2008; Nelson et al., 2013; Yung et al., 2019). Epidemiological studies have focused on selective schizotypal experiences during childhood and adolescence, primarily from the positive dimension, to examine their association with the development of psychotic disorders in adulthood. While psychotic-like experiences (PLEs) have shown some predictive value for future schizophrenia-spectrum disorders, their specificity is relatively low (Fonseca-Pedrero et al., 2016). Early prevention research has aimed at identifying specific at-risk states to distinguish between converters and non-converters before the onset of pathology. Although these early identification procedures are advancing, their predictive power diminishes when evaluated more than 36 months prior to the putative onset of the disorder.

The pioneering longitudinal studies by Chapman et al. (1994) have demonstrated that schizotypy traits can predict psychotic outcomes over the long term, from adolescence into young adulthood. However, schizotypy traits measured in non-clinical populations tend to have lower predictive power compared to clinical state indicators assessed in help-seeking individuals. This has sometimes led to the interpretation that schizotypy is a poor risk indicator with lower sensitivity and specificity for high-risk states. Consequently, in developmental high-risk research, the phenomena encompassed by the construct of schizotypy have been dispersed across different fields of investigation. Although this dispersion has yielded important insights into pre-psychotic states, the articulation of these states with schizotypal traits and their predictive value remains understudied.

## 1.6 Mentalizing in Individuals with State and Trait Risk for Psychosis: A Systematic Review[1]

### *Introduction*

Mentalizing refers to the capacity to understand ourselves and others' behavior in terms of intentional mental states – i.e., feelings, desires, wishes, attitudes, and goals (Fonagy & Bateman, 2006). It is a complex construct encompassing the capacity to deduce cognitive and emotional states pertaining to oneself and others. This underscores its dynamic character in relation to diverse contexts of interpersonal interactions (Bateman & Fonagy, 2013). Given its complexity, in order to facilitate its measurement within studies, mentalizing has been operationalized through the introduction of the reflective function construct, which is often used synonymously with mentalization. Reflective function (RF) captures all the different facets of mentalizing, including mental state understanding for both cognitions and affects in oneself and others (Fonagy et al., 2016). Mentalization can be conceived as an umbrella term, covering related constructs from social cognition research including Theory of Mind (ToM) and metacognition (Choi-Kain & Gunderson, 2008; Luyten & Fonagy, 2015). ToM is the ability to make inferences about others' thoughts and intentions. The term refers to the cognitive ability to attribute mental states to others and understand the link between mental states and actions (Premack & Woodruff, 1978). Metacognition has been primarily defined as the ability to "think about thinking" (Flavell, 1979). It involves introspection of one's own behavior, whereas ToM involves perceiving the mental states driving others' behavior. It is unclear to what extent mentalization, ToM, and metacognition are independent mechanisms with distinct abilities that relate to different outcomes, or whether they share a common architecture that allows them to follow similar developmental paths and provide similar inputs (Peters & Garety, 2006). Nevertheless, ToM and metacognition may overlap mentalization respectively for the component directed toward others and for the cognitive component concerning awareness of thought. The shared identity of mentalization, metacognition, and Theory of Mind can be captured by the concept of Higher-Order Cognition (HOC) (Rudrauf, 2014). HOC processes stem from hierarchical networks of information processing that allow for abstraction. They involve self-awareness and awareness of oneself in relation to others and the

[1] The article was published in 2023 in Frontiers in Psychiatry. Following the reference: De Salve, F., Rossi, C., & Oasi, O. (2023). Mentalizing in individuals with state and trait risk for psychosis: a systematic review. *Frontiers in Psychiatry*, *14*, 1214385. https://doi.org/10.3389/fpsyt.2023.1214385

world. In the context of psychotic or first-episode psychotic patients, the role of HOC functions has been investigated in numerous studies (Mancuso et al., 2011; Kukla & Lysaker, 2020; Guimond et al., 2023; Nijman et al., 2023). These studies have explored the significance of mentalizing abilities across the continuum of psychosis, leading to the hypothesis that enhancing HOC could assist individuals in reorganizing their cognitive processes, resulting in more flexible and adaptive models of reality testing (Messé et al., 2014; Rudrauf, 2014).

When discussing the psychotic continuum, it is essential to focus on schizotypy and At-Risk Mental States (ARMS). Schizotypy represents the manifest expression of an underlying trait vulnerability for schizophrenia spectrum disorders (Kwapil & Barrantes-Vidal, 2015). This construct unfolds along three principal dimensions: the cognitive-perceptual dimension (positive schizotypy: hallucination, delusional phenomena), the interpersonal dimension (social anxiety, constricted affect), and the disorganization dimension (odd behaviors, odd speech) (Fonseca-Pedrero et al., 2018; Raine, 2006). Its expression encompasses a broad range of phenomenology involving personality, subclinical, and clinical psychosis (Kwapil & Barrantes-Vidal, 2015).

Individuals with ARMS – also known as at Clinical High Risk (CHR) or Ultra High-Risk (UHR) for psychosis – exhibit a vulnerability of state (i.e., newly emergent attenuated psychotic symptoms, brief and limited psychotic symptoms, reduced social occupational functioning) and or genetic risk based on having a first degree relative with psychosis. These factors increase the likelihood of psychotic onset. The concept of ARMS has settled thanks to UHR criteria for psychosis, one or more of the following conditions should be fulfilled: (a) first-degree relative with a psychotic disorder; (b) diagnosis of schizotypal personality disorder; (c) attenuated/ or subthreshold psychotic symptoms, (d) brief limited and intermittent psychotic symptoms (i.e., that have resolved spontaneously within a week of onset) (Fusar-Poli, 2017). Moreover, individuals with ARMS have consistently low social and occupational functioning or have incurred a decrease in the latter of at least 30% from the previous year (Fusar-Poli et al., 2013). The formulation of the At-Risk Mental State (ARMS) construct – alongside the Clinical High Risk (CHR) and Ultra High Risk (UHR) criteria – was undertaken with the objective of identifying individuals who are at increased proximal risk for transitioning into a primary episode of psychosis. Consequently, its significance resides in the early detection and intervention before the onset of full-blown clinical psychosis.

Past research has brought out that people with psychotic disorders, including those with ARMS and schizotypal traits often experience difficulties with mentalization, ToM, and metacognition. According to some authors, excessive focus on self generates dysfunctional metacognitive beliefs (e.g., positive metacognitive beliefs and negative beliefs) that predispose subjects to vulnerability to psychopathology (Fonagy & Bateman, 2006; Wells & Papageorgiou, 1998). Specifically, positive metacognitive beliefs about psychotic experiences (i.e., belief that worrying/ruminating will help to cope) can lead to hallucinations and delusions, while negative beliefs (i.e., negative beliefs about uncontrollability of thoughts and negative beliefs about thoughts in general) can cause distress (Morrison, 2001).

Regarding ToM, the literature presents inconsistent results. On the one hand, deficits in ToM appear to constitute a vulnerability factor for the transition to psychosis in at-risk individuals (Stanford et al., 2011); however, on the other hand, some longitudinal studies conducted on large samples do not support this finding (Piskulic et al., 2016).

The existing studies show high heterogeneity in methods, samples, and results. To the best of our knowledge, no recent systematic review that has already been published focuses on this specific topic. This justifies a thorough examination of the nature of the links between mentalizing and psychosis risk aimed at integrating the knowledge accrued in the more recent years.

This systematic review aims to (a) evaluate the links between low mentalizing and both state (ARMS/CHR) and trait (schizotypy) risk for psychosis, (b) compare the difference in mentalizing abilities between individuals with ARMS, schizotypy, full-blown psychosis, and healthy controls. For the purposes of the current review, the construct of mentalizing due to its complex and multifaceted nature will be restricted only to studies that have strictly measured reflective functioning, as well as ToM and metacognition.

## *Methods*

A systematic review was conducted to identify studies that examined mentalizing abilities in individuals with ARMS and its links with schizotypy in non-clinical samples. To ensure a relatively recent comprehensive overview of the literature, the starting year for article publication was set as 2010. The review protocol was developed following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Moher et al., 2010) and was registered on PROSPERO (number: CRD42023397594, latest updated on 29/03/2023).

### *Study Selection*

In February 2023, data sources for relevant publications on empirical studies were gathered via computer-based searches in four databases, namely Google Scholar, Scopus, PubMed, and PsycINFO. Each database was searched independently using three specific iteration research strings: ("At-Risk Mental States") OR ("Ultra High-Risk") OR ("Clinical High Risk") OR (Schizotypy) AND ("Mentalizing") OR ("Theory of Mind") OR ("Metacognition"). These strings were selected to encompass a broad range of features related to mentalizing abilities and At-Risk Mental States. Citations were retrieved independently for each iterative search and compiled into a complete list, which was then screened for duplicates and imported into Rayyan for the title and abstract screening. The tool aims to improve the efficiency and transparency of systematic reviews and thanks to the blind review function, it allows the convoluted researchers deputed to evaluate the articles to minimize selection bias. To minimize bias, a third independent judge was included to evaluate articles in which the two main judges did not agree. More details are given in studies inclusion paragraph (p. 26).

### *Inclusion Criteria*

Articles that present a sample composed of individuals at risk for psychosis by both state (ARMS/CHR) and trait (schizotypy) conditions were included. The ARMS approach to psychosis was introduced in the mid-1990s to describe a state in which there is a heightened risk of developing psychosis (Fusar-Poli, 2017; Yung et al., 2007). To be included in the review, studies were required to:

(a) have at least one of the following risk conditions: a family history of schizophrenia, schizotypal personality traits, schizotypal personality disorder, the presence of

attenuated positive symptoms emerging or worsening, and deterioration of social and occupational functioning. More specifically, we will include the studies considering the following instruments for the assessment of ARMS condition: Comprehensive Assessment of At-Risk Mental States (CAARMS), Structured Interview for Psychosis-risk Syndromes (SIPS), Early Recognition Inventory for the retrospective assessment of the Onset of schizophrenia Checklist (Checklist-ERIRAOS) the companion Scale of Prodromal Symptoms (SOPS), the Basel Screening Instrument for Psychosis (BSIP), the Basic Symptoms (BSABS), and the Schizophrenia Proneness Instrument, Adult Version (SPI-A). All these instruments are usually utilized to assess the ARMS condition. Studies that do not meet the risk criteria and/or have not used a valid assessment including the above-mentioned instruments will be automatically excluded;

(b) investigate the association between psychotic risk and mentalizing abilities;

(c) Evaluate differences in mentalizing abilities (reflective functioning, ToM, and metacognition) between individuals with state or trait risk for psychosis, overt psychosis [according to the Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Classification of Diseases (ICD)], and healthy controls/comparison group;

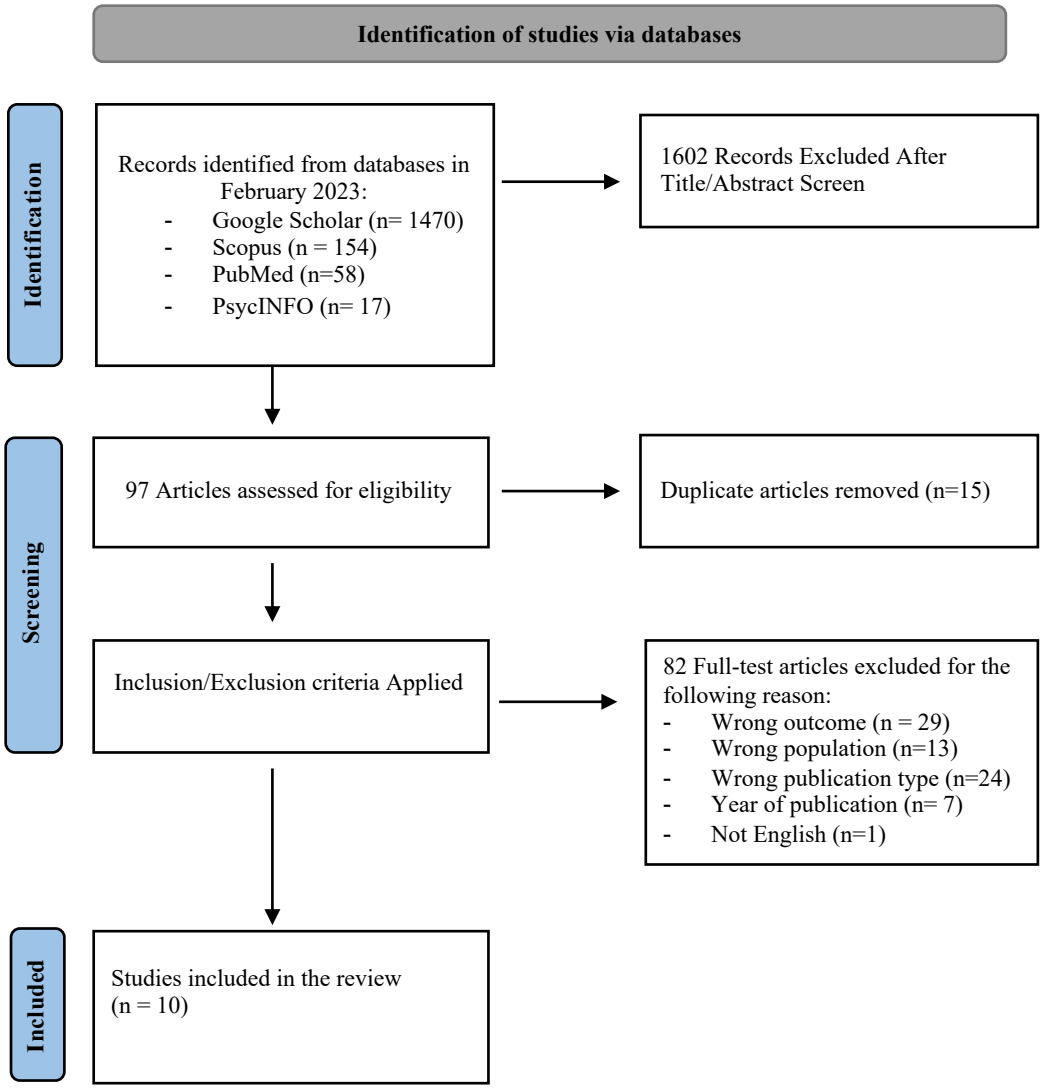
(d) be peer-reviewed research articles;

(e) be original articles. Reviews, meeting abstracts, conference proceedings, notes, letters to the editor, research protocols, patents, editorials, books or chapters, and other editorial materials were deemed ineligible for inclusion in this systematic review;

(f) be quantitative studies;

(g) be published between 2010 to June 2023

**Figure 1.** PRISMA Flow Chart for studies selection.



### *Studies inclusion*

Two reviewers, F.D.S. and C.R., conducted a thorough review of all non-duplicate titles and abstracts to identify articles that were eligible for inclusion in the study. The same reviewers meticulously analyzed the full text of all pertinent articles and resolved any disagreements by reaching a consensus. In the event of any potential differences in agreement, a third reviewer, O.O., was designated to serve as an arbitrator.

### *Data Extraction*

F.D.S. and C.R. independently extracted the following data: type of psychotic risk (CHR/ARMS and schizotypy), participants, gender, age, methodology involved, type of mentalizing abilities measured, and major outcomes.

Data are available in Table 1.

**Table 1.** Studies characteristics according to extraction parameters.

| Authors and year | Type of psychotic risk | Gender | Mean Age (SD) | Methodology | Construct measured | Instruments | Major Outcomes |
|---|---|---|---|---|---|---|---|
| (Barbato et al., 2014) | Clinical High Risk (CHR): 153<br>Help Seeking Control (HSC): 68 | M: 88<br>F: 65 | 19.7 (±4.2) | Longitudinal | Metacognition | *Metacognition:* Meta-Cognitions Questionnaire (MCQ)<br>*Psychotic risk:* Structured Interview for Prodromal Syndromes (SIPS) | At baseline, the CHR group exhibited significantly higher levels of conviction in negative beliefs related to uncontrollability, thoughts' uncontrollability, danger, and thoughts in general compared to the help-seeking control (HSC) group. |
| (Boldrini et al., 2020) | Ultra-High Risk (UHR): 57<br>Healthy Control (HC): 53 | M: 44<br>F: 66 | 16.85 (±2.35) | Longitudinal | Reflective functioning (RF) | *Mentalization*: Reflective Functioning Scale (RFS)<br>*Psychotic Risk:* Structured Interview for Prodromal Syndromes (SIPS) | There was a negative correlation between mentalization and attenuated psychotic symptoms, additionally, individuals with lower RF were more likely to develop a psychotic disorder. |
| (Brüne et al., 2019) | At-Risk Mental States (ARMS): 23<br>Schizophrenia (SZ): 15<br>Healthy Control (HC):21 | M: 37<br>F: 22 | 24.61 (±4.48) | Cross-sectional | Metacognition | *Metacognition:* Metacognition Questionnaire (MCQ)<br>*Psychotic risk:* Structured Interview for Prodromal Syndromes (SIPS) | Individuals with ARMS displayed higher scores in both "negative beliefs" and "need for control" MCQ subscales, as well as in their overall MCQ scores when compared to the control group. Remarkably, those who later converted to psychosis had higher negative metacognitive beliefs at baseline. |
| (Kong et al., 2021) | Ultra-High Risk (UHR): 28<br>Healthy Control (HC): 28 | M: 19<br>F: 9 | 20.35 (±3.15) | Cross-sectional | Theory of Mind (ToM) | *ToM:* ToM Picture Stories Task (ToM-PST)<br>*Psychotic risk:* Structured Interview for Prodromal Syndromes (SIPS) | There were no significant differences between the two groups in terms of ToM skills. |
| (Ohmuro et al., 2016) | At-Risk Mental States (ARMS): 36<br>First Episode Psychosis (FEP): 40<br>Healthy Control (HC): 25 | M: 36<br>F: 65 | 21.7 (±4) | Experimental | Theory of Mind (ToM) | *ToM*: ToM Picture Stories Task (ToM-PST)<br>*Psychotic risk:* Comprehensive Assessment of At-Risk Mental States (CAARMS) | In ARMS and FEP groups ToM was significantly lower than that of the HC. Differences between ARMS and HC disappeared when controlling for premorbid IQ.<br>ToM deficits in ARMS were confirmed only in the comprehension of higher-order false belief. |
| (Salaminios et al., 2021) | Schizotypy: 105 | M: 52<br>F:53 | 15.72 (±1.91) | Cross-sectional | Reflective functioning (RF) | *Mentalization:* Reflective Functioning Questionnaire<br>*Schizotypy:* Schizotypal Personality Questionnaire (SPQ) | Schizotypal traits (specifically, social anxiety and odd speech) were associated with RF dysfunctions. |
| (Stanford et al., 2011) | Clinical High Risk (CHR): 63<br>Schizophrenia (SZ): 13<br>Healthy Control (HC): 24 | M: 71<br>F: 7 | 24.73 (± 5.83) | Cross-sectional | Theory of Mind (ToM) | ToM: "Apple Task", "Refrigerator Task", "The Strange Stories Task"<br>*Psychotic risk:* Structured Interview for Prodromal Syndromes (SIPS) | The higher-order Theory of Mind (ToM) capacity was similarly in CHR and HC. The lowest levels of ToM were obtained from schizophrenic patients. Finally, performance at ToM was influenced by IQ. |
| (Vargas et al., 2019) | Clinical High Risk (CHR): 24<br>Healthy Control (HC): 26 | M: 24<br>F: 23 | 19.84 (± 2, 47) | Cross-Sectional | Theory of Mind (ToM) | *ToM:* Short Story Task<br>*Psychotic risk:* Structured Interview for Prodromal Syndromes (SIPS) | CHRs did not differ in explicit ToM ability but produced less spontaneous inference of mental states. The negative association between ToM skills and symptoms was confirmed. |
| (Wastler and Lenzenweger, 2019) | Schizotypy: 40<br>Negative affect: 30<br>Healthy control (HC): 46 | M: 24<br>F: 82 | 19.33 ± (1.73) | Cross-sectional | Theory of Mind (ToM) | *ToM:* Original hinting task and Self-referential hinting task<br>*Schizotypy:* Perceptual Aberration Scale and Magical Ideation Scale | Schizotypal individuals made significantly more hypermentalization errors than both control groups. Moreover, Self-referential hypermentalization was significantly related to referential thinking, aberrant salience, interpersonal schizotypal traits. |
| (Zhang et al., 2018) | Clinical High Risk (CHR): 84<br>Healthy Control (HC): 95<br>Schizophrenia (SZ): 66 | M: 127<br>F: 118 | 26.9 (±7.6) | Cross-sectional | Theory of Mind (ToM) | ToM: Reading the Mind in the Eyes Test (RMET)<br>*Psychotic risk:* Structured Interview for Prodromal Syndromes (SIPS)/ Scale of Prodromal Symptoms (SOPS) | CHR and SZ subjects had difficulties in reading the mind. Both CHR and SZ subjects spent almost twice as much time on RMET as HC individuals. For SZ patients a significant positive correlation was found between RMET accuracy and time response. |

*Results*

Of 1699 studies retrieved from Google Scholar, Scopus, PubMed, and PsycINFO, after screening all non-duplicate titles and abstracts, 1602 did not fit the preliminary inclusion criteria. Subsequently, the full text of 97 articles was retrieved and the studies were analyzed for the specific inclusion criteria. Of these 97 studies, 87 were excluded. Reasons for exclusion were lack of appropriateness of the study sample (e.g., no state or trait risk for psychosis under previously mentioned criteria were assessed or considered), no pertinence of the construct analyzed in the study (i.e., reflective functioning, ToM, Metacognition examined), wrong publication type (i.e., review or meta-analysis, qualitative methodology), no English language. Please see Figure 1 for more details about the inclusion/exclusion process. Therefore, 10 articles met the inclusion criteria and were identified as suitable for the review.

In the following paragraphs, study characteristics and results will be presented. Section 3 will focus on specific mentalizing abilities (reflective functioning, ToM, and metacognition) and their association with state and trait risk for psychosis. In addition, the study will present the variations in mentalizing skills among patients with ARMS/CHR, schizotypy, healthy individuals, and patients with full-blown psychosis. Exploring the differences in mentalizing abilities between these groups could provide a better understanding of the progression of psychotic disorders and enable the development of interventions to enhance mentalizing abilities and social functioning.

Detailed information about study characteristics, including the type of risk for psychosis (ARMS,UHR, CHR, schizotypy), participants, gender, age, the methodology involved, type of mentalizing abilities measured (reflective functioning, ToM and metacognition), and major outcomes are presented in Table 1.

*Study Characteristics*

Table 1 displays the study characteristics based on the extraction parameters. The studies included in the review have a sample size dimension that varies from a minimum of 48 (Leung et al., 2021) to a maximum of 221 participants (Barbato et al., 2014).

Out of the 10 studies extracted, 2 specifically investigate reflective functioning (Boldrini, Pontillo, et al., 2020; Salaminios et al., 2021), 6 focus on the Theory of Mind (Kong et al., 2021; Ohmuro

et al., 2016; Stanford et al., 2011; Vargas et al., 2019; Wastler & Lenzenweger, 2019; Zhang et al., 2018), and 2 on metacognition (Barbato et al., 2014; Brüne et al., 2019).

Among the 2 studies on reflective functioning, one focuses on the risk for psychosis attributed to schizotypal personality (Ohmuro et al., 2016), and the other one on the comparison between UHR patients and help seeking controls (Boldrini et al., 2020).

Regarding the 6 studies on Theory of Mind, 2 investigate differences between healthy controls and CHR/UHR (Brüne at al., 2019; Wastler et al., 2019), 3 compare state risk (CHR/UHR/AMRS), people suffering with psychosis, and healthy controls (Stanford et al., 2011; Ohmuro et al., 2016; Zhang et al., 2018), and the last one focuses on the differences between schizotypal, negative affect and healthy control groups (Wastler & Lenzenweger, 2019).

Finally, concerning metacognition, 1 study investigates differences between CHR patients and Help-Seeking Control (Barbato et al., 2014), while the other focuses on differences between ARMS individuals, people suffering with psychosis, and healthy controls (Brüne et al., 2019).

### *Types of Mentalizing Ability Analyzed (Reflective functioning, ToM, Metacognition)*

#### *Reflective functioning*

Two studies have been concerned with investigating the association between risk for psychosis (schizotypy and UHR) and reflective functioning – the operationalization of mentalization (Boldrini, Pontillo, et al., 2020; Salaminios et al., 2021).

Salaminios et al. (Salaminios et al., 2021) aimed to investigate various aspects related to schizotypal personality characteristics – assessed with the Schizotypal Personality Questionnaire (Dumas et al., 2000) and mentalization. Mentalization was measured through the Reflective Functioning Questionnaire (Badoud et al., 2015) a self-report instrument evaluating mentalizing abilities by assessing the degree of certainty and uncertainty with which individuals utilize mental state information to understand their own and others' behavior. Results revealed that social anxiety and odd speech – features of schizotypy traits – contributed significantly to uncertainty about mental states. These findings highlight schizotypal traits – in particular, social anxiety and odd speech – were associated with RF dysfunctions.

Concerning state risk for psychosis, Boldrini et al. (2020) conducted a study that focused on reflective functioning in a clinical sample of Ultra High-Risk (UHR) – status indexed on the Structured Interview for Psychosis-Risk Syndrome (SIPS) (McGlashan, et al., 2001) – and help seeking controls. The study had multiple objectives, including comparing reflective functioning scores between UHR and help seeking controls, exploring the association between reflective functioning and subclinical psychotic symptoms, and examining the predictive value of reflective functioning for the transition to psychosis in UHR subjects. Reflective functioning was assessed through the Reflective Functioning Scale (Fonagy et al., 2016) which provides an index of the ability to mentalize derived from the application of transcripts from the Adult Attachment Interview. It is designed to evaluate whether individuals comprehend attachment-related experiences in terms of mental states. The study found significant differences in mean reflective functioning scores between UHR and help seeking controls, with UHR individuals displaying significantly lower scores. Correlation analysis revealed a negative relationship between reflective functioning and certain attenuated positive psychotic symptoms. Additionally, the analysis confirmed that reflective functioning had a significant effect on the transition to psychosis, explaining over 17% of the variance. Reflective functioning levels emerged as the only dimension capable of predicting the onset of psychosis in this population, with high accuracy in distinguishing UHR individuals who transitioned to psychosis from those who did not develop the disorder. These findings, along with the results from other studies, highlight the presence of mentalizing impairments in both UHR individuals and those with schizotypal traits (Boldrini et al., 2020; Salaminios et al., 2021).

*Theory of Mind (ToM)*

Of the 10 selected studies, 5 focused on ToM in individuals at Clinical High Risk (CHR), Ultra High-Risk (UHR) or At Risk Mental State (ARMS) (Kong et al., 2021; Ohmuro et al., 2016; Stanford et al., 2011; Vargas et al., 2019; Zhang et al., 2018), and 1 was on differences between schizotypy, negative affect, and healthy control groups in ToM levels (Wastler & Lenzenweger, 2019). Stanford et al. (2011) comprehensively evaluated Theory of Mind (ToM) in Clinical High Risk (CHR) individuals – status assessed with SIPS/SOPS (Miller et al., 2003) – comparing them with healthy controls and people

suffering with schizophrenia. ToM was measured by three different tasks: “The Apple Task” (Baron-Cohen et al., 2001), “The Refrigerator Task” (Corcoran et al., 1995) and “The Strange Stories Task” (Happé, 1994). The "Apple Task" is a cartoon-based assessment that examines whether an individual can determine if an object has been moved in their absence, focusing on first-order false beliefs. Meanwhile, the "Refrigerator Task" is another cartoon-based task that introduces the concept of recognizing deception, emphasizing second-order false beliefs. Finally, the Strange Stories Task is a verbal task that entails advanced inference skills and an understanding of higher-level cognitive processes in others, such as telling white lies, sarcasm, and pretense. No significant differences were found in first-order false belief tasks. Only people suffering with schizophrenia displayed deficits in higher-order ToM tasks. Both CHR patients and the healthy group performed on higher-order tasks similarly but differently from people suffering with schizophrenia – who performed worse than both groups. Notably, none of the ToM measures predicted conversion to psychosis.

Ohmuro et al. (2016) compared Theory of Mind (ToM) in healthy controls, First Episode Psychosis (FEP) individuals, and those with ARMS – criteria assessed with Comprehensive Assessment of At Risk Mental States (Miyakoshi et al., 2009). Significant differences were found in mean ToM task scores among the three groups. ToM was assessed with the Theory of Mind Picture Stories Task (Brüne, 2005). This assignment consists of six illustrated cartoon narratives portraying instances where two characters collaborate, one character engages in deception towards another, or two characters work together to deceive a third individual. For each narrative, participants were tasked with arranging four cards in a logically sound sequence and responding to inquiries concerning Theory of Mind (ToM) proficiency, such as the deduction of a character's intent. FEP and ARMS groups differed significantly from healthy controls, with a trend-level difference between FEP and ARMS. The FEP group scored significantly differently from all other groups on second-order false belief tasks, while ARMS individuals showed a trend-level difference.

Two years later, Zhang et al. (Zhang et al., 2018) assessed Theory of Mind (ToM) in Healthy Controls (HC), CHR – condition assessed with SIPS/SOPS (McGlashan et al.,

2001), and patients suffering with schizophrenia (SZ) to investigate the impact of time consumption on emotion detection. The Reading the Mind in the Eyes Test was administered as a measure of ToM. It consists of the presentation of photographs of the eye region of human faces (Baron-Cohen et al., 2001). The results confirmed difficulties in emotional perception for SZ and CHR individuals. Although CHR individuals performed better than the SZ group on ToM tasks, their time consumption was similar. In contrast, the HC group completed the tasks faster with higher accuracy. Additionally, increasing time reaction was associated with improved emotion recognition, highlighting challenges in taking the Reading the Mind in the Eyes Test (RMET).

Vargas et al. (Vargas et al., 2019) compared a CHR group – criteria assessed with SIPS (McGlashan et al. 2001) – with a healthy control group to explore correlations between implicit and explicit ToM and positive and negative symptoms. ToM was assessed through Short Story Task (Dodell-Feder et al., 2013) which envisages participants read "The End of Something," a short story by Ernest Hemingway. After reading the story, participants are asked a series of 14 questions to assess comprehension, explicit mental state reasoning and spontaneous mental state inference. In the results, it was found that CHR did not differ to healthy controls in explicit ToM ability, but CHR produced less spontaneous inference of mental states, suggesting impaired implicit and spontaneous ToM ability. From the associations between ToM and symptoms in the CHR, trend-level relationships were found with positive and negative symptoms. This result suggests that CHR individuals exhibit impaired implicit ToM (implying a decreased ability to spontaneously think about the mental states of others), whereas explicit ToM may be relatively more intact at this stage of disease progression (implying that CHR individuals are still able to exercise Theory of Mind and imagine the mental states of others when explicitly elicited).

Kong et al. (Kong et al., 2021) compared healthy patients with UHR individuals for psychosis – condition assessed with SIPS (McGlashan et al., 2001). They investigated impaired ToM skills – evaluated using the ToM Picture Stories Task (Brüne, 2005) – and their relationship with schizotypy and executive function in UHR subjects. No significant

difference emerged between the groups in ToM skills. Low ToM skills were correlated with positive schizotypy and executive function in UHR individuals.

Wastler and Lenzenweger (Wastler & Lenzenweger, 2019) investigated the relationship between schizotypal traits – assessed with The Schizotypal Personality Questionnaire (Cohen et al., 2010) – and ToM performance. ToM was measured with original and self-referential hinting Task which assess one's ability to make inferences about self and others' and mental states based on given indirect speech (Corcoran et al., 1995). They expected individuals with high schizotypal traits to perform worse than healthy and psychiatric control groups in overall ToM. Specifically, they anticipated more self-referential hypermentalization errors (i.e., excessive inferences and extrapolations beyond the social cues provided regarding the mental state of others) from the schizotypal group. Notably, the schizotypal group exhibited the highest number of self-referential hypermentalization errors. These errors were correlated with schizotypal trait features, encompassing phenomena such as ideas of reference and anomalous perceptions (indicative of positive schizotypy), alongside manifestations of social anxiety and restricted affect (characteristic of negative schizotypy).

The results obtained from the extracted studies do not confirm the presence of significant differences between CHR/ARMS or UHR and healthy controls for cognitive ToM (Kong et al., 2021; Ohmuro et al., 2016; Stanford et al., 2011; Vargas et al., 2019). Individuals with CHR, however, take longer (a similar time that is taken by people suffering with psychosis) than healthy controls to attribute emotion to others – a measure of emotional ToM (Zhang et al., 2018). Finally, low ToM abilities have been associated with a wide range of schizotypal manifestations (Kong et al., 2021); with evidence from one study suggesting that those reporting high schizotypal traits show a tendency towards committing more hypermentalizing errors (Wastler & Lenzenweger, 2019).

*Metacognition*

Two of the 10 studies identified were concerned with assessing the association between metacognition and CHR/ARMS (Barbato et al., 2014; Brüne et al., 2019). Barbato et al. (Barbato et al., 2014) conducted a longitudinal study on CHR individuals – condition

assessed with SIPS (42), and help-seekers control (HSC). The authors' objective was to track and analyze metacognitive development over time in a group of CHR. Additionally, they sought to establish whether there was a connection between metacognition and the subsequent onset of psychosis. Metacognition was measured with Meta-Cognitions Questionnaire (MCQ) (Cartwright-Hatton & Wells, 1997). It has been developed to assess metacognitive beliefs, judgments, and monitoring that are thought to be involved in the development of psychological disturbances. MCQ has five sub-scales: (i) positive beliefs about worry, which includes items related to the idea that worrying is necessary to solve problems; (ii) negative beliefs about uncontrollability of thoughts and corresponding danger, with items related to beliefs about mental and physical danger of worrying and about worrying being uncontrollable; (iii) cognitive confidence, which refers to the efficacy of one's cognitive skills such as attention and memory; (iv) negative beliefs about thoughts in general, including themes of responsibility, punishment, and superstition whose items concern the negative outcomes that might result from specific thoughts; and (iv) cognitive self-consciousness, which includes items regarding one's tendency to focus on their own thinking processes (Barbato et al., 2014). From the results emerged that negative beliefs about uncontrollability and cognitive confidence were positively associated with general symptoms in the CHR group. At the baseline, the CHR group reported significantly more conviction in negative beliefs about uncontrollability, negative beliefs about the uncontrollability of thoughts and danger, and negative beliefs about thoughts in general, as well as higher overall MCQ scores compared to the help-seeking controls (HSC), but their conviction in these beliefs decreased over time. Moreover, those who later converted to psychosis had higher negative metacognitive beliefs at baseline. The study suggests impairments in metacognitive beliefs may be linked to the development of genuine psychotic transition. The second selected study was conducted by Brüne et al. (Brüne et al., 2019) and compared a group of ARMS individuals – condition assessed with SIPS/SOPS (42), people suffering with psychosis, and a healthy control with respect to metacognition – assessed with Meta-Cognitions Questionnaire–Revised (Wells & Cartwright-Hatton, 2004). People with ARMS showed significantly higher scores in both the "negative beliefs" and "need for control" MCQ subscales, as well as overall MCQ, compared to the HSC. Of note, those experiencing psychosis had the highest overall MCQ

scores among the groups studied. Significant relationships were found in metacognition levels between groups, particularly in the subscales “negative beliefs” and “need for control”. The ARMS group obtained an intermediate level compared with the people suffering with psychosis (lower level) and healthy group (higher level). Both studies identified (Barbato et al., 2014; Brüne et al., 2019) confirmed that CHR/ARMS individuals present more negative metacognitive beliefs and a higher overall MCQ score compared to respective controls.

## Discussion

To the best of our knowledge, up until the search date of February 2023, this systematic review represents a pioneering endeavor aimed at investigating the role of mentalizing abilities (reflective functioning, ToM, and metacognition) concerning vulnerability to psychosis. The review pursued the following objectives: (a) to assess the associations between low mentalizing and the risks for psychosis due to both state (ARMS/CHR) and trait conditions (schizotypy), and (b) to compare the differences in mentalizing abilities between individuals with ARMS, schizotypy, full-blown psychosis, and healthy controls.

Studies extracted confirmed the negative associations of mentalizing abilities with state (Boldrini et al., 2020; Vargas et al., 2019; Zhang et al., 2018), and trait (Salaminios et al., 2021; Wastler & Lenzenweger, 2019) risk for psychosis. Specifically, results revealed, that low levels of RF and negative metacognitive beliefs are predictive of transition to psychosis in individuals at risk (Barbato et al., 2014; Boldrini et al., 2020). Negative metacognitive beliefs, such as negative beliefs about the uncontrollability of thoughts and negative beliefs about thoughts in general, appear to be characteristics of individuals who meet the clinical criteria for the ARMS (Fonagy et al. 2016).

The research findings regarding differences in mentalizing abilities (Barbato et al. 2014; Vargas et a., 2019; Kong et al.2021; Wastler et al., 2019; Cotter et al., 2017; Flückiger et al., 2019; Dimopoulou et al., 2017; Fonagy et al., 2016) among individuals with ARMS, schizotypy, full-blown psychosis, and healthy controls yielded mixed results. It was observed that negative metacognitive beliefs and the “need for control” tended to be more pronounced in individuals at risk (Salaminios et al., 2021; Badoud et al., 2015). In the context of Theory of Mind (ToM) tasks, some studies failed to identify significant distinctions between CHR patients and healthy controls

(Barbato et al., 2014; Cotter et al, 2016; Flückiger et al, 2019), whereas others reported lower ToM performance levels among schizotypal (Dimopoulou et al., 2017) and CHR individuals (Brüne et al., 2019; Wasteler et al., 2019).

The variability in these findings possibly indicates that in individuals with CHR, their cognitive Theory of Mind (ToM) abilities may remain fairly intact (Barbato et al., 2014; Cotter et al., 2016; Flückiger et al., 2016). However, they do tend to take significantly more time to recognize emotions in facial expressions compared to healthy controls (Vargas et al., 2019). The need for more time to "read" emotions on the face is plausibly related to the greater difficulty of CHR compared to healthy controls in discerning and understanding the emotional component. Additionally, the discrepancy in the obtained results could be attributed to the effect of cognitive functioning. In fact, studies conducting statistical analyses controlling IQ did not find significant differences between individuals at risk for psychosis and the controls (Ohmuro et al., 2016; Stanford et al., 2011), showing that lower IQ scores may be responsible for the differences in ToM performance found between the groups.

To summarize, deficits in reflective functioning and dysfunctional metacognitive beliefs have been identified both in individuals with trait and state risk for psychosis (Barbato et al., 2014; Boldrini, Pontillo, et al., 2020; Brüne et al., 2019; Salaminios et al., 2021). The results derived from studies on reflective functioning (Kong et al., 2021; Zhang et al., 2018) and metacognitive beliefs (Vargas et al., 2019; Fonagy et al., 2016) align with the perspective that considers impairments in these capacities as potential moderators of the expression of psychotic phenotypes (Debbané et al., 2016, Fonagy et al., 2016). Therefore, clinical strategies aimed at enhancing mentalization and metacognition, and thereby promoting resilience, may be more tailored to address the specific needs of individuals across the spectrum of psychosis.

## *Clinical Implications*

Mentalization Based Treatment for Psychosis (MBT-P) applied to individuals with both state and trait risk for psychosis may help in the management of attenuated psychotic symptoms. MBT-P, moreover, could be helpful in preventing (Brent, 2009) from the onset of full-blown psychosis through improved long-term social functioning (Armando et al., 2019; Debbané et al., 2016). In addition, dysfunctional personality traits are particularly prevalent in this population (De Salve et al., 2023; Rossi et al., 2023), and an estimated 40% of this population has a personality disorder in comorbidity (Boldrini et al., 2020), findings that can justify the application of treatment.

Moreover, the results obtained from the review suggest that the application of strategies to attenuate maladaptive metacognitive beliefs may be equally effective in improving psychotic symptoms in CHR (Morrison et al., 2006; Addington et al., 2011; Lin et al., 2012; Fusar-Poli et al., 2013; Hutton et al., 2014). Metacognitive training is grounded in theoretical principles that focus on addressing cognitive (e.g., jumping to conclusions) and problem-solving (e.g., poor memory recall) errors and biases, which, in turn, play a significant role in the formation of false beliefs, eventually leading to delusional states (Dimopoulou et al., 2017). Case studies and preliminary trials have shown promising results for metacognitive therapies, showing benefits in improving the sense of self and perceived agency and attenuation in negative metacognitive belief in people suffering with schizophrenia (De Jong et al., 2016; Van Donkersgoed et al., 2014). Working on altered mentalization and metacognition (Cotter et al., 2017) should mitigate the phenotypic expression of psychotic disorders, improving the discontinuous experience of the self and psychotic symptomatology in individuals with both state and trait risk for psychosis (68).

## *Limitations and Future Directions*

The present systematic review has several limitations. In general, the research designs used in the selected studies make causal inferences difficult. Therefore, the implementation of more longitudinal studies on the role of mentalization and metacognition and clinical trials applying MBT-P and metacognitive interventions are advocated.

Another constraint to consider is the paucity of research that was both identified and carried out within the temporal scope encompassed by this systematic review. This factor also hampers the ability to make causal inferences.

Finally, only one study (Zhang et al., 2018), among those selected, included neurophysiological or neuroimaging measures in conjunction with psychological/behavioral measures. Considering neuroimaging assessments could further elucidate the links between mentalizing and psychosis risk.

## *Conclusion*

Considering that impairments in mentalization and metacognition were associated with a wide range of attenuated psychotic symptoms and were predictive of psychotic onset, the assessment of mentalization and metacognition could potentially provide additional prognostic value for individuals along the psychotic continuum. In this regard, further research is needed to clarify the relationship between the mentioned dysfunctions and the development and persistence of psychotic and nonpsychotic clinical symptoms. Lastly, it would perhaps be more appropriate to consider good functioning of mentalization and metacognition as protective factors that can improve levels of social and occupational functioning predictive of transition to psychosis (Davies et al., 2016; Devoe et al., 2019; Takahashi et al., 2017).

# Chapter 2

# Study 1 – At-Risk Mental States and Personality Traits: A Cluster Analysis Approach on a Group of Help-Seeking Young Adults[2]

## 2.1 Introduction

Over the last decades, psychiatry research has identified criteria for individuals at 'high risk' for developing psychotic illness. Since then, professionals have been able to implement preventive clinical strategies of different natures, aimed at lowering the risk of transition to psychosis among young people.

Because individuals with At-Risk Mental States (ARMS) are more likely to experience a psychotic onset, early detection and intervention have been a priority for mental health clinicians. To promote early diagnosis, the Personal Assessment and Crisis Evaluation (PACE) clinic in Melbourne, Australia (1994), developed the Ultra High-Risk (UHR) diagnostic category. The UHR criteria include specific characteristics—states and traits risk factors—such as a family history of schizophrenia, schizotypal personality disorder, the presence of emerging attenuated positive symptoms and impairments in social and occupational functioning (Yung et al., 2007).

Premorbid personality disorders (PDs) may represent a risk factor for psychotic transition, especially in the developmental stage between adolescence and young adulthood (Cuesta et al., 2002). Particularly, dysfunctional personality traits are known to increase the risk for a variety of psychopathological conditions that can lead to full-blown psychotic disorders (Heikkilä et al., 2004). Three different models can explain the relationship between personality and psychotic disorders (Widiger, 2011): (a) personality might modify the phenotypic expression of the disorder; (b) the interplay between etiological and genetic factors contributes to the generation of a clinical

[2]This chapter presents a paper published in 2023 in Early Intervention in Psychiatry. Following the reference: Rossi, C., De Salve, F., Biagianti, B., Cavalera, C., Malvini, L., Barbera, S., Pastelli, I., Tagliabue, S., Oasi, O., & Percudani, M. (2023). At-risk mental states and personality traits: A cluster analysis approach on a group of help-seeking young adults. *Early Intervention in Psychiatry*, 1–9. https://doi.org/10.1111/eip.13397

spectrum, where personality and psychotic disorders lie on a continuum (Debanné et al., 2015); (c) personality and psychotic disorders may have a causal (etiological and possibly bidirectional) relationship, through which individual patterns of thinking, feeling, behaving and relating to others contribute to the onset of a mental disorder – that is, a severe or chronic psychotic disorder may itself contribute to major changes in personality.

Some studies have investigated the relationship between personality and psychosis onset to prevent or intervene early on patients' vulnerabilities (Andersen & Bienvenu, 2011; Bolinskey et al., 2001; Chmielewski et al., 2014; Hunter et al., 2014; Ohi et al., 2016). The relationship between normal personality traits and psychosis has often been evaluated through the dimensions identified by the Five- Factor Model (FFM) (Hogan, 1996). A strong negative association has emerged between openness to experience and general psychopathology, predisposition to psychosis, and psychotic traits (Chmielewski et al., 2014). Other studies have reported lower levels of extraversion, agreeableness, and conscientiousness in schizophrenic patients compared to control groups (Andersen & Bienvenu, 2011). Other research groups have examined the relationship between personality traits and psychosis using the Alternative DSM-5 Model for Personality Disorders (Bastiaens et al., 2019; Meliante et al., 2021). Indeed, the alternative model for the classification of personality disorders (PD) in DSM-5 Section III comprises two major components: impairments in personality functioning (Criterion A) and maladaptive personality traits (Criterion B) (Zimmermann et al., 2015). Focusing on the latter, a recent meta-analysis (Boldrini et al., 2019) showed that UHR patients may present heterogeneous personality traits, including social withdrawal and affective flattening (common among schizotypal patients), interpersonal instability and emotional dysregulation (common among borderline patients). This heterogeneity suggests the presence of distinct personalities that differ in adaptive functioning, aetiological variables, comorbidity patterns, and response to psychotherapeutic treatment. As a result, empirical subtyping of personality in UHR individuals could help to clarify the etiopathogenetic pathways that contribute to the onset of psychosis (van Os & Guloksuz, 2017) and improve the understanding of processes that underlie treatment efficacy (Hilsenroth et al., 2018).

Several studies confirm that consistently implementing early interventions reduces the transition to psychosis (Fusar-Poli et al., 2013; Nelson, 2014). Focusing on the 18–25 age range,

the time window with the highest incidence of psychotic onset (Yung et al., 2007), the present study investigated the personality traits associated with psychosis onset, with the goals of (a) classifying and comparing patient groups according to different levels of psychotic risk; (b) identifying personality traits that may differentiate the eventual presence of psychotic risk from the psychotic onset and (c) exploring the association between the level of social and occupational functioning and psychotic risk. According to the literature (Drvaric et al., 2018; Meliante et al., 2021), the most influential personality traits for the risk of psychosis are expected to be detachment and disinhibition.

## 2.2 Materials and Methods

### *Participants*

From an initial sample of 200 individuals, 169 were included in the analysis. The sample consisted of young, help-seeking (82 males and 87 females) individuals who approached the Youth Mental Health Service for early intervention at Niguarda Hospital in Milan, Italy, during the years 2019 and 2020. At the time of their first admission to the centre, participants were aged 18–25, with an average of 20.22 years (SD = 2.11). The classification of at-risk mental states was made possible through cluster analysis, using the Checklist ERIraos scores (Maurer et al., 2018).

Participants were excluded from the study if (a) they had a diagnosis of intellectual disability or autism, (b) the personality assessment was incomplete and (c) they requested a one-time consultation for diagnostic purposes.

### *Procedures*

Informed consent was obtained from all the subjects involved in the research. The study complies with the Guidelines of the 1964 Declaration of Helsinki and its later amendment (World Medical Association, 2013) and was approved by the Ethical Committee of Niguarda Hospital in Milan (protocol 305-19 052 021). Data were collected during the routine assessment of patients joining Programma 2000 (Cocchi et al., 2008; Meneghelli et al., 2010).

The study was conducted in line with Programma 2000, a youth mental health service for early intervention implemented at Niguarda Hospital in Milan, Italy. This project integrates the management of chronic psychotic disorders with preventative services that promote health and

recovery. Patients access this service via spontaneous help-seeking or through institutionally mediated paths (e.g. primary care, district-based mental health services, school counselling and emergency rooms). The metropolitan area served by the program includes about 350 000 inhabitants. Programma 2000 offers a personalized and customizable intervention package that includes individual psycho-educational and motivational sessions, cognitive-behavioral psychotherapy, psychoeducation, family support, and therapeutic group activities (e.g. anxiety management, assertive and problem-solving training, etc.) (Cocchi et al., 2008; Meneghelli et al., 2010). Personality assessment represents a critical element in customizing and personalizing the intervention package.

### *Measures*

Besides the collection of socio-demographic data, Programma 2000 assessments include the PID-5, the Checklist ERIraos and the SOFAS.

Personality inventory for DSM-5

The Personality Inventory for DSM-5 (or PID-5) is a self-report questionnaire. It was developed to assess Criteria B (Pathological Personality Traits) in Section III of the DSM-5 to adopt a dimensional and inferential-contextual approach. The PID-5 is composed of 220 items with a Likert scale from 0 (very false/often false) to 3 (very true/often True) and assesses 25 personality traits linked in five main personality traits labeled detachment, disinhibition, negative affect, antagonism and psychoticism. For the current study, the scoring was conducted following the indications of Krueger et al. (2012), and the main domains were determined by calculating the average of the corresponding scores. In the current study, McDonald's Omega (Nájera Catalán, 2019) for the five domain scales were 0.8 (Negative affectivity), 0.8 (Detachment), 0.8 (Antagonism), 0.6 (Disinhibition) and 0.8 (Psychoticism).

Early recognition inventory-retrospective assessment onset of schizophrenia (checklist)

The Checklist ERIraos, developed by Maurer et al., 2006, is a semi-structured interview useful for identifying early signs of mental illness. The clinician must have a thorough knowledge of the psychopathological areas to use the tool. It aims to identify the perceived psychopathological changes and the family history of the subject. The Checklist consists of 17 items and combines the

nonspecific distress symptoms that may accompany the prodromes of schizophrenia, such as social withdrawal and depression, loss of sense of reality, persecutory ideas and hallucinations that suggest an increased risk of the transition to psychosis (Meneghelli et al., 2014). A score ≥6 requires a referral to the Early Intervention Center for further investigation while a score ≥ 12 identifies the presence of a psychotic onset. The internal consistency of the Checklist score of the current study, analyzed through the Omega's value, was considered good (Ω = 0.8).

Social and occupational functioning assessment

The Social and Occupational Functioning Assessment (SOFAS) scale originated from the need to revise the Global Assessment of Functioning Scale (GAF) (Aas, 2010). It mainly focuses on the individual's level of social and occupational functioning and is not directly influenced by the severity of the psychological symptoms (Morosini et al., 2000). The SOFAS is a clinician-report instrument that evaluates functioning at the time of assessment; however, in some contexts, it can be used to assess past functioning. While the SOFAS scale normally generates a quantitative score, considering the level of social and occupational functioning along an ideal continuum ranging from excellent to severely impaired, we chose to stratify SOFAS scores using three cut-offs (Morosini et al., 2000). The first level included the lowest scores (from 0 to 50) indicating compromised functioning, the second (from 51 to 74) a moderate level of functioning, and the last one (>75) a good level of functioning.

## 2.3 Data analyses

Analyses were performed using SPSS 25.0 statistical software. Skewness and kurtosis analyses were used to evaluate the normality of the distribution of the sample. All the variables resulted within the acceptable range between -2 and +2 (Podsakoff et al., 2003).

The current study employed a two-step Cluster Analysis (CA). This method has previously been used in health-related studies to explore the relationship between at-risk mental states and personality traits (Amendola et al., 2020; Bastiaens et al., 2021). The CA, following the procedures outlined by Norusis (2011), was applied to the Checklist ERIraos scores to identify different mental states and the presence of a psychotic risk. The log-likelihood method was used to reveal natural groupings in the data set based on Schwarz's Bayesian information criterion (BIC). Once the

cluster solution was derived, differences in PID-5 personality traits among the three ERIraos-based clusters were explored using MANOVAs with Bonferroni multiple comparison tests. One-way ANOVA with Tukey's Post-hoc was performed in case of significant effects. Partial eta-squared effect sizes were reported. Spearman correlations were conducted to investigate significant associations between ERIraos clusters and SOFAS categories. The significance level for all statistical tests was set a priori to a = 0.05.

## 2.4 Results

### *Descriptive Statistics*

Characteristics of the sample are reported in Table 1.

Table 1. Descriptive statistics

| Characteristic | | Group | N (%) |
|---|---|---|---|
| Sex | | Female | 87 (51.5%) |
| | | Male | 82 (48.5%) |
| Age (years) | M (SD) | 20.22 (2.11) | 169 (100%) |
| | Min-max | 16-25 | |
| Education level | | Primary school diploma | 1 (0.6%) |
| | | Middle school diploma | 81 (47.9%) |
| | | High school diploma | 77 (45.6%) |
| | | Graduated from University | 10 (5.9%) |
| Work status | | No worker | 35 (21.7%) |
| | | Worker | 20 (12.4%) |
| | | Student | 114 (65.8%) |
| Substance abuse | | No | 125 (74%) |
| | | Yes | 39 (23%) |
| | | Suspected | 5 (3%) |
| Alcohol abuse | | No | 129 (76.3%) |
| | | Yes | 29 (17.2%) |
| | | Suspected | 11 (6.5%) |
| Familiarity for psychosis | | No | 82 (48.2%) |
| | | Yes | 87 (51.8%) |

*Cluster Analysis*

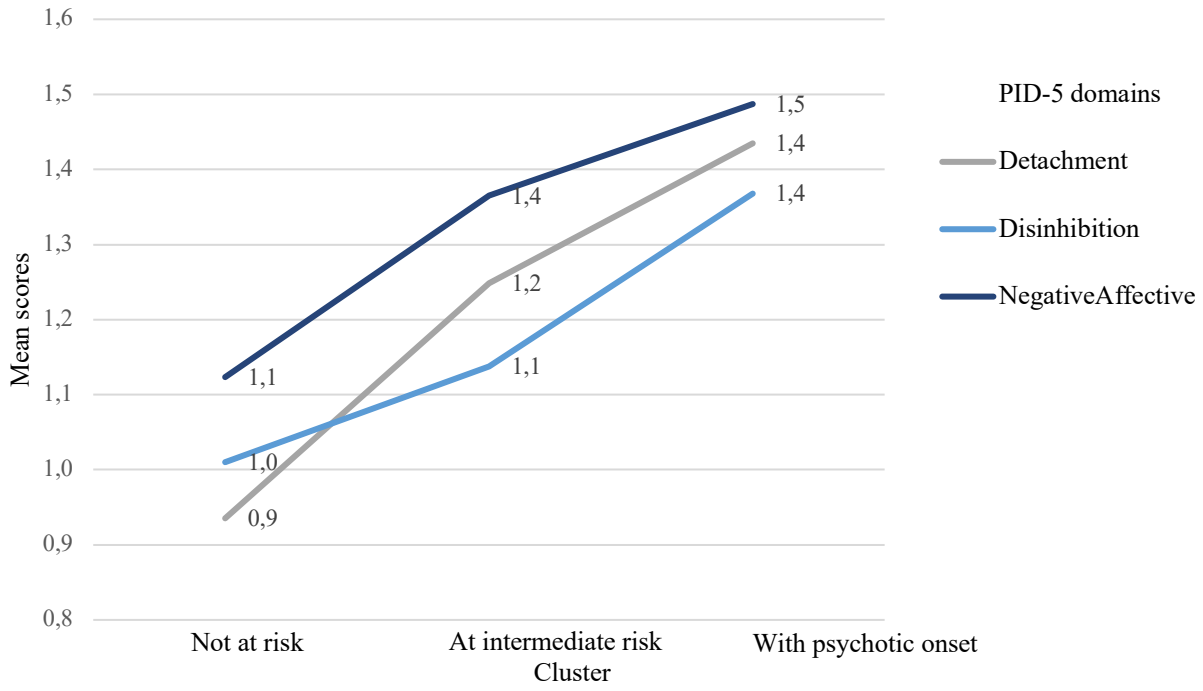
CA identified a three-factor solution with a silhouette measure of cohesion and separation of 0.7. The three subgroups were significantly different on Checklist ERIraos scores, providing a solid indicator for the validity of the solution. Based on the cluster means, the three groups have been labeled as follows: Cluster 1 'Not at psychotic risk' (n = 46; 27.2%; Mchecklist = 6.39); Cluster 2 'At intermediate risk' (n = 65; 38.5%; Mchecklist = 16.09); Cluster 3 'With psychotic onset (n = 58; 34.3%; Mcheck-list=29.29)'. The cluster distribution is shown in Figure 1. Specifically, the first cluster includes a male majority (58.7%) while the second and the third were composed mainly of females (respectively 55.4% and 55.2%). The first group gathers individuals reporting low scores in Checklist ERIraos (M = 6.39), hence not considered to be at psychotic risk or in need of early intervention. The 'At intermediate risk' group was so named due to the mean score of 16.09, indicating a moderate risk. These individuals were referred to the early intervention Centre for further investigation. The third group included patients who scored the highest on the Checklist ERIraos: in addition to high scores in the first part of the scale (which investigates non-specific distress), these subjects also showed high scores on the last items of the instrument (which examine the presence of positive symptoms). The group's mean score (M = 29.29) may be indicative of psychotic onset.

## *Differences in Personality Domains*

The multivariate analysis of variance (MANOVA) was conducted considering the three-cluster solution, sex and age as factors, and the PID-5 domains as dependent variables. The assumption of the equality of covariance matrices was confirmed by the Box's test, p = .2955 (>.05), hence the covariance matrices are roughly equal as assumed by the MANOVA. To test the homogeneity of group variances, the Levene test was conducted. First, age was not significant. In addition, also the interaction between sex and cluster resulted not significant. Second, regarding sex, there was a significant effect only for the domain of antagonism (Wilks's $\Lambda = 0.863$, $\eta$partial = 0.137; $p < .001$; $F(1,163) = 12.946$; $\eta_{partial} = .074$; $p < .001$). As shown in Table 2, males reported higher levels of antagonism than females.

Third, concerning personality traits, the MANOVA revealed a main effect of the ERIraos classification on the PID-5 domains of detachment, disinhibition and antagonism (Wilks's Λ = .756; ηpartial = 0.130, p < .001) as shown in Figure 1.

**Figure 1.** PID-5 domains distribution according to the cluster-solution




Psychoticism was found to be significant on the Levene test and was excluded from the analysis. Significant differences were found at alpha <0.01 between groups for negative affect [F (2,163) = 8.327; $\eta_{partial}$= .093], detachment [F (2,163) = 12.362; $\eta_{partial}$= .132], disinhibition [F(2,163) = 11.157; $\eta_{partial}$ = .120] and also for antagonism [F (2,163) = 3.475; $\eta_{partial}$ = .041, p = .033]. Bonferroni's Post-hoc multiple comparisons revealed significant differences between the means among the clusters for the domains of negative affective, detachment, and disinhibition.

Table 2 shows means and standard deviations for the PID-5 domains of each group, as well as the Post-hoc comparisons. Concerning negative affect and detachment domains, the 'Not at risk' group was significantly different from the 'At intermediate risk' and the 'With psychotic onset' groups. The 'With psychotic onset' group showed significantly higher dis- inhibition scores compared to

the other two. In order to better understand the results obtained from the MANOVA for antagonism, a one-way ANOVA was implemented including cluster classification as a fixed factor and antagonism as the dependent variable. No significant difference were found [$F(2,166) = 2.408$; $\eta partial = .28$, $p = .93$].

Table 2. Descriptive statistics and Post-hoc

| PID-5 domain | Cluster | M | SD | N | P-value | Post-Hoc |
|---|---|---|---|---|---|---|
| Negative Affect | 1. Not at risk | 1,12 | 0,37 | 46 | p≤.001 | (1) vs (2) p= .013<br>(1) vs (3) p= <.001 |
| | 2. At intermediate risk | 1,36 | 0,39 | 65 | | |
| | 3. With psychotic onset | 1,49 | 0,52 | 58 | | |
| | Total | 1,34 | 0,45 | 169 | | |
| Detachment | 1. Not at risk | 0,94 | 0,49 | 46 | p≤.001 | (1) vs (2) p=.005<br>(1) vs (3) p= <.001 |
| | 2. At intermediate risk | 1,25 | 0,48 | 65 | | |
| | 3. With psychotic onset | 1,43 | 0,55 | 58 | | |
| | Total | 1,23 | 0,54 | 169 | | |
| Antagonism | 1. Not at risk | 0,58 | 0,38 | 46 | p= .033 | |
| | 2. At intermediate risk | 0,63 | 0,39 | 65 | | |
| | 3. With psychotic onset | 0,75 | 0,44 | 58 | | |
| | Total | 0,66 | 0,41 | 169 | | |
| Disinhibition | 1. Not at risk | 1,01 | 0,36 | 46 | p≤.001 | (1) vs (3) p<.001<br>(2) vs (3) p=.004 |
| | 2. At intermediate risk | 1,14 | 0,36 | 65 | | |
| | 3. With psychotic onset | 1,37 | 0,43 | 58 | | |
| | Total | 1,18 | 0,41 | 169 | | |

Finally, the dimension of social functioning was explored. As a whole, the sample presented a moderate level of social and occupational functioning (M = 60.98, SD = 12.95) with a minimum score of 20 and a maximum of 90. Spearman's correlation revealed a significant association between the three clusters and the SOFAS categories ($\rho$ = -.182; p = .018).

## 2.5 Discussion

The present study aimed at identifying the personality traits that may characterize the onset of psychosis. To the best of our knowledge, three studies have used CA to define levels of psychotic risk (Gawęda et al., 2019; Valmaggia et al., 2013). In our study, three groups have been identified and labelled (1) "Not at psychotic risk", (2) "At intermediate risk" and (3) "With psychotic onset". This classification is in line with Yung et al. (2004) who have conceptualized psychosis along a continuum from the absence of psychotic risk to full-blown onset. Moreover, they identified characteristics typical of patients at high psychotic risk: age between 15-25 years, being a help-seeker, and having experienced a significant decline (>30%) in social and work functioning in the last 12 months or a long-standing low functioning.

Sex did not have emerged as a risk factor for psychotic onset based on cluster classification, if not for antagonism, where males reported higher scores than females (Table 1), which is aligned with previous research (Geniole et al., 2013; Blötner et al., 2021). Collison et al. (2021) showed that differences in personality traits, in particular antagonism and social dominance, are associated with sex.

The MANOVA analysis conducted based on clusters identified three personality domains where the three groups significantly differed: negative affect, detachment, and disinhibition, which have all been previously identified as general risk factors for psychopathology (Longenecker et al., 2020). According to several studies (Meliante et al., 2021; Bastiaens et al., 2017), the "At intermediate risk" and "With psychotic onset" groups reported higher scores for negative affect and detachment than the "Not at psychotic risk" group.

Experiences of a wide range of negative emotions and associated behavioral manifestations are common in patients with at-risk mental states, likely due to dysfunctional emotion regulation that often already occurs in individuals at risk of psychosis (Schultze-Lutter et al., 2015; Freeman & Garety, 2003). These regulation difficulties are thought to originate from lower activation of the ventrolateral prefrontal cortex, which is associated with high negative affect, lower social functioning, and high rates of psychotic symptoms (Van Der Velde et al., 2015).

Detachment is often associated with avoidance of social and emotional experiences, causing withdrawal from interpersonal interactions and restricted hedonic experiences (Rapado-Castro et al., 2015). In this study, detachment scores were significantly higher for the "At intermediate risk" and "With psychotic onset" groups, compared to the "Not at risk" group, in line

with research suggesting that detachment could serve as a premorbid indicator of negative symptoms (Meliante et al., 2020). Moreover, social withdrawal (one of the many implications of detachment) represents, along with depressive symptoms, a very common feature in the prodromal phase of psychosis (Yung & McGorry, 1996). Suspiciousness, another result of detachment, is also typical in some young people at psychotic risk, who tend to incur cognitive distortions, attributing their ideas and opinions about themselves to others (Freeman & Garety, 2014). This tendency, often driven by pervasive feelings of social inadequacy, can easily evolve into direct persecutory experiences that clinicians should consider during their practice (Freeman & Garety, 2014).

With respect to disinhibition, the group "With psychotic onset" showed significantly higher scores than the "Not at risk" and "At intermediate-risk" groups – a finding that corroborates previous research showing high disinhibition in the help-seeking population with a vulnerability to psychosis and/or overt psychotic onset (Hazan et al., 2020; Yung et al., 2019).

In line with the literature, antagonism was found to be a personality domain that is not relevant to at-risk mental states (van der Gaag et al., 2019; Fresán et al., 2015). Similarly, psychoticism was not found to be a domain associated with identified clusters of psychotic risk, which replicated findings from Drvaric et al. (2018). Despite psychoticism being indexed by the PID-5 and the Checklist ERIraos Scale as a composite of Unusual Beliefs and Experiences, Eccentricity, and Perceptual Dysregulation, no significant differences emerged between the three clusters. This is possibly because psychoticism is a trans-diagnostic personality feature that does not significantly increase the risk for psychosis (Bastiaens et al., 2019).

Finally, the three levels of social functioning, as indexed by the SOFAS, were found to be negatively associated with clusters of psychotic risk, such that having lower social functioning was associated with increased psychotic risk. In a recent study conducted by Leijdesdorff et al. (2022), a similar relationship between social functioning and psychiatric symptoms in youth emerged, suggesting that social functioning could predict transdiagnostic psychiatric symptoms.

This study has several limitations. First, the sample size was small, and future studies with a larger sample size are recommended. Second, the cross-sectional nature of data collection limited the possibility of exploring whether personality traits predict the onset of psychosis. Third, the SOFAS (Morosini et al., 2000) used to investigate social functioning is a clinician-report instrument and does not rely on self-reports. Finally, the distinction of at-risk mental states was conducted through the Checklist ERIraos, which does not effectively detect the classification as required by the UHR

criteria (Yung et al., 2005). Therefore, in light of these findings, the CAARMS (Yung et al., 2005) will be introduced into the Programma 2000 assessment strategy.

Despite its limitations, the present research suggests the involvement of personality traits in the development of psychosis-related psychopathology. Namely, higher levels of negative affect, disinhibition, and detachment distinguish people who are more vulnerable to psychosis or who already have overt psychosis from those who are not at psychotic risk.

Given the high prevalence of personality disorders in ultra-high-risk patients (18% after 6 months, 22% after 1 year, and 29% after 2 years to 36% after 3 years) compared to the relatively low rate of psychotic transition (Boldrini et al., 2020; 2019; Sevilla-Llewellyn-Jones et al., 2018, Fusar-Poli et al., 2016), intervention programs for at-risk mental states patients should be supplements with personalized treatments that recognize, focus, and treat maladaptive personality traits, to prevent transition to psychosis and promote psychological well-being. Future research should investigate the relationship between psychopathological dimensions of personality and outcomes of early intervention programs for psychosis.

# Chapter 3

# Study 2 - Personality Traits and Transition to Psychosis One Year After the First Assessment[3]

## 3.1 Introduction

Different psychotic manifestations can be read according to an evolutionary perspective; indeed, in the natural history of the psychological disease, it is frequently observed the presence of different phases, prodromal, acute, and chronic (Yung et al., 2003). The prodromal phase has an average duration of between 1 and 5 years and is often associated with high psychosocial impairment and disability (Loebel et al., 1992; Häfner et al., 1993; Establishing the onset of psychotic illness, 1993). Prodromal states are characterized by non-specific symptoms of different nature, including restlessness, concentration, social and cognitive difficulties, fear, low self-esteem, social withdrawal, poor school or work performance, worsening quality of life, anxiety, sleep disorders, personality, and mood changes, and attenuated psychotic symptoms (Yung et al., 2007). Some studies have shown that very often the decrease in cognitive performance and impairment of social functioning anticipate the actual onset of the disease by up to several years; these dysfunctions act as both maintenance factors and transition markers (Tarbox et al., 2014; Nelson et al., 2021). Whereas the acute phase corresponds to the psychotic onset, the chronic one is characterized by the continuative presence of positive, and negative, cognitive symptoms and functional disabilities (Yung et al., 2003).

The concept of At-Risk Mental State becomes crucial in clinical practice, especially from a preventive perspective (Lin et al., 2012). Recognizing in advance certain signs that could lead to the development of a psychotic pathology, allows early intervention to reduce the likelihood of its onset and the related social consequences (Wölwer, 2018). Literature shows the transition rate to full-blow psychosis - among high-risk patients - is between 35% and 41%. (Yung et al., 2003, 2004; Radua et al., 2018; Oliver et al., 2020).

[3] This chapter presents a paper published in 2023 in Frontier in Psychology. Following the reference: De Salve, F., Rossi, C., Cavalera, C., Malvini, L., Barbera, S., Tagliabue, S., ... & Oasi, O. (2023). Personality traits and transition to psychosis one year after the first assessment. *Frontiers in Psychology*, 14, 1096626. https://doi.org/10.3389/fpsyg.2023.1096626

The early intervention treatment aims to prevent the psychotic onset, when possible, and reduce the damage when primary prevention is no longer applicable. Whether the patient is already in the care of the service, it is possible to reduce the DUP (Duration of Untreated Psychosis) and improve the prognosis regarding general functioning. Pelizza et al., 2022 showed that a psychotherapeutic and/or psychoeducational intervention, during the risk phase, significantly reduces the probability of onset in the following 12 months. Notwithstanding, the intention to create a stage model is somewhat limited by the lack of knowledge of the factors that modulate the level of risk in these individuals.

Symptoms represent an epiphenomenon of an underlying etiopathology. The identification of associated states and outcomes is entirely symptom-based. Indeed, the general pattern underlying the development of psychosis involves the culmination of genetic and environmental factors that may increase (risk factors) or decrease (protective factors) the likelihood of developing psychosis, as well as the interplay between them (Insel, 2010; Radua et al., 2018). In this regard, one strand of scientific research is trying to identify, personality traits that can predict both the level of risk and the likelihood of developing the disorder (Drvaric et al., 2018; Meliante et al., 2021). (Fusar-Poli et al., 2014) found anxiety and depression play a central role in psychotic transition whereas, empirical findings on the role of personality are still controversial, and scarcely comprehensive. A recent meta-analysis (Boldrini et al., 2019) showed that 39.4% of high-risk patients have comorbidity with personality disorders and the most common diagnoses in this clinical population are schizotypal and borderline. Specifically, with the former, there is an overlap in deficits in interpersonal relationships and detachment, while with the latter there is vulnerability to disinhibition, negative affect, emotional dysregulation, anxiety, and depression (Smith et al., 2009; Woods et al., 2009; Debbané et al., 2015). Instead, other studies have focused on identifying the most prevalent personality traits in high-risk patients. Studies based on Personality Inventory for DSM-5 (PID-5; Fossati et al., 2013) highlighted an additional element to distinguish high-risk patients which are detachment, disinhibition, negative affect, and psychoticism (Drvaric et al., 2018, 2018; Meliante et al., 2021).

For this reason, the current study has three main aims: (a) exploring the evolution of the initial diagnosis over 12 months among patients recruited and assigned to three groups (Not at risk, At-risk, Ultra High Risk) (b) assessing differences in social and occupational functioning between the groups (c) identifying common (trans-diagnostic) personality traits of psychotic risk groups.

## 3.2 Materials and Methods

### *Participants*

Of an initial sample of 110 individuals who in 2019 referred to the Youth Mental Health Service for Early Intervention at Niguarda Hospital in Milan (Italy), 97 participants were included in the study. They were 44 males and 53 females with an average age of 20.5 years (SD = 2.17). The following exclusion criteria were applied: a) incomplete personality assessment, (b) diagnosis of intellectual disability or autism, (c) psychotic onset (d) dropouts after 1 year from the first consultation.

Participants completed the routine Programma 2000 assessment which is a youth mental health early intervention service implemented at Niguarda Hospital in Milan, Italy. The metropolitan area served by the program includes about 350,000 inhabitants. The project integrates the management of chronic psychotic disorders with prevention services that promote health and recovery. Patients access this service through spontaneous help-seeking or institution-mediated pathways (e.g., primary care, district mental health services, school counseling, and emergency rooms). Programma 2000 offers an individualized and customizable intervention package that includes cognitive-behavioral psychotherapy, psychoeducational and motivational sessions, family support, and therapeutic group activities (e.g., anxiety management, assertive and problem-solving training, etc., etc.).

### *Procedures*

All the study participants gave their informed consent after being properly informed. The study has been authorized by the Niguarda Hospital in Milan's Ethical Committee (Protocol 305-19052021) and complies with the 1964 Declaration of Helsinki's Principles and any later amendments (World Medical Association, 2013).

The assessment proposed in Programma2000 is a key element in tailoring the intervention package. It consists of socio-demographic data, the Social and Occupational Functioning Assessment, the Early Recognition Inventory-retrospective assessment onset of schizophrenia, and the Personality Inventory for DSM-5. One year after the first assessment, psychiatrists administered the QuickSCID-5 to assess the diagnostic trajectories of the patients taken into care.

### Measures

*Quick Structured Clinical Interview for DSM-5 (SCID-5)*

The instrument is a structured interview created for making the major DSM-5 diagnoses. The QuickSCID-5 consists of ten independent modules: Module A (episodes and mood disorders), Module B (screening for psychotic symptoms), Module C (substance use disorders), Module D (anxiety disorders), Module E (obsessive-compulsive disorder); Module F (attention-deficit/hyperactivity disorder). Module I (screening questions for other disorders), and Module J (questions for exclusion of mental disorders due to other medical conditions). Due to the modular nature, only the modules of interest can be administered (Somma et al., 2020).

*Social and Occupational Functioning Assessment (SOFAS)*

The SOFAS is a clinician-report tool that measures functioning at the time of the assessment. It does not directly depend on how severe the psychological symptoms are, but it primarily concentrates on the person's level of social and occupational functioning (Morosini et al., 2000). Precisely, SOFAS is structured as a comprehensive evaluation of the social and occupational functionality of a patient, rating from “superior functioning in a wide range of activities” (=100) to “inability to function in almost all areas” (<30).

*Early Recognition Inventory-retrospective assessment onset of schizophrenia (Checklist ERIraos)*

The Checklist ERIraos (Maurer et al., 2018) is a semi-structured interview that aims to identify early signs of mental illness evaluating the perceived psychopathological changes and the family history of the subject. It combines the non-specific distress symptoms that may accompany the schizophrenia prodromes (such as social withdrawal and depression, persecutory thoughts, loss of sense of reality, and hallucinations indicating an elevated risk of psychotic development), into a single list of 17 items (Meneghelli et al., 2014). A score ≥ 12 necessitates a referral to the Early Intervention Center for additional investigation.

*Personality Inventory for DSM-5 (PID-5)*

The Personality Inventory for DSM-5 (PID-5) has been created to assess the pathological personality traits of Criteria B in section III of the DSM-5 from a dimensional and inferential-contextual point of view. It is a self-report questionnaire composed of 220 items with a Likert scale (from 0 to 3). PID-5 is structured on 25 facets gathered into 5 main domains of personality traits: detachment, disinhibition, negative affect, antagonism, and psychoticism (Fossati et al., 2013).

## 3.3 Data Analyses

According to the aims, the sample was divided into three different groups based on Programma 2000 assessment and labeled as follows: 1) Ultra-High Risk (UHR): consisting of patients who have exceeded the Checklist cut-off with a score >12. They specifically resulted to be positive for the last 4 items of the Checklist (which refers to frankly psychotic symptoms) and presented the risk factors for UHR diagnosis (family history of schizophrenia, a schizotypal personality disorder, the presence of emerging or worsening attenuated positive symptoms, deterioration of social and occupational functioning); 2) At Risk: consisting of patients who have exceeded the cut-offs for the Checklist but presented neither positivity to the last 4 items of the Checklist nor risk factors for the UHR diagnosis; 3) Not at risk: consisting of all the patients who did not exceed the cut-offs of the assessment's scales for at-risk mental states.

Analyses of skewness and kurtosis were performed to assess the sample's distribution's normality and each variable's results within the acceptable range of ± 2 (Podsakoff et al., 2003). Firstly, the Person's Chi-Square test was conducted to investigate the development of psychotic risk in the sample exploring the evolution of the initial diagnosis over 12 months among patients recruited and assigned to three groups (Not at risk, At Risk, Ultra High Risk). Differences in social and occupational functioning (considering SOFAS scores), among the groups, were then explored by conducting a One-way ANOVA. Finally, a MANOVA was used to investigate common trans-diagnostic personality traits (PID-5) of psychotic risk groups. Both ANOVA and MANOVA Bonferroni multiple comparison tests were led. Analyses were performed using SPSS 25.0 statistical software.

**Table 1.** Socio-Demographics characteristics of the sample.

| Variables | N | % | Tot. | Mean | SD |
|---|---|---|---|---|---|
| Age | | | 97 | 20.5 | 2.17 |
| Gender | | | 97 | | |
| Male | 44 | 45.36 | | | |
| Female | 53 | 54.63 | | | |
| Occupation | | | 97 | | |
| None | 22 | 22.68 | | | |
| Student | 6 | 6.18 | | | |
| Worker | 67 | 68.04 | | | |
| Misuse of alcohol | | | 97 | | |
| None | 77 | 79.38 | | | |
| Yes | 13 | 13.40 | | | |
| Suspected | 7 | 7.22 | | | |
| Misuse of substances | | | 97 | | |
| None | 71 | 73.19 | | | |
| Yes | 24 | 24.74 | | | |
| Suspected | 2 | 2.06 | | | |
| Previous contacts with child neuropsychiatry (yes) | 45 | 46.39 | 97 | | |
| Familiarity with psychic disorder (yes) | 46 | 47.42 | 97 | | |

## 3.4 Results

The sample, aged 18 to 25 years with a mean age of 20.5 (SD = 2.17), was composed of 45.36% (=44) of males and 54.63% (=53) of females. Participants' demographic information is reported in Table 1 including habits in misusing alcohol and substances. Most of the sample had previous contact with Child Neuropsychiatry (=45) and familiarity with psychotic disorder (=46). According to the SCID-5, the sample was divided into eight macro diagnostic categories: psychosis (=15), personality disorders (=32), bipolar disorder (=5), anxiety/depression (=27), substance/alcohol use disorders (=1), eating disorders (=2), trauma and stress-related disorders (=13), and dissociative identity disorder (=2). Pearson's Chi-square test was performed to analyze the evolution of the initial diagnosis over 12 months. As shown in Table 2, results revealed a significant association between the eight categories after one year ($\chi^2$= 45.04; p=.000). Participants were then analyzed for their levels of social and occupational functioning. Overall, the sample presented a moderate score for SOFAS (M=60, SD=13.43) with a minimum score of 20 and a maximum of 85. Differences in social and occupational functioning among the three groups (Not at risk, At Risk, Ultra High Risk) were explored with a one-way ANOVA. The results (F(2,94)= 9.068; p<.001) and the Bonferroni Post-Hoc (Table 3) showed higher levels of social and occupational functioning in the Not at-risk group (M=63.86) compared to the Ultra High Risk (M=52.34) for p =.004, and At Risk (M=63.72) groups for p =.000.

Finally, to investigate common trans-diagnostic personality traits (PID-5) between groups a MANOVA was required. A main effect in the three groups emerged for the PID-5 domains of detachment and disinhibition (Wilks's $\Lambda$ = .702; F=3.478; $\eta_{partial}$ =0.162, p<.001) as shown in Table 3. Negative affect and psychoticism were found to be significant on the Levene test and thus excluded from the investigation whereas antagonism was not significant in the Post-Hoc analysis. According to Bonferroni multiple comparison tests, significant differences were confirmed between groups for detachment [F(2,94)=6.214; p=.003; $\eta_{partial}$ =117] and disinhibition [F(2,94)=4.215; p=.018; $\eta_{partial}$ =.082]. Specifically, the detachment was found to be higher in the group At Risk (M=1.39) compared to that one Not at risk (M=.90) for p=.003, as well as disinhibition for which the group At Risk (M=1.19) and Ultra High Risk (M=1.24) reported higher scores in comparison to the Not at risk group (M=.91).

**Table 2.** Diagnostic trajectories after 1 year from the evaluation of risk for psychosis

| Variables | Not at Risk | At Risk | High Risk | Tot. | *p value* |
|---|---|---|---|---|---|
| N | 21 | 44 | 32 | 97 | |
| % | 21.65% | 45.36% | 32.98% | 100% | |
| Primary diagnosis after one year | | | | | **.000[a]** |
| *Psychosis* | 0 | 2 | 13 | 15 | |
| % On total sample | 0 | 2.1% | 13.4 | 15.5 | |
| % On Group of Risk | 0 | 4.5% | 40.6 | | |
| *Personality disorders* | 7 | 11 | 14 | 32 | |
| % On total sample | 7.2 | 11.34 | 14.43 | 32.97 | |
| % On group of Risk | 33.3 | 25 | 43.7 | 100 | |
| *Bipolar disorders* | 0 | 2 | 3 | 5 | |
| % On the total sample | 0 | 2.1 | 3.1 | 5,1 | |
| % On the group of Risk | 0 | 4.5 | 9,4 | | |
| *Anxiety/Depression* | 10 | 15 | 2 | 27 | |
| % On total sample | 10.3 | 15.5 | 2.06 | 27.8 | |
| % On group of risk | 47.6 | 34.1 | 6.3 | | |
| *Substance/alcohol use disorders* | 0 | 1 | 0 | 1 | |
| % On total sample | 0 | 1.0 | 0 | 1.0 | |
| % On group of risk | 0 | 2.3 | 0 | | |
| *Eating disorders* | 0 | 2 | 0 | 2 | |
| % On total sample | 0 | 2.1 | 0 | 2.1 | |
| % On group of Risk | 0 | 4.5 | 0 | | |
| *Trauma and stress related disorders* | 3 | 10 | 0 | 13 | |
| % On total sample | 3,1 | 10.3 | 0 | 13.4 | |
| % On group of Risk | 14.3 | 27.7 | 0 | | |
| *Dissociative Identity disorder* | 1 | 1 | 0 | 2 | |
| % On total sample | 1.0 | 1.0 | 0 | 2.1 | |
| % On group of Risk | 4.7 | 2.27 | 0 | | |

## 3.5 Discussion

Research on at risk mental states is a crucial field of investigation with implications for early intervention (Carrión et al., 2013; Kraan et al., 2017; van der Gaag et al., 2019; Joa et al., 2021). Studies have intensively focused on predictors of psychotic onset to minimize the likelihood of transition and improve social and occupational functioning.

For this reason, the current study's first aim was to explore the evolution of the initial diagnosis over 12 months among patients recruited and assigned to Not At risk, At-risk, and Ultra-High-Risk (UHR) groups. One year after the first assessment, the most prevalent category diagnoses were anxiety/depression, personality disorders, and psychosis in the total sample. Specifically, the most common diagnosis in the UHR group was psychosis (40.6%). This result is in line with Yung et. al (2003) who found that 40.8% of the high-risk youths had a psychotic onset after one year. It is possible that the number of transitions would have been greater whether, during the year, UHR patients had not received a psychological – or pharmacological, as required – intervention tailored to their needs (Yung et al., 2003, 2004).

Once the diagnostic categories most associated with high psychotic risk were established, differences in the level of social, occupational functioning, and personality traits were identified. Again, the lowest social and occupational functioning scores were found in the UHR group. Similar findings have been found in previous studies (Yung et al., 2004; Fusar-Poli, 2017; Radua et al., 2018). Specifically, the high-risk population presents a poor quality of life and impairment in social and occupational functioning (Yung and McGorry, 1996; Olvet et al., 2015; Fusar-Poli et al., 2016). These shortcomings are due to negative symptoms, disorganization, metacognitive deficits, and consequently an impaired Theory of Mind (Lin et al., 2012; Carrión et al., 2013; Yung et al., 2015; Kraan et al., 2017). Cotter et al., 2019 highlighted three potential factors that may influence the shortcomings which are (a) exposure to adverse life experiences, (b) the presence of positive and negative symptoms, and (c) cognitive dysfunction. The last two would directly impact social functioning; while having experienced adverse events would negatively affect self-esteem and self-efficacy, elements in themselves responsible for metacognitive defunctions, and self-stigmatizing attitudes, which can reduce social functioning.

Concerning differences in PID-5 personality traits, the highest scores, in detachment and disinhibition, were found in At-risk and UHR groups. Detachment was found to be a prevalent trait in people with psychotic risk (Meliante et al., 2021). It manifests as avoidance of emotions, social

situations, interpersonal withdrawal, and anhedonia. This pattern is consistent with widespread negative symptoms in psychotic risk patients (Freeman and Garety, 2014; Meliante et al., 2021). Moreover, according to research, avoidant behavior (expression of detachment) should be conceived as an attempt to manage positive symptoms by limiting disturbing external stimuli (Pallanti et al., 2000; McMillan et al., 2009). On this line, it is possible to hypothesize that these behaviors are directly involved in poor functioning and unsatisfactory quality of life (Cotter et al., 2019).

Individuals with high disinhibition traits engage in impulsive behaviors without thinking about possible future consequences (Krueger et al., 2012). The high scores, obtained by UHR patients in this dimension, were somehow expected and corroborates previous research (Yung et al., 2019; Hazan et al., 2020). Usually, high levels of disinhibition are common among patients diagnosed with borderline personality disorder (Boldrini et al., 2019; Longenecker et al., 2020). The results obtained in the current study could be explained in different ways. Recent research has focused on identifying the most prevalent personality disorders in high-risk patients, finding BPD as the most prevalent one (Barbato et al., 2014; Brüne et al., 2019)(Ryan et al., 2017; Boldrini et al., 2019). High scores in disinhibition for UHRs can be explained by appealing to distractibility – one of the facets present in the disinhibition factor. It is known that UHR patients present difficulties in concentration, planning activities, and time management (Cotter et al., 2019), elements highly correlated with high levels of distractibility (Mukwevho, 2018).

To conclude the discussion on personality traits, remarks on negative affect, antagonism, and psychoticism are considered appropriate. No statistically significant differences were found between the groups for the traits. Previous studies – which have instead found a significant difference in the levels of negative affect – compared groups of patients with psychosis vs psychiatric patients with different diagnoses, or patients at high psychotic risk vs healthy controls (Uliaszek et al., 2015; Bastiaens et al., 2019). Thus, probably the lack of significance presented in the current study can be attributed to the type of groups compared. Antagonism is a personality domain not involved in psychotic risk (Fresán et al., 2015; van der Gaag et al., 2019). Regarding psychoticism, the results obtained confirmed those of Drvaric et al. (2018). Indeed, although psychoticism is defined as a set of unusual beliefs and experiences, eccentricity, and perceptual dysregulation (Krueger et al., 2012), no significant differences emerged between the groups. This could mean that psychoticism does not discriminate between psychotic and non-psychotic patients

(Longenecker et al., 2020) and it cannot be considered a trans-diagnostic trait that increases the psychotic risk (Bastiaens et al., 2019).

The study presents different limitations. First, the sample dimension is limited. Second, although the study is longitudinal, only two measures were included. Third, SCID-5 was only administrated during the assessment after one year. Lastly, the impact of Covid-19 was not evaluated. Further studies will be undoubtedly needed.

## 3.6 Conclusion

Results obtained by the current study should be considered a first attempt to better understand the diagnostic trajectories and trans-diagnostic personality traits in a group of young help-seekers, specifically in UHR. Findings have two main clinical implications: (a) Psychotherapy should focus specifically on maladaptive traits (b) Treatments for UHR should implement training aimed at improving social and occupational skills. All the traits and impairments identified in this clinical population are disabling during emerging adulthood, a stage of life in which succeeding well socially becomes critical to establishing oneself scholastically, occupationally, and above all, to enjoying satisfying interpersonal relationships (Velthorst et al., 2010).

To improve the clinical utility of psychosis classification systems, it is necessary to consider how symptoms may reflect dimensions of psychopathology that go beyond the boundaries of traditional diagnostic classifications (Longenecker et al., 2020).

# Chapter 4

# Study 3 - Psychometric Evaluation and Predictive Modeling of the Certainty About Mental States Questionnaire

## 4.1 Introduction

This research aims to replicate the validation study conducted by Müller et al. (2023). To achieve this objective, the Italian version of the Certainty About Mental States Questionnaire (CAMSQ; Müller et al., 2023) was psychometrically tested as a self-report measure of perceived mentalizing capacity.

After the Explorative Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), CAMSQ convergent and discriminant correlations were assessed. The study examined the relationship between the CAMSQ and constructs associated with perceived mentalizing capacity. Specifically, Reflective Functioning [Reflective Functioning Questionnaire (RFQ-8); Morandotti et al., 2018] and measures of empathy [Empathy Quotient (EQ); Preti et al., 2011] were used to assess mentalizing of the self, while measures of perspective-taking [Reading the Mind in the Eyes Test (RMET); Baron-Cohen et al., 2001] were used to evaluate mentalizing of others. Affective empathy, encompassing emotional or behavioral responses to others' mental states such as empathic concern, sympathy, and compassion, was expected to show relatively low correlations due to its conceptual differences from inferring others' mental states. Considering that the CAMSQ evaluates perceived success in mentalizing activities, potentially influenced by positive self-views, correlations were also examined with constructs related to positive self-evaluation, namely self-esteem and subclinical narcissism [Narcissistic Admiration Rivalry Questionnaire (NARQ); Vecchione et al., 2018]. Despite previous findings indicating minimal convergence between self-reported mentalizing capacity and performance in emotion recognition tasks (e.g., Fonagy et al., 2016; Murphy & Lilienfeld, 2019), it was employed performance measures to operationalize perceived mentalizing capacity by querying respondents about their perceived performance in tasks. Given the CAMSQ's focus on perceived mentalizing capacity, it was hypothesized that the

CAMSQ would correlate with perceived performance in emotion recognition tasks. The results obtained are reported in Table 4.

## 4.2 Materials and Method

### *Participants*

In this study, inclusion criteria were strictly applied to ensure participants were adults aged between 18 and 70 years, proficient in Italian as their native language, and capable of providing informed consent. To enforce these criteria, responses to questions regarding age and Italian language proficiency were programmed to prevent progression to subsequent survey sections for those not meeting these requirements. Considering inclusion and exclusion criteria, a total of 571 participants were recruited online based on voluntary participation. The survey was administered using Qualtrics and disseminated across social media platforms including WhatsApp, LinkedIn, Facebook, and Instagram. Detailed demographic characteristics of the sample are presented in Table 1.

### *Procedure*

The present study was approved by the Ethical Committee of Catholic University of Sacred Heart, Milan, Italy (protocol 13-24) and complies with the Guidelines of the 1964 Declaration of Helsinki and its later amendment (World Medical Association, 2013). Informed consent was obtained during the survey from subjects who decided to be involved in the study.

### *Instruments*

*The Certainty About Mental States Questionnaire* (CAMSQ; Müller et al., 2021) is a self-report tool that measures perceived mentalizing capacity, which is the ability to understand one's own and others' mental states. It includes 20 items rated on a 7-point Likert scale (1 = never to 7 = always). The questionnaire aims to assess two aspects of mentalizing: certainty about one's own mental states and certainty about others' mental states. The back-translation method was used to ensure that the meaning conveyed by the items is comparable in the Italian language. The Italian version of the questionnaire is included in the supplementary material at the end of the dissertation.
*The Reading the Mind in the Eyes Test* (RMET; Baron-Cohen et al., 2001) is a measure based on a task of 36 items that evaluates emotion recognition based on visual cues. Participants view photographs of the eye region of individuals and are asked to select which of four presented terms

best describes the target's mental state (e.g., Item 12: "skeptical", "indifferent", "embarrassed", "discouraged").

*The Reflective Functioning Questionnaire* (Morandotti et al., 2018) is an 8-item self-report tool used to assess reflective functioning. It identifies two dimensions: the degree of certainty and uncertainty in mentalizing. Items are rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree).

*The Empathy Quotient* (EQ; Preti et al., 2011) is a 60-item self-report measure of empathy that provides an empathy quotient score. This study will use, as done by Müller et al. (2021) for the German and American validation, only the 10-item cognitive empathy scale and the 11-item emotional reactivity scale (totaling 21 items). Items are rated on a 4-point scale ranging from true (1) to false (4).

*The Narcissistic Admiration and Rivalry Questionnaire* (NARQ; Vecchione et al., 2018) was developed to assess "normal" narcissism as a personality trait in the general, non-clinical population. It consists of 18 items rated on a 6-point Likert scale (1 = strongly disagree to 6 = strongly agree). Each dimension includes three facets, with three items per facet. The facets of narcissistic admiration are grandiosity, uniqueness, and charm, while the facets of narcissistic rivalry are devaluation, supremacy, and aggressiveness.

*Reading the Mind in the Eyes Test* (RMET; Baron-Cohen et al., 2001) is a measure based on a 36-item task that assesses the recognition of emotions from visual cues. In the task, participants view black-and-white photographs of the eye region of individuals and are asked to select which of the four presented terms best describes the target's mental state (e.g., Item 12: "skeptical," "indifferent," "embarrassed," and "discouraged").

## 4.3 Data Analyses

The sample's normality distribution was assumed considering skewness and kurtosis. All the variables were within the acceptable range between −2 and +2 (Podsakoff et al., 2003). First, descriptive statistics were required. Participants' demographic information is shown in Table 1.

Following, descriptive analyses and intercorrelation were performed with SPSS 27.0, whereas EFA and CFA were run on JASP 0.19.0.

**Table 1.** Descriptive statistics of the sample.

| Gender | N | % |
|---|---|---|
| Male | 226 | 39.5 |
| Female | 343 | 60.0 |
| Non-binary | 1 | .2 |
| I prefer not to say | 1 | .2 |
| Total | 571 | 100 |
| Educational Level | | |
| Student | 58 | 10.1 |
| Student/worker | 75 | 13.1 |
| Employed | 334 | 58.5 |
| Unemployed | 48 | 8.4 |
| Stay-at-home | 43 | 7.5 |
| Retired | 13 | 2.3 |
| Total | 571 | 100 |
| Geographical position | | |
| North of Italy | 350 | 61.3 |
| Central Italy | 71 | 12.4 |
| South of Italy and Islands | 146 | 25.5 |
| Abroad | 4 | .7 |
| Total | 571 | 100 |
| Psychotherapy | | |
| Yes | 203 | 35.6 |
| No | 367 | 64.4 |
| Total | 570 | 100 |

## 4.4 Results: Factor Structure

An exploratory analysis of participants' scores was performed to identify the major dimension of mentalization. Parallel analysis criteria were used to determine the appropriate number of factors to retain: the scree test (Cattell, 1966), the Kaiser rule (i.e. eigenvalues ≥ 1), and Oblimin rotations.

From 20 final items, results suggested retaining 2 latent factors that replicated the 2-factor structure proposed by Müller et al. (2021) and accounted for 47% of the variance. The Kaiser–Meyer–Olkin (KMO) - a measure of sampling adequacy - was 0.94, indicating that the factor solution is likely to be stable. The standardized factor loadings with Oblimin rotation are reported in Table (2).

**Table 2.** Factor Loading of mentalization with Oblimin rotation.

| | Factors | |
|---|---|---|
| | Self-Certainty | Other-Certainty |
| Item 1 | **.695** | |
| Item 2 | .142 | **.472** |
| Item 3 | | **.581** |
| Item 4 | **.655** | |
| Item 5 | **.688** | |
| Item 6 | .134 | **.530** |
| Item 7 | **.650** | .118 |
| Item 8 | | **.847** |
| Item 9 | **.800** | |
| Item 10 | -.199 | **.939** |
| Item 11 | **.592** | |
| Item 12 | | **.784** |
| Item 13 | **.578** | .111 |
| Item 14 | **.644** | |
| Item 15 | .201 | **.481** |
| Item 16 | **.766** | |
| Item 17 | .163 | **.540** |
| Item 18 | .159 | **.531** |
| Item 19 | .149 | **.584** |
| Item 20 | **.412** | .291 |

Note. N= 558. *Primary factor loadings are in bold.*

The first factor (self-certainty) is composed of the following items: 1, 4, 5,7, 9, 11, 13, 14, 16, 20. Whereas, the second factor (other- certainty) comprised items 2, 3, 6, 8, 10, 12, 15, 17, 18, 19. The factor correlation matrix indicates that the correlation between the factors is .68.

The results from this exploratory study confirm the presence of an underlying structure in the Italian sample identical to the German and American samples (Muller et al., 2021). This first study was exploratory, and a more consistent confirmatory analysis was needed to support the structure. This was addressed in the next paragraph.

## 4.5 Results: Is the Two-Factor Structure Stable?

Considering the previously published studies (Müller et al., 2023), a CFA was conducted to test the stability of the factor extracted from the EFA. The model parameters were estimated using the maximum likelihood (ML) fit function. The model's goodness of fit was evaluated with the chi-square ($\chi^2$) test and selected global fit indices, following the recommendations of Hu and Bentler (1999). The assumption of multivariate normality was tested and confirmed.

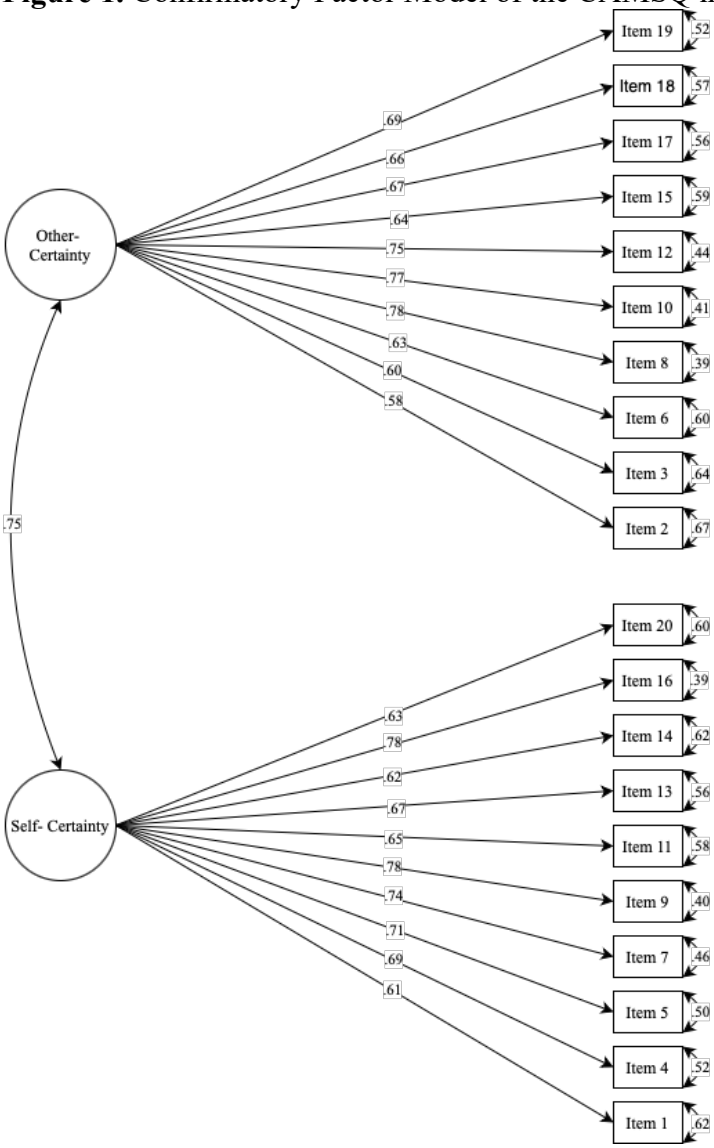
Three types of global fit indices were applied: Comparative Fit Index (CFI), with a cutoff value of ≥.90 (Hooper et al., 2008); Root Mean Square Error of Approximation (RMSEA), with a cutoff value of <.08 (Hooper et al., 2008); Standardized Root Mean Square Residual (SRMR), with a cutoff value of ≤.08 (Hooper et al., 2008).

A critical alpha level (α) of .05 was assumed for all analyses. The model estimates from the CFA are illustrated in Figure 1. The fit indices obtained from the tested model were CFI = .90, RMSEA = .08, and SRMR = .052. These values indicate an acceptable model fit, confirming the stability of the model.

**Table 3.** Descriptive statistics of two-factor structure.

| | M | SD |
|---|---|---|
| Self-Certainity | 4.41 | .79 |
| Other- Certainity | 4.11 | .77 |

**Figure 1.** Confirmatory Factor Model of the CAMSQ in the Italian sample.




Note. Confirmatory Factor Models of the CAMSQ in the Italian sample (N=558). Standardized estimates are displayed. Item numbers of the final CAMSQ are shown (see Appendix). Residual variances are not displayed. Model fit was $\chi 2(169) = 745.57$, CFI = .90, RMSEA = .80, SRMR = .05. CAMSQ = Certainty About Mental States Questionnaire; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

## 4.6 Convergent and Discriminant Validity

Using the final CAMSQ, nomological networks in terms of convergent and discriminant Correlations were explored. RFQ (Fonagy et al., 2016; Morandotti et al., 2018) as a measure concerning mentalizing the self, while, using measure of cognitive empathy and perspective-taking as a measure relating to mentalizing others (e.g., Baron-Cohen et al., 2001). *Social Skills* are the ability to effectively and appropriately interact and communicate with others, understanding and responding to their feelings and perspectives (Baron-Cohen et al., 2004). As inferring other's mental states, interacting and communicating with others properly are conceptually different, we expected a low correlation between Other-Certainty and social skills (factor of Empathy Quotient; Preti et al., 2011). Given that the CAMSQ is intended to evaluate the perceived success of one's mentalizing abilities and may be influenced by positive self-views, we also explored correlations with constructs related to positive self-assessment, such as self-esteem and subclinical narcissism (measured with NARQ; Vecchione et al., 2018). Additionally, we included performance measures for emotion recognition. Fonagy et al. (2016) and Murphy & Lilienfeld (2019) revealed a low correlation between performance in emotion recognition tasks and self-reported mentalizing capacity, so we did not anticipate finding strong association – but still statistically significant – between the CAMSQ and these tasks (Müller et al., 2023).

### *Results of Convergent and Divergent Validity*

The correlation patterns of Self- and Other-Certainty indicated moderate convergent correlations and comparatively lower discriminant correlations (please see table 4). Specifically, the strongest correlates of Other-Certainty were the cognitive empathy scale (r=.43) and admiration (r=.247), whereas associations with EQ social skills weren't significant. RFQ-8 uncertainty about mental states, and NARQ Rivality were less pronounced. Self-Certainty correlated most strongly with EQ social skills (r = .39) and EQ cognitive empathy (r = .34). Consistent with the expectations, certainty about mental states as reflected in the CAMSQ scales was associated with emotion recognition tasks (i.e., RMET). In line with meta-analytic findings, the other self-report measures of social-cognitive abilities also explained little variance in the tasks. Importantly, higher certainty about mental states was linked to higher perceived performance in the emotion recognition tasks ($.16 \leq r \leq .21$).

**Table 4.** Convergent and Discriminant Correlations of the CAMSQ in Italian sample.

| | Self-Certainty | Other-Certainty |
|---|---|---|
| Measures | | |
| RFQ Uncertainty | -.20 | -.102* |
| RFQ Certainty | -.056 | -.029 |
| EQ Social skills | .386** | .259 |
| EQ cognitive empathy | .335** | .428** |
| RMET | .148** | .093* |
| Task performance | .164** | .208** |
| NARQ Rivality | .005 | .109* |
| NARQ Admiration | .212** | .247** |

Note. N = 472. CAMSQ = Certainty About Mental States Questionnaire; RFQ-8 = Reflective Functioning Questionnaire (8-item version); EQ = Empathy Quotient; NARQ = Narcissistic Admiration and Rivalry Questionnaire; RMET = Reading the Mind in the Eyes Test; *p < .05; **p< .01; absence of asterisk means non statistically significant.

## 4.7 Discussion

In this initial phase, the study sought to evaluate the validity and reliability of the Italian version of the CAMSQ. The researchers identified two empirically related but distinct factors within the 20-item measure: Self-Certainty and Other-Certainty. They noted that the CAMSQ scales fit within a theoretical framework that showed plausible convergent and discriminant correlations. Specifically, Other-Certainty correlates with measures related to understanding others' mental states, such as cognitive empathy and perceived performance in emotion recognition tasks, while Self-Certainty correlates with social skills, cognitive empathy, and task performance. No statistically significant correlations were found between RFQ Uncertainty and Self-Certainty; however, a weak inverse correlation was observed between RFQ Uncertainty and Other-Certainty. This result was unexpected but can be explained by the research of Müller et al. (2022), which highlighted strong statistical limitations of the RFQ related to item content, scoring procedures, and dimensionality. Overall, the results for convergent and discriminant validity were not strong, which should be acknowledged as a study limitation.

# Chapter 5

# Study 4 - Does Self and Other-Certainty About Mental States Influence Psychoticism and Schizotypal Features?

## 5.1 Introduction

Study 4 aims to investigate the relationship between the CAMSQ and levels of psychopathology. Specifically, given that one of the objectives of this doctoral thesis is to examine the trait of psychotic risk and mentalization, specific results will be reported. It is hypothesized that Self-Certainty and Other-Certainty will be negatively and positively correlated, respectively, with levels of psychoticism and schizotypal features (cognitive-perceptual, interpersonal, disorganization).

## 5.2 Instruments and Methods

The present study (study 4) is a follow-up to study 3 (Chapter 4). Therefore, the procedure, participants, and ethical committee remain the same as in the previous study. For more details, please refer to page 63.

### *Instruments*

*The Certainty About Mental States Questionnaire* (CAMSQ; Müller et al., 2021) translated into Italian was used. Psychometrics proprieties of the instruments and description of the scale are reported in Chapter 4 (pp. 61-72).

*The Personality Inventory for DSM-5 Brief Form* (PID-5 BF; Fossati et al., 2017) is a self-report questionnaire developed to assess Section III DSM-5 criteria B (maladaptive personality traits) using a dimensional approach. It consists of 25 items rated on a 4-point scale (0 = very false or often false to 3 = very true or often true), capturing five primary trait domains: Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism.

*The Schizotypal Personality Questionnaire-Brief* (SPQ-B; Fonseca-Pedrero et al., 2018) is a self-report tool consisting of three factors (cognitive-perceptual, interpersonal, and disorganized) that provides an index of schizotypy. The SPQ-B comprises 22 statements, to which participants respond "yes" or "no" based on whether they have experienced the events described in the items.

## 5.3 Data Analyses

Analyses were performed with SPSS 27.0 and R Studio (Lavaan package; version 0.6.15). Intercorrelations between the investigated variables (negative affectivity, antagonism, disinhibition, detachment, psychoticism, schizotypal features) were calculated as a preliminary analysis. A critical alpha level (α) of .05 was assumed for all analyses.

A path analysis was conducted to test the direct effect of self-certainty and other-certainty on psychoticism and schizotypal features (cognitive-perceptual, disorganization, and interpersonal). Maximum Likelihood Estimation was used to test the models. A bootstrapping test (n boots = 1000) was used to calculate the bias-corrected confidence intervals (CI: 95%).

The model converged successfully after 44 iterations using the Maximum Likelihood (ML) estimator and the NLMINB optimization method. A total of 572 observations were collected, out of which 501 were utilized in the final analysis due to data completeness and quality considerations.

### Model Fit Indices

For the tested model (Figure 2), the goodness of fit was evaluated using $\chi^2$ significance tests (Cheung & Rensvold, 2002; Bentler & Bonett, 1980), the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). A CFI higher than .90 is considered acceptable, and scores of RMSEA and SRMR lower than .08 indicate an admissible fit (Marsh et al., 2004). All the fit indices used suggested an excellent fit to the observed data.

The $\chi^2$ significance test for the model was 0.667 with 1 degree of freedom, yielding a p-value of .414. This indicates that the model fits the data well, as the null hypothesis that the model fits the data was not rejected ($\chi^2(1) = 0.667$, $p = 0.414$). The Comparative Fit Index (CFI) was 1.000, indicating an excellent fit of the model relative to the baseline model. The Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR) provided additional measures of model fit. The RMSEA was 0.000, with a 90% confidence interval ranging from 0.000 to 0.110. The p-value for the null hypothesis that RMSEA $\leq 0.050$ was 0.645, and the p-value for RMSEA $\geq 0.080$ was 0.160, both indicating a good fit. The SRMR was 0.007, indicating an excellent fit between the model and the observed data.

## 5.4 Results

Descriptive statistics and intercorrelations are reported in tables 4 and 5.

**Table 4.** *Descriptive Statistics and Internal Consistency among the Variables*.

| | *N* | *M* | *SD* | *Omega* | *Spearman-Brown* |
|---|---|---|---|---|---|
| 1. Self-Certainty | 558 | 4.413 | .793 | .890 | .862 |
| 2. Other-Certainty | 558 | 4.115 | .779 | .893 | .846 |
| 3. Psychoticism | 522 | 2.013 | .712 | .815 | .801 |
| 4. Cognitive-Perceptual | 501 | 3.083 | 2.150 | .700 | .700 |
| 5. Disorganized | 501 | 1.820 | 1.751 | .763 | .774 |
| 6. Interpersonal | 501 | 3.860 | 2.370 | .712 | .707 |
| 7. Negative affectivity | 522 | 2.414 | .644 | .708 | .632 |
| 8. Antagonism | 522 | 1.823 | .690 | .881 | .782 |
| 9. Disinhibition | 522 | 1.944 | .657 | .771 | .702 |
| 10. Detachment | 522 | 2.134 | .698 | .761 | .777 |

Intercorrelations among the variables are reported in Table 5. There were no significant correlations found between psychoticism and Other-Certainty, Self-Certainty and Other-Certainty with cognitive-perceptual dimensions, nor between the disorganized dimension and Other-Certainty. These preliminary results support the application of the model.

**Table 5.** Intercorrelations among the Variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Self-Certainty | - | | | | | | | | | |
| 2. Other-Certainty | .693** | - | | | | | | | | |
| 3. Psychoticism | -.218** | *ns* | - | | | | | | | |
| 4. Cognitive-Perceptual | *ns* | *ns* | .445** | - | | | | | | |
| 5. Disorganized | -.172** | *ns* | .55** | .552** | - | | | | | |
| 6. Interpersonal | -.230** | -.136** | .335** | .459** | .412** | - | | | | |
| 7. Negative Affectivity | -.197** | ns | .564** | .407** | 350** | .427** | - | | | |
| 8. Antagonism | -.148** | ns | .732** | .352** | .384** | .210** | .464** | - | | |
| 9. Disinhibition | -.199** | ns | .677** | .393** | .449** | .216** | .492** | .656** | - | |
| 10. Detachment | -.246** | -.106* | .582** | .375** | .448** | .513** | 472** | .533** | 512** | - |

*Note: **p<.01*; ns= non-significant correlation, p>.05

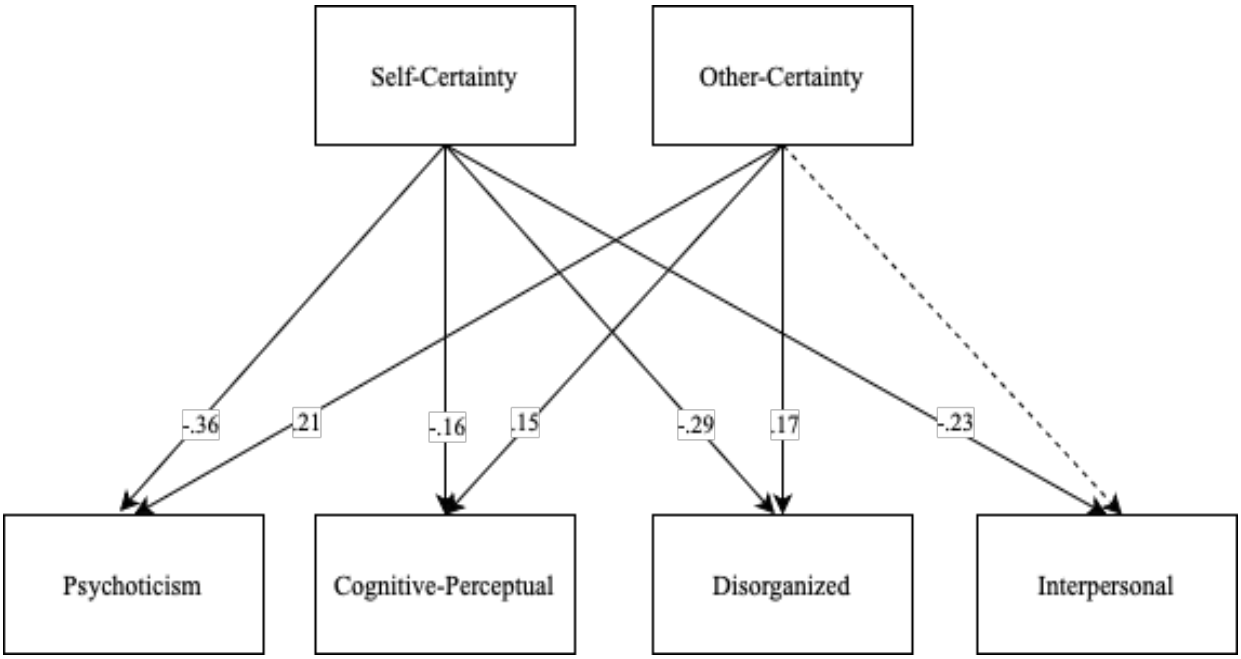
## Path Coefficients

The standardized and unstandardized path coefficients, and their standard errors, low and upper confidence intervals, and p-values, are presented below (table 6). Most pathways from Self-Certainty and Other-Certainty to the outcome variables (psychoticism, cognitive-perceptual, interpersonal, and disorganized dimensions) were statistically significant (figure 2). However, Other-Certainty did not significantly predict the interpersonal dimension of schizotypy.

The model, presented in Figure 2 had excellent fit indices [$\chi^2(1) = 0.667$, $p = 0.414$; CFI = 1.000, RMSEA= .000 and SRMR= 0.007]. The estimated model explained a modest but significant portion of the variance of psychoticism ($R^2 = .069$), cognitive-perceptual ($R^2 = .014$), disorganized ($R^2 = 0.044$), and interpersonal dimensions ($R^2 = 0.053$).

Self-Certainty about mental states had a significant negative effect on psychoticism (β= -.363, p<.001), cognitive-perceptual (β=-.155, p=.01), disorganized (β=-.289, p <. 001), and interpersonal dimensions (β= -.230, p<.001). Moreover, Other-Certainty about mental states had a significant positive effect on psychoticism (β= 0.214, p<.001), cognitive-perceptual (β= .150, p=.01), and disorganized dimensions (β= .166, p=.002). The results indicate that higher self-certainty about mental states is associated with lower levels of psychoticism, cognitive-perceptual issues, disorganization, and interpersonal problems, whereas higher certainty about others' mental states is associated with higher levels of psychoticism, cognitive-perceptual issues, and disorganization.

**Figure 2.** Path model with coefficients




*Note.* Dashed lines mean no statistical significance was revealed. P-values are reported in Table 6.

The plot (N = 501) represents the effects of self and other certainties about mental states on psychoticism and schizotypal features (cognitive-perceptual, disorganized, and interpersonal).

**Table 6.** Coefficients Model

| *Predictor* | *DV* | *b* | *SE* | *β* | *LCI* | *UCI* | *p Value* |
|---|---|---|---|---|---|---|---|
| Self-Certainty | Psychoticism | -.327 | .053 | -.*363*** | -.432 | -.*222* | .000 |
| | Cognitive Perceptual | -.419 | .159 | -.155* | -.731 | -.107 | .008 |
| | Disorganized | -.635 | .127 | -.289* | -.885 | -.385 | .002 |
| | Interpersonal | -.686 | .130 | -.230* | -.686 | -.230 | *.001* |
| Other Certainty | Psychoticism | .193 | .052 | .214** | .092 | *.294* | .000 |
| | Cognitive Perceptual | .406 | .150 | -.289* | .111 | .701 | .002 |
| | Disorganized | .367 | 0.118 | .166* | .135 | .599 | *.002* |
| *Total effects* | | | | | | | |
| | Psychoticism | -.196 | .047 | -.227** | -.288 | -.104 | .000 |
| | Cognitive Perceptual | -.183 | .179 | -.029 | -.534 | .168 | .305 |
| | Disorganized | -.501 | .149 | -.171* | -.793 | -.209 | .001 |

*Note. **p < .001; *p<.01*

## 5.5 Discussion

Study 4 aimed to explore the relationships between Self-Certainty, Other-Certainty, psychoticism, and schizotypal traits, aiming to clarify how self- and other-related certainties might differentially impact these dimensions. It was hypothesized that Self-Certainty would be negatively correlated with psychoticism and schizotypal features, serving as protective factor, while Other-Certainty would be positively correlated with these outcomes, potentially contributing to vulnerability. The findings partially support these hypotheses, offering new insights into these complex relationships.

Specifically, the path model revealed that pathways from Self-Certainty to psychoticism and the three dimensions of schizotypy – cognitive-perceptual, interpersonal, and disorganized – were statistically significant. This suggests that individuals with higher levels of Self-Certainty tend to exhibit lower levels of psychotic traits and schizotypal characteristics, supporting Self-Certainty as a potential protective factor against psychotic and schizotypal symptoms (Nonweiler et al., 2023). These results reinforce the idea that a stable sense of self may buffer individuals against the risk of psychosis by fostering resilience, potentially through mechanisms related to identity consolidation and self-coherence.

For Other-Certainty, the model showed statistically significant pathways to psychoticism and the cognitive-perceptual and disorganized dimensions of schizotypy, aligning with our hypothesis and previous literature (Simonsen et al., 2020). This indicates that higher levels of Other-Certainty may relate to increased risk for certain psychotic and schizotypal symptoms, particularly those that influence one's perception and organizational thought processes. These findings imply that certainty about others, when excessive, could reflect or contribute to a more rigid, potentially mistrustful social worldview, which in turn might exacerbate certain schizotypal characteristics.

However, contrary to the initial hypothesis, Other-Certainty did not significantly predict the interpersonal dimension of schizotypy. This non-significant relationship suggests that Other-Certainty may influence cognitive-perceptual and disorganized schizotypal traits, it does not have the same effect on interpersonal aspects. One possible explanation is that interpersonal schizotypy may be more closely related to social skills and empathy, which are not directly influenced by general certainty about others (Henry et al., 2008). Additionally, other unmeasured factors – such as attachment styles or social anxiety – may be more directly implicated in the interpersonal dimension of schizotypy (Berry et al., 2007). This suggests that interpersonal schizotypy could

arise from unique psychosocial factors distinct from those that impact cognitive-perceptual and disorganized features.

These findings have several implications. First, they underscore the importance of distinguishing between Self-Certainty and Other-Certainty when assessing risk factors for psychosis and schizotypal traits. The differential impact of these certainties highlights that self-related beliefs might protect against, while other-related beliefs could exacerbate, certain psychotic symptoms. Second, these results underscore the multifaceted nature of schizotypal traits, supporting the notion that different dimensions of schizotypy may arise from distinct psychological mechanisms (Claridge & Beech, 1995; Lenzenweger, 2010).

Clinically, these findings imply that fostering Self-Certainty could be advantageous in early interventions for individuals at elevated risk for psychosis. Supporting self-reflection, personal stability, and confidence in one's identity might serve as a preventive approach, potentially reducing the likelihood of psychotic symptom progression. Additionally, our results support a framework in which challenges in mentalizing significantly influence the connection between schizotypal traits and symptoms relevant to Clinical High-Risk for Psychosis (CHR-P). This aligns with findings from Boldrini et al. (2020), who observed that mentalizing impairments were linked to symptoms such as unusual thoughts, persecutory beliefs, and disorganized communication, as well as a higher risk of transition to psychosis in a young adult UHR (Ultra High Risk) group. Collectively, these insights indicate that mentalizing skills may play a modulatory role in psychosis vulnerability across its continuum—from premorbid traits through active psychosis risk to potential clinical onset. Future research with larger sample sizes may benefit from employing network analysis to better delineate the complex relationships among mentalizing capacities, schizotypal characteristics, and CHR-P, ultimately aiding in the development of more precise intervention strategies.

Future research could explore this idea further: should improving self-reflection be a specific target in therapeutic interventions? If so, under what conditions or for which subgroups? Conversely, for individuals displaying high Other-Certainty, interventions could focus on fostering adaptive social interpretations and reducing rigid or overly certain beliefs about others, aiming to improve social functioning and reduce cognitive-perceptual distortions.

In conclusion, this study contributes to a more nuanced understanding of how self-perception and perception of others relate to psychoticism and schizotypal traits. While Self-

Certainty appears to be a consistent predictor across various dimensions, the influence of Other-Certainty is more nuanced, especially regarding the interpersonal aspects of schizotypy. Further research is required to elucidate these relationships and their implications for clinical practice and interventions.

# Discussion: Studies 3 and 4

Studies 3 and 4 aim to accomplish two primary objectives. First, it seeks to validate the Italian version of the Certainty About Mental States Questionnaire (CAMSQ) as a self-report measure of perceived mentalizing capacity. This involves a thorough examination of the questionnaire's internal structure, an assessment of its reliability, and an exploration of its associations with both convergent and discriminant constructs. The results replicate and confirm the psychometric properties for the Italian population, which align with the findings of Müller et al. (2023) for the German and American populations, demonstrating consistency across different nations.

Secondly, this chapter investigates the relationship between the CAMSQ and levels of psychopathology. In particular, given the overarching objective of this doctoral thesis to examine the trait of psychotic risk in relation to mentalization, specific attention is devoted to this aspect. It is hypothesized that Self-Certainty will positively predict levels of psychoticism and schizotypal features (cognitive-perceptual, interpersonal, disorganization), whereas Other-Certainty will negatively predict these features. The results confirmed both the objectives and the hypotheses.
Concerning the latter objective and hypothesis, it is crucial to discuss these findings in the context of existing research. Salaminios et al. (2021) indicated that odd speech, a key feature of schizotypy, significantly contributed to uncertainty about mental states (or hypomentalizing), suggesting an association between schizotypal traits and dysfunctions in reflective functioning. As shown by Müller et al. (2023), uncertainty about mental states, or hyper-mentalizing, can also manifest as having greater certainty about understanding others' minds compared to understanding one's own. This aligns with our findings where Other-Certainty negatively correlated with schizotypal features, reflecting impaired mentalization in individuals exhibiting these traits.

Additionally, Boldrini et al. (2020) identified significantly lower reflective functioning scores in individuals with psychotic risk compared to help-seeking controls. Reflective functioning was negatively correlated with certain attenuated positive psychotic symptoms (e.g., mild delusional phenomena, odd speech, suspiciousness or paranoia, perceptual abnormalities) and was a significant predictor of the transition to psychosis. These findings highlight the significant role of mentalizing impairments in the development of psychotic disorders. Our results further support this, showing a negative correlation between Self-Certainty and psychoticism levels.

Moreover, delusional phenomena in schizotypy warrant consideration. Delusions, often characterized by fixed, false beliefs, are closely tied to cognitive-perceptual distortions, a core dimension of schizotypy (Freeman, 2007; Garety & Freeman, 2013). Our results showed that Other-Certainty positively predicted psychoticism, cognitive-perceptual, and disorganization dimensions of schizotypy. This suggests that individuals with higher certainty about others' mental states may be more prone to delusional thinking, possibly due to a diminished tendency to attribute erroneous mental states to others. This is consistent with theories positing that impaired mentalization can lead to misunderstandings and misattributions about others' intentions and beliefs, which are hallmark features of delusional thinking (Langdon & Coltheart, 2000; Bentall et al., 2001).

Collectively, these studies support the association between mentalization deficits and psychotic risk, providing a broader context for understanding our findings. The observed correlations between the CAMSQ subscales and psychotic traits in this study contribute to the growing evidence of mentalizing impairments in both schizotypal and high-risk populations. This reinforces the importance of assessing and addressing mentalization capacities in clinical settings to potentially mitigate the progression of psychotic disorders.

## Limitations and Future Research: Studies 3 and 4

Study 4 provides valuable insights into the relationship between mentalization capacities and psychotic vulnerability. However, several limitations warrant consideration and suggest directions for future research. Firstly, the use of a cross-sectional design restricts the ability to establish causality between mentalizing deficits and psychotic traits. Longitudinal investigations are essential to determine the temporal sequence of these associations and to explore how changes in mentalizing abilities may influence the onset and progression of psychotic symptoms. Such studies could also assess whether interventions targeting mentalization could potentially mitigate the development of psychotic disorders (Boldrini et al., 2020).

Secondly, reliance on self-report measures, such as the CAMSQ, may introduce response biases and limit the depth of understanding of nuanced aspects of mentalization. Future research could benefit from employing a multimodal assessment approach, integrating behavioral tasks and neuroimaging techniques to provide a more comprehensive and objective evaluation of mentalization abilities across diverse populations and clinical settings. Incorporating informant

reports or observer ratings could also yield a more holistic assessment of individuals' mentalization skills.

Third, while the study sample was diverse in terms of demographic characteristics, it comprised individuals from the general population. This may restrict the generalizability of findings to clinical populations and community samples. Additionally, the sample was slightly unbalanced for gender, with 60% of participants being female, which could introduce gender-related biases in the results. Future investigations should aim to replicate these findings in diverse and more balanced samples to ascertain the consistency of observed relationships across various socio-cultural contexts and levels of mental health functioning. Exploring how cultural factors influence mentalization processes and their relationship with psychotic symptomatology could offer insights into the universality versus cultural specificity of these constructs.

Fourth, the data collection was conducted online, which may have introduced biases related to participants' access to technology. Individuals without a personal computer or smartphone were unable to participate in the research, potentially skewing the sample. However, it is hypothesized that this issue affects only a small portion of the population. Future research should consider alternative data collection methods or include assessments of participants' access to and comfort with digital tools to control for these potential biases.

Finally, investigating potential moderating factors is crucial for a nuanced understanding of the complexities underlying mentalization and psychotic risk. For example, examining the impact of co-occurring mental health conditions (e.g., mood disorders, substance use disorders) and environmental stressors (e.g., trauma, social adversity) on mentalization abilities and their association with psychotic symptoms could elucidate differential pathways to psychosis. Exploring interactions between genetic predispositions and neurobiological mechanisms underlying mentalization deficits may inform personalized treatment strategies.

In summary, while this study significantly advances knowledge of mentalization deficits in relation to psychotic risk, addressing these limitations and pursuing these avenues for future research is imperative. Such efforts will enhance the validity and applicability of mentalization-focused interventions aimed at preventing or ameliorating the impact of psychotic risk.

# General Discussion and Conclusions

This doctoral thesis set out to explore the complex interplay between psychotic vulnerability, personality traits, and mentalization in a clinical and general population. The research journey began with a thorough conceptualization of psychotic vulnerability, delving into ARMS and schizotypal personality features. Following, a systematic review of mentalizing in individuals at risk highlighted the importance of mentalization abilities in understanding psychosis has been presented. This paragraph set the stage for the subsequent empirical investigations by outlining critical concepts and theoretical frameworks. The dissertation progressed through empirical investigations using cluster analysis and longitudinal study, culminating in validating a psychometric tool to assess mentalizing capacities (CAMSQ). The conclusions drawn from these chapters contribute valuable insights into the early identification and intervention strategies for psychosis.

Examining chapters in more detail, the first established a foundational understanding of psychotic vulnerability by defining ARMS and exploring the associated protective and risk factors. Key points included the significance of functioning and the role of personality traits in psychosis proneness.

The second chapter utilized a cluster analysis approach to identify personality traits and social functioning among help-seeking young adults aged 18-25. The study's objective was to distinguish personality profiles that characterize ARMS. The sample of 169 individuals was assessed using various scales, resulting in a three-cluster solution: “Not at psychotic risk”, “At intermediate risk,” and “With psychotic onset”. Significant differences were found in negative affect, detachment, and disinhibition among the clusters. These findings underscore the importance of identifying specific personality traits to differentiate levels of psychotic risk, providing a basis for targeted early interventions.

In the third chapter, a longitudinal study examined the evolution of diagnoses over 12 months, differences in social and occupational functioning, and common personality traits associated with psychotic risk. The sample included 97 young adults categorized into Ultra-High Risk (UHR), At-Risk, and Not At-Risk. The study revealed that psychosis was the most common diagnosis in the UHR group, which also exhibited the lowest social and occupational functioning scores. Differences in personality traits showed that the At-Risk and UHR groups scored higher in

detachment and disinhibition. These results highlight the importance of continuous monitoring and the potential for personality traits to inform diagnostic trajectories and intervention strategies.

The final chapter focused on validating the Italian version of the CAMSQ. This involved assessing its internal structure, reliability, and associations with psychopathology constructs. The study confirmed the psychometric properties of the CAMSQ for the Italian population, consistent with findings from German and American populations (Müller et al., 2023). Additionally, it investigated the relationship between CAMSQ scores and levels of psychoticism and schizotypal features, supporting the hypotheses that Self-Certainty negatively predicts these features while Other-Certainty positively predicts them. These findings reinforce the role of mentalization in psychotic risk and provide a reliable tool for future research and clinical practice.

Despite its contributions, this dissertation has some limitations. In Chapter 1, the systematic review did not include a formal risk of bias assessment using an established scale, which could have enhanced the rigor of the findings. The results presented in Chapters 2 and 3 are based on data collected exclusively from Niguarda Hospital in northern Italy, potentially limiting the generalizability of the findings to other settings. Future studies should employ multicentric longitudinal designs and RCT across diverse regions of Italy to improve external validity.

Chapter 4 provides a psychometric evaluation and predictive modeling of the Certainty About Mental States Questionnaire, though these findings should be considered preliminary. Further research should assess measurement invariance to confirm that the identified factors represent the same latent constructs across different groups (e.g., gender, Italian vs. German vs. American populations).

Finally, with regard to Chapter 4, psychoticism and schizotypy were assessed in a general population sample. Replication of these findings in a clinical sample is recommended to strengthen their applicability and relevance to clinical contexts.

Nevertheless, this thesis advances the understanding of psychotic vulnerability by integrating theoretical insights with empirical data. It highlights the critical role of personality traits and mentalization in identifying and managing psychotic risk among young adults. The validation of the CAMSQ adds a valuable instrument for assessing mentalizing capacities, further bridging the gap between research and clinical application. The results emphasize the necessity of early and tailored interventions, informed by comprehensive assessments of personality and mentalization, to reduce the onset and progression of psychosis.

In light of the previously mentioned points, various measures have been taken over the years to address mental health issues in young people. What has been the impact of these measures? This final paragraph seeks to answer these questions by acknowledging that we are dealing with moderate to severe conditions. While early intervention can be effective, these conditions can be difficult to treat and may not always lead to positive outcomes.

For example, consider schizophrenia: although it has a low incidence in the general population (on average, 1 case per 10,000 people) and an even lower incidence among young adults, considering the onset typically occurs from late adolescence to about 35 years, this should not be misleading. Schizophrenia is the most prevalent mental disorder among patients under psychiatric care, indicating a significant level of mental suffering.

Initially, the focus on patients experiencing their first psychotic episode was driven by cost management concerns. The cost-effectiveness of early intervention in psychosis was considered, with the possibility that early intervention, despite its costs, might ultimately reduce healthcare expenses for this severe mental condition or, in some cases, prevent its development. However, a recent publication (Aceituno et al., 2019) fail to provide definitive answers due to the diversity of variables across different contexts, making studies on the topic highly heterogeneous.

Fortunately, the issue is not solely about costs. Consider the "head-to-head" debate in the British Medical Journal in 2008 between Patrick McGorry, an advocate for early interventions (McGorry, 2008), and Anthony Pelosi, a critic (Pelosi, 2008). While McGorry emphasizes the need to reduce the so-called DUP (Duration of Untreated Psychosis) because the longer psychosis "works" in a young person's mind, the more it erodes their resources and, consequently, their chances of "recovery," Pelosi highlights the significant risk for the young person of undergoing treatment beyond what is necessary, with unavoidable consequences for their entire surrounding context.

Australia and New Zealand have played a pioneering role in health policy focused on prevention since the late 20th century, not just for schizophrenia but for a range of mental health conditions. Their commitment is evident in the establishment of highly specialized facilities. In 2019, McGorry celebrated the 25th anniversary of Orygen Youth Health, a notable example of such a facility that he presides over.

In Italy, the healthcare organization is regional, leading to different healthcare policies regarding early interventions for At-Risk Mental States, sometimes even concerning the age group to be considered, which has generally settled between 15 and 25 years. A certain unity of intent

has been found through proposals made by Angelo Cocchi and Anna Meneghelli with the establishment of a Milanese group of practitioners who began working under the aegis of the so-called *Programma 2000* about twenty years ago. On a national level, the AIPP (Italian Association for the Prevention and Early Intervention in Mental Health), co-founded by Angelo Cocchi, has been operational for several years. Regarding the specific interventions proposed and implemented for young people with at-risk mental states, it can highlight the most important and enduring ones. Targeted psychotherapies, thanks to careful assessment processes, are conducted in non-stigmatizing settings, usually outside typical psychiatric spaces. Home interventions, often carried out by professional educators, aim to "track down" young people whose social and relational functioning has deteriorated. Support interventions, usually psychoeducational, are provided for the families of the young individuals under care. Moreover, dedicated teams comprising both child neuropsychiatrists and adult psychiatrists ensure continuity of care for at-risk youths. This preventative focus has brought additional resources through so-called "innovative regional projects" to the healthcare system, represented by Clinical Psychology Services and Psychiatry Units. Furthermore, as at-risk mental states, like psychosis, can be found not only in psychiatric situations but also in perinatal contexts or related to gender identity formation, the funding has significantly contributed across a wide range of areas. This has allowed, according to Parabiaghi's (2019) hourglass model, a reduction or slowing of the transition of users from lower to higher levels of care needs. With Parabiaghi's "hourglass model," in which preventive efforts, together with grassroots coalition interventions, work to reduce – or "empty"– the demand for higher-level care needs by intervening earlier in community settings. This approach emphasizes collaboration between mental health services and community coalitions of stakeholders. The hourglass model thus offers a holistic perspective on adolescent mental health, integrating prevention with treatment and emphasizing both risk and protective factors.

In this regard, Mentalization-based interventions hold promise as a key strategy for preventing the transition to psychosis, particularly in individuals with traits and state risk factors. Research indicates that disruptions in social cognition, particularly in the capacity for mentalization play a critical role in the pathogenesis of psychotic disorders. Adolescence and early adulthood are periods for the maturation of social cognitive processes, including mentalization. Impairments during these stages, often exacerbated by stress, trauma, or attenuated psychotic

symptoms, can lead to deficits in interpreting social cues and managing interpersonal relationships, thereby increasing vulnerability to psychosis (Armando et al., 2019; Debbané et al., 2016).

As shown in previous chapters, the concept of mentalization could be particularly relevant to psychosis prevention because it directly addresses the core deficits in social cognition that are linked to functional outcomes and resilience. For example, studies (Kong et al., 2021; Ohmuro et al., 2016) have evidenced that individuals with CHR often exhibit difficulties in theory of mind tasks, which assess the ability to infer others' intentions, emotions, or beliefs. These impairments are not only present during the high-risk phase but may also predate it, highlighting their potential role as both a risk marker and a target for intervention (Armando et al., 2019; Debbané et al., 2016).

For this reason, psychological interventions targeting mentalization abilities are hypothetically appropriate. By fostering a better understanding of interpersonal dynamics, these interventions can mitigate the social withdrawal, hypermentalizing, or misinterpretation of social stimuli frequently observed in CHR individuals. This is critical, as impaired social functioning is one of the strongest predictors of poor outcomes in psychotic disorders, regardless of symptom remission.

From a developmental perspective, early interventions targeting mentalization align with neurobiological findings. Brain regions associated with mentalization, such as the prefrontal cortex and the superior temporal sulcus, undergo significant changes during adolescence. These areas are also implicated in the neural underpinnings of psychosis. Intervening during this period of neuroplasticity may not only strengthen social cognitive networks but also reduce the neurodevelopmental disruptions associated with psychosis (Armando et al., 2019; Debbané et al., 2016).

Furthermore, mentalization-based interventions offer a non-stigmatizing and accessible approach to CHR care. Unlike pharmacological treatments, which carry potential side effects and may not directly address social and cognitive deficits, psychological interventions focus on enhancing intrinsic psychological capacities. This aligns with a broader shift in psychosis prevention toward functional rather than purely symptomatic outcomes. Emerging evidence suggests that robust mentalization skills can even act as a protective factor, reducing distress from psychotic experiences and fostering adaptive coping mechanisms (Debbané et al., 2016).

In a nutshell, less need for care equals lower costs and more investment in prevention. More funds for primary prevention mean raising public awareness, as well as that of the peers of the young people involved in innovative interventions, about psychosis and its effects on those affected. Bringing or having patients who feel capable share their experiences in high school, for instance, helps others understand the difficult moments these patients face and approach mental illness appropriately. The term "mental illness," often crudely associated with "madness," highlights the goal of these proposals: to work on the spread and suffering caused by stigma, which can only exacerbate a situation where a young person's overall functioning and their family's emotional climate are already severely tested. The reduced psychiatrization of treatment (Oasi et al., 2021) and the improvement of family climate (Meneghelli et al., 2011) are outcomes of significant scientific and human value from interventions on at-risk mental states.

However, effectively utilizing resources also requires precise targeting, and understanding the specific situation being addressed. As shown in the research presented in the previous chapters, this includes the implementation of targeted assessment paths with valid and reliable tools. Among these, the ERIraos Checklist (Early Recognition Inventory-retrospective assessment onset of schizophrenia, Maurer et al., 2006) and The Prodromal Questionnaire (PQ-16, Ising, 2012). Currently, the most reliable tool for assessing this condition is the CAARMS (Comprehensive Assessment of At-Risk Mental States, Yung et al., 2006), enabling clinicians to classify the assessed patient into the Ultra High Risk group. Developed in Australia by the PACE Clinic team in Melbourne, the CAARMS is now used worldwide, including in a brief version. Other valuable tools are the SIPS (Structured Interview for Psychosis-risk Syndromes) and the SOPS (Scale of Prodromal Symptoms), initially developed by McGlashan's team and finalized by Miller et al. (1999). The GAF or VGF (Global Assessment of Functioning, APA, 1994) and the SOFAS (Social and Occupational Functioning Assessment Scale, Morosini et al., 2000) are crucial for assessing the patient's functioning. Additionally, a thorough evaluation of individuals at risk of mental health issues should consider their personality configuration and mentalization abilities.

In summary, a focused assessment approach encourages the researcher to contemplate clinical practice, with the goal of establishing consistency in the young person's mental well-being. Both the caregiver and the young person need to have a clear and reliable point of reference in the assessment. Research should support clinical practice, and vice versa.

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# Supplementary material

Certainty About Mental States Questionnaire (CAMSQ)
© Sascha Müller, Leon P. Wendt, Johannes Zimmermann
ITALIAN version of the Certainty About Mental States Questionnaire
Translation by Francesca De Salve, Chiara Rossi, Osmano Oasi

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Istruzioni | Le persone interpretano abitualmente sentimenti, pensieri e comportamenti, sia propri che altrui. Di seguito, verranno presentate varie affermazioni che possono essere usate per descrivere se stessi. Per ogni affermazione, le chiediamo gentilmente di valutare quale opzione di risposta sia più appropriata per lei. | | | | | | |
| Scala | Mai | Quasi mai | Qualche volta | La metà delle volte | Spesso | Quasi sempre | Sempre |
| Item numero: | ITALIANO | | | | | | |
| 1 | Conosco i miei desideri e le mie aspirazioni più profonde. | | | | | | |
| 2 | Sono in grado di dire se una persona è in pace con se stessa. | | | | | | |
| 3 | So come le persone reagiscono alle situazioni. | | | | | | |
| 4 | Capisco perché certe cose mi rendono felice. | | | | | | |
| 5 | So cosa sto cercando di raggiungere con il mio comportamento. | | | | | | |
| 6 | Sono in grado di capire quando una persona in un gruppo si sta sentendo in imbarazzo. | | | | | | |
| 7 | So perché sono interessato a certe cose. | | | | | | |
| 8 | Sono in grado di dire quando le persone non sono sincere nel dare la propria opinione. | | | | | | |
| 9 | Capisco i miei sentimenti. | | | | | | |
| 10 | So quando gli altri stanno nascondendo quello che pensano. | | | | | | |
| 11 | Conosco le mie qualità. | | | | | | |
| 12 | Sono in grado di dire quando gli altri stanno fingendo di trovare una cosa divertente. | | | | | | |
| 13 | Conosco le ragioni per cui ho un’opinione rigida su un certo argomento. | | | | | | |
| 14 | Quando sono di cattivo umore, ne conosco le ragioni. | | | | | | |
| 15 | So se una persona è affidabile. | | | | | | |
| 16 | Conosco le ragioni sottostanti i miei comportamenti. | | | | | | |
| 17 | So dire quando le persone se ne stanno approfittando. | | | | | | |

| | |
|---|---|
| 18 | So dire se una persona è annoiata da quello che sto dicendo. |
| 19 | So come si sente una persona quando la guardo negli occhi. |
| 20 | So quale sia la decisione migliore da prendere per me quando mi trovo in una circostanza di vita difficile. |