THE ROLE OF PERSONALITY IN SCHIZOPHRENIA AND PSYCHOSIS: A SYSTEMATIC REVIEW

Anna Chiara Franquillo, Camilla Guccione, Giacomo Angelini,
Renato Carpentieri, Giuseppe Ducci, Vincenzo Caretti

Abstract

Although personality is a widely discussed topic within the academic field, little is still known about its role in affecting psychopathology, specifically schizophrenia, which can involve psychosis. While the existing literature connects these fields, it is necessary to deepen the knowledge about the relationship between these and the role that personality disorders and traits have on such psychopathology. With the implementation of the AMPD in the DSM-5 and the related assessment of impairment in personality functioning and pathological personality traits, moving from traditional models as the FFM Model of Personality, the present systematic review aims to clarify and summarize the state of the art of the studies regarding this topic. According to the Prisma Statement, literature collection was built based on two databases: PubMed and PsycINFO, and the search focused on recent studies in a period from 2011 to 2020 to check for studies consistent with recent updates.

The search process started from 866 articles and ended with 10 selected studies from the two databases, covering years from 2011 to 2020. Studies differ in sample size, measures, aim, and outcome making the present literature review diversified in its content. This review gathers evidence and sheds light on the complexity of these topics and their interconnection. Future studies may be required to clarify the clinical implications of these aspects, aiming at incrementing treatments with a more specific focus on assessment that can provide enhanced preventions.

Key words: premorbid personality, personality traits, schizophrenia, psychosis, systematic review

Anna Chiara Franquillo, LUMSA University, Rome, a.franquillo@lumsa.it
Camilla Guccione, LUMSA University, Rome, c.guccione@lumsa.it
Giacomo Angelini, LUMSA University, Rome, g.angelini@lumsa.it
Renato Carpentieri, LUMSA University, Rome, r.carpentieri92@gmail.com
Giuseppe Ducci, Department of Mental Health, ASL Rome 1, giuseppe.ducci@aslroma1.it
Vincenzo Caretti, LUMSA University, Rome, vincenzocaretti@gmail.com

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Corresponding author
Anna Chiara Franquillo, LUMSA University, Rome
E-mail: a.franquillo@lumsa.it

Introduction

Rationale

Since the beginning of the 20th century, personality has been acknowledged as one fundamental topic of study in psychology, prompting scores of scholars and researchers to build a vast array of theories. Indeed, historically, several authors attempted to define personality, and its conceptualization has been discussed in many fundamental psychological theories (Allport, 1937; Eysenck, 1947; Eysenck and Eysenck, 1976; McCrae and Costa, 1987; Cloninger et al., 1993). These theories provide many definitions to describe and decline personality, that can be defined, according to Andersen and Bienvenu (2011), as "an individual's characteristic pattern of thinking, feeling and behaving in a variety of contexts across the lifespan." Although there is a vast presence of theories that attempt to conceptualize the comprehensive meaning of personality, actual empirical evidences highlight that, in understanding and defining the level of impairments in personality, we need to consider two elements as core aspects of this construct, such as the self-definition and the interpersonal functioning (Bender, D.S., 2011/this issue; Morey et al., 2011; DSM-5, American Psychiatric Association, 2013). Since 2011, they stressed the need to consider self and interpersonal difficulties together, and, according to this idea, they proposed to explore personality psychopathology, based on the relation self-other severity dimensions, in order to create a scale for DSM–5 enhancing levels of personality functioning based on self–other problems.

As Krueger and colleagues (2007) pointed out, one of the main problems in psychopathology has always been attempting to highlight the distinction between normality and abnormality. Suggesting the need to reformulate the term "personality disorder," they claim that personality, something everyone has, is troubled in case of a personality disorder. In the light of this conceptualization, it emerges the difference between individual differences (personality traits) and those personality mechanisms that fail in their expected roles and functions (personality disorders). For this reason, according to Krueger et al. (2007), it can be useful to deal with this issue by merely defining personality disorder

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as a result of severe personality traits. So recently, with the introduction of the latest edition of the DSM (APA, 2013), the DSM-5 has changed in its conceptualization due to the launch and the promotion of the Alternative DSM-5 Model for Personality Disorders (AMPD), which represents the introduction of the dimensional model for personality, providing a hybrid categorical-dimensional PD diagnoses. According to APA (2013) "This alternative model is included to encourage further study on how this new methodology could be used to assess personality and diagnose personality disorders in clinical practice. DSM-5 moves from the multiaxial system to a new assessment that removes the arbitrary boundaries between personality disorders and other mental disorders".

The advantage of having a categorical-dimensional hybrid model is the combination of both elements from the old tradition before the DSM-5 and new dimensional elements and suggestions, yet still taking account of the developments made since the time of DSM-III.

According to The Alternative DSM-5 Model for Personality Disorders, the diagnosis of a personality disorder needs both the assessment of moderate or great impairment in personality functioning (Criterion A) and the evaluation of pathological personality traits (Criterion B).

The Criterion A Level of Personality Functioning Scale (LPFS), which differentiates five levels of impairments from no or little impairment to severe or extreme, is composed of two domains: Self-functioning (Identity and Self-Direction as subdomains) and Interpersonal-functioning (Empathy and Intimacy as subdomains). According to Waugh et al., (2017), "The LPFS incorporates familiar clinical constructs such as self-esteem stability, perception of self and others, interpersonal boundaries, identity, interpersonal mutuality, mentalization, reflective functioning, and developmental level of personality organization".

Furthermore, pathological personality traits, where DSM-5 describes personality trait as "a tendency to feel, perceive, behave, and think in relatively consistent ways across time and across situations in which the trait may manifest", are constituted by five broad trait domains (Criterion B) which are Negative affectivity, Detachment, Antagonism, Disinhibition, Psychoticism. DSM-5 describes the five domains as variants of the five domains belonging to the Five Factor model (FFM) also known as Big-Five (McCrae & Costa, 1987). As part of the Criterion B, the maladaptive personality traits have theoretically been compared to those traits belonging to the Five-Factor Personality Model. Indeed, Negative Affectivity relates to FFM Neuroticism, Detachment to low FFM Extraversion, Antagonism to low FFM Agreeableness, Disinhibition to low Conscientiousness, and Psychoticism aligns to FFM Openness (e.g., Thomas et al., 2013; Gore, W. L., and Widiger, T. A., 2013).

As we will see in the search' findings, Boyette et al. (2013) claim and describe that "The five personality traits of the FFM are Neuroticism: the vulnerability to emotional instability and self-consciousness, Extraversion: the tendency to be warm and outgoing, Openness: the cognitive disposition to creativity and esthetics, Agreeableness: the tendency to be sympathetic, trusting and altruistic and Conscientiousness: the tendency towards dutifulness and competence. These five traits are believed to represent the most basic dimensions of personality (Costa and McCrae, 1992)". Furthermore, Harkness et al. (2014) reviewed and highlighted the congruence between the Personality Inventory for DSM-5 (PID-5), which assesses these maladaptive personality traits and the Personality Psychopathology Five Model (PSY-5 Model). The five maladaptive personality traits domains are constituted by elements of personality variations which are known as Facets.

The Criteria C through G of the AMPD relates to the pervasiveness and stability of impairments, to the link between such impairments with other psychopathology, to the effects of substances and developmental stage or sociocultural environment. This model provides a way of rating pathological traits that seems to be more useful in different aspects, including the possibility of giving a global description of the person, a more effective communication with clients and colleagues, a comprehensive picture of personality problems, and a better planning in treatment (Morey et al., 2014). This theoretical background on personality is therefore essential for the subsequent discussion of the studies included. This because, as underlined by Andersen and Bienvenu (2011), years of clinical experience provide the idea that some individuals are more vulnerable to psychiatric disorders concerning their personalityand also that premorbid personality affects the psychiatric onset, as well as this illness can have effects on personality itself.

To delineate schizophrenia, Jablensky (2010) defines it as a disorder with a complex etiology involving both genetic vulnerability and the combination of environmental factors. According to Arciniegas (2015), psychosis is a common symptom with an upsetting function that belongs to many conditions, such as psychiatric, neurodevelopmental, neurological, and medical. Psychosis is also a significant "mark" of both evaluation and treatment in neurologic and psychiatric practice and a crucial aspect of Schizophrenia Spectrum and Other Psychotic Disorders, also occurring in other disorders such as bipolar or major depressive ones.

In the last DSM-5, there has been a shift in the consideration of schizophrenia, which is not seen as the "old" psychotic disorder anymore, but as part of several psychotic disorders that exist along a continuum of psychopathology. Those disorders are different from each other based on type, number, complexity, severity, and duration of the psychotic symptoms and other features that are correlated and define them. Symptoms within schizophrenia spectrum disorders involve hallucinations, delusions, disorganized thinking (formal thought disorder, usually deductible from an individual's speech), grossly disorganized or abnormal motor behavior (including catatonia), and negative symptoms. The movement between the two ends of the spectrum (mild to severe) influences the number, duration, and complexity of the symptoms required for a diagnosis. Reinforcing the need to consider the self-other as a fundamental aspect to take into account in many psychopathologies, even Ebisch and Gallese (2015) strenghten the idea of this relation as a fundamental aspect in schizophrenia. Damiani et al. (2020) presents a model called world-self ambivalence, where it is observed how psychotic symptoms might be related to a loss of the boundary between the objective world and the objective self.

Over the past decade, different studies have been conducted in order to investigate this connection, such as Solano and De Chavez (2000) who attempted to gather evidence that would explain the prevalence of specific personality disorders in schizophrenic patients, and they showed that the most frequent personality disorder was the Avoidant PD with a percentage of 32,5% in schizophrenic patients, followed by Schizoid PD (27.5%) Dependent PD and Paranoid PD with both

a percentage of 20 each. Schizotypal PD was showed in only 12.5% of the patients and Obsessive-Compulsive PD in 10% of the patients (with the 10% of the patients showing a childhood behavior disorder, Antisocial B criterion).

Some years before, Berenbaum and Fujita (1994) examined the relationship between personality dimensions in individuals with schizophrenia, supposing that the personality aspects linked with schizophrenia seem to represent an underlying vulnerability to the illness. They also highlight that any schizophrenia and personality model should figure out and take into account some issues, like what are the personality characteristics related to schizophrenia, how these characteristics evolve and how they are affected. Also, it is necessary, by Berenbaum and Fujita (1994), to find out if all the personality characteristics directly contribute to schizophrenic psychosis or they do not at all, and if they affect other personality characteristics that contribute to schizophrenic psychosis. Based on their investigation, they assumed that patients with schizophrenia seem to show more introverted and neurotic characteristics than controls and even more "peculiarity," which is a feature characterized by different beliefs and perceptions. Lönnqvist et al. (2009) studied the premorbid personality traits Neuroticism, Extraversion, and Disinhibition as predictors for later schizophrenia and other psychoses, showing a connection between these psychopathologies and high Neuroticism and low Extraversion. Furthermore, they present that after controlling for intellectual performance, the association between Neuroticism and schizophrenia diminished, making inconsistent the link between Extraversion and schizophrenia. To increase the understanding of the link between personality traits and psychosis, Beauchamp et al. (2006) compared patients at their first episode of schizophrenia and control groups. This study aimed to find if patients at their first episode of psychosis were showing differences from the control group on the Five-Factor Model of personality, and also if they exhibited similar profiles holding stable personality traits over time. Moreover, patients exhibited a diagnosis of the first episode of psychosis within the past two years. Beauchamp et al. (2006) showed that the first episode group had higher levels of Neuroticism, Openness to experience and Agreeableness but lower levels of Extraversion and Conscientiousness with traits that remained stable over time (three-months follow up).

It is necessary to deepen the investigation regarding whether patients with schizophrenia exhibit common and diverse aspects linked to both personality traits and disorders. Andersen and Bienvenu (2011), with their review on personality and psychopathology, shed light on this connection, limiting their investigation using the FFM. Among the presented studies they report that individuals with high Neuroticism and low Extraversion predicted onset of schizophrenia (Van Os and Jones, 2001) or that high Neuroticism and low Extraversion can be risk factors for schizophrenia as suggested by Krabbendam et al. (2002) who linked Neuroticism with psychotic symptoms by 3-year follow up. As such, their observations posed the grounds for our literature research, so we limited the selection time after 2011 to look for new studies that investigate these constructs together.

Aims of the present review

Based on the concepts and assumptions just outlined, the present review aims to collect studies that explore the role of personality in patients with schizophrenia and psychosis. Andersen and Bienvenu (2011) shed light on this connection gathering studies until the end of December 2010. So as starting point, considering this selection time, we started looking for articles from 2011 and aimed for studies that, from 2013, would refer to and use the Alternative Model of Personality (AMPD) in their research. It is, therefore, necessary to collect recent literature on the topic in order to improve assessment and evaluation criteria when it comes to clinical practice. A critical approach to the actual studies can provide new methodologies for implementing and endorsing more investigations that would clarify these fields' connection and overlap. Besides, fresh evidences from 2011 can suggest new directions that will allow a better understanding of certain aspects and awareness of the interconnection within psychopathology.

Methods

To create this review, we followed the systematic procedures related to the Preferred Reporting Items for Systematic reviews and Meta-analysis (PRISMA) guidelines (Liberati et al., 2009), using a systematic qualitative approach due to the high heterogeneity of the current studies, showing differences in terms of study design, sample size, measures, aim and outcome.

Search, screening and selection strategies

According to the PRISMA guidelines, the first step was to start a search in March 2020 with the last search on 27th March 2020. The main goal of the search process was to identify relevant studies underlining the role of personality in schizophrenia and psychosis, in terms of the significant aspects and traits of personality and the link with such psychopathology. To reach these aims, we chose to use two databases: PubMed and PsycINFO, because both are relevant and related to psychological studies. We searched for articles from 1st January 2011 to 27th March 2020 (date of search) in each of the databases. Therefore, the manuscript is based on articles pursued after the publication of Andersen and Bienvenu's review (2011), which comprises articles till the end of December 2010 and with the purpose of observing if, from 2013, there would be the application of the AMPD in new studies. We performed a bibliographic search using a combination of keywords chosen from the authors thought to be pertinent for the research question. These keywords were gathered and put together according to the following groups:

1) *Premorbid personality* IN *Schizophrenia*
2) *Personality traits* IN *Schizophrenia*
3) *Premorbid personality* AND *Psychosis*

Afterward, we identified and removed duplicated articles resulting from the initial screening. Then, titles and abstracts were screened and chosen according to the relevance of the research question. We accounted for the following eligibility criteria during the first screening: a) articles from January 2011 to March 2020. We limited the literature search to this time range because we took as a starting point Andersen and Bienvenu's review of "Personality and psychopathology" written in 2011 as already pointed out; b) studies related to the topic; c) articles only written in English.

Meanwhile, we excluded the following criteria a) meta-analysis, reviews, books, editorials b) papers with contents not in line with our initial interests.

Finally, the included studies had to satisfy specific criteria, choosing those that explicitly focus on the relationship between personality traits and schizophrenia or psychosis, personality disorders, and schizophrenia or psychosis with no other content that could be other than the ones connected to the initial purpose. Regarding personality traits, we prioritized to collect only those articles that focus on FFM traits, in line with Andersen and Bienvenu's review and our theoretical model (Criterion B of the AMPD – DSM 5). Concerning personality disorders, we prioritized articles that, from 2013, would implement the AMPD model but, according to our search, there is still a lack of evidence in this direction. The following selected articles only concentrate on the two topics that underpin the primary purpose of this work.

Detailed information about the study selection process are provided in the PRISMA Flow Diagram (**figure 1**).

Results

Summary of studies

As shown by the PRISMA Flow Diagram (**figure 1**), the first search provided 866 articles. After the first search, we excluded the duplicates from the 866 articles, and we obtained 651 articles. The next step was to check titles and abstracts related to the studies, and we excluded 587 of them for not meeting the eligibility criteria, reaching the number of 63 articles to read entirely. In the final analysis, we counted 10 articles that met the inclusion criteria for this review.

General study characteristics

Table 1 summarizes the study characteristics showing authors, year, study design, sample size, measures, aim, and outcome. The 10 articles included in this review have been published between 2011 and 2020 and originated from the Netherlands, Germany, UK, Sweden, Australia, and USA.

All the studies, except for three (Schultze-Lutter et al., 2012; Schroeder et al., 2012; Compton et al., 2015) included control subjects. We only chose to include studies with a clinical group since some studies found during the literature screening did not necessarily have a clinical group. Compton et al. (2015), considered a group of young-adult patients with psychiatric problems. Nilsson et al. (2016), in their group of patients with schizophrenia, involved 4 of them who were antipsychotic naïve and 19 who were treated with second-generation antipsychotics, while Cicero et al. (2019) comprised a psychotic-disorder group and a never psychotic one.

Boyette et al. (2013) involved patients with psychotic disorders, their siblings, and healthy control subjects. Sevilla-Llewellyn-Jones et al. (2018) involved help-seeking individuals at High-Risk (HR) for psychosis, in parallel with a random sample of healthy volunteers (HV). Also, Schultze-Lutter et al. (2012) included at-risk patients for psychosis, both who had developed a DSM-IV first-episode psychosis and did not show a conversion.-Schroeder et al. (2012) and Ridgewell et al. (2017), focused on patients with schizophrenia-spectrum disorder: some of whom had schizophrenia or schizoaffective disorder, as well as in the study of Moore et al. (2012), and some also had schizophreniform disorder (Ridgewell et al., 2017).

Figure 1. *PRISMA FLOW DIAGRAM*

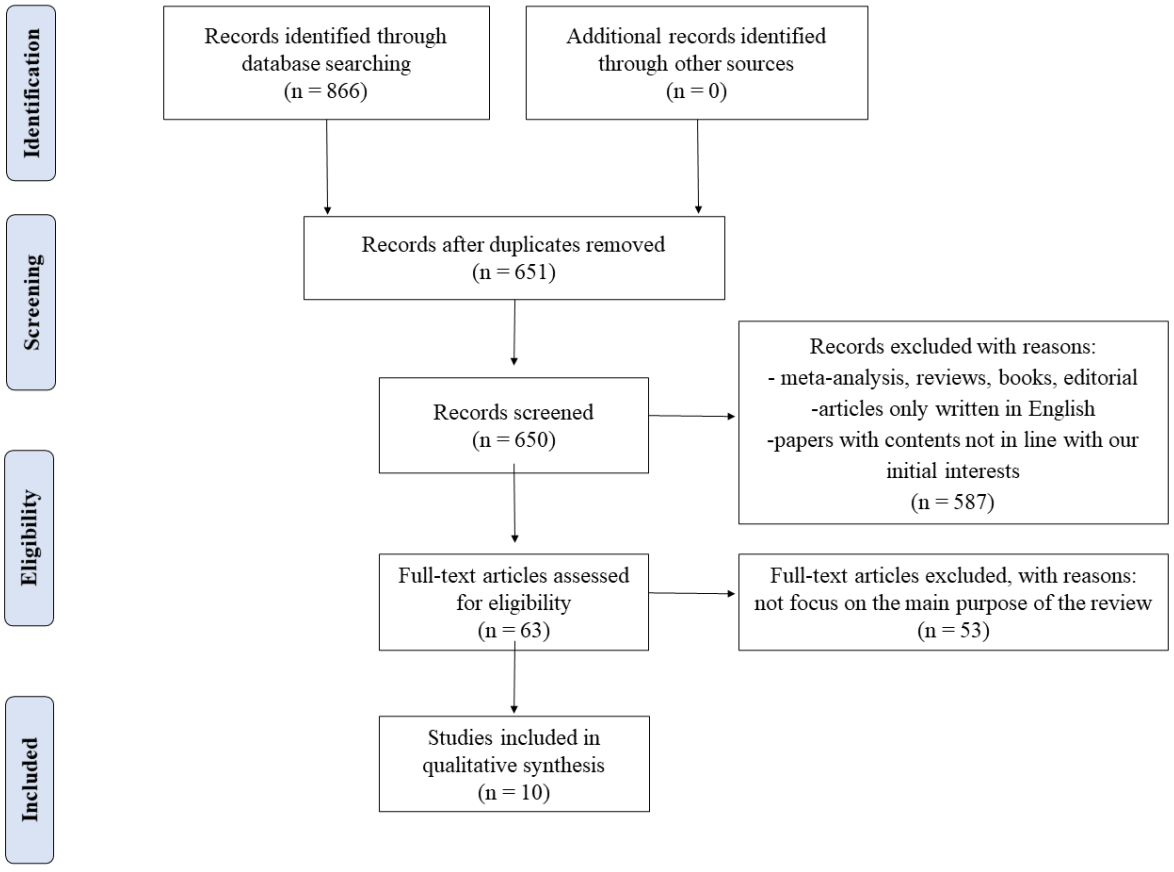

Table 1. *The included studies*

N	Authors	Year	Study Design	Sample Size	Measures	Aim	Outcome
1	Boyette et al.	2013	Multicenter Cohort Study	- 217 patients with psychotic disorders - 281 siblings of patients with psychotic disorders - 176 HCs	- NEO-FFI - PANSS	- Investigating if patients, their siblings, and HCs reported different PTs - Exploring associations between subclinical psychotic symptoms and PTs	- Patients had higher levels of N, lower levels of E, A and C than siblings and HCs - Higher N is associated with a higher risk of developing psychosis; lower A and E and higher N were associated with more severe symptoms - E was lower and N was higher in siblings of patients than in HCs. - Higher N and higher O were associated with more psychotic experiences regarding subclinical symptoms
2	Cicero et al.	2019	Data from a longitudinal epidemiologic study	- 288 adult patients with psychotic-disorders - 257 never-psychotic participants	- BFI - SNAP - SAPS - SANS	Understanding symptoms and PTs linked to psychosis	2-spectra model conceptualize heterogeneity within psychotic disorders and interpret their comorbidities: - Negative symptoms, negative schizotypy, low E and D formed one spectrum - Positive symptoms, positive schizotypy and P formed the other spectrum
3	Compton et al.	2015	Cross-Sectional Study	- 104 young-adult patients with psychiatric problems	- NEO-FFI - PANSS - GAF	- Examining how some specific PTs influenced DUP, global functioning, and positive and negative psychotic symptom severity	- DUP was negatively correlated with E and A, and positively correlated with N; - DUP was also negatively correlated with C - A was negatively associated with positive symptoms
4	Ridgewell et al.	2017	Case-Control Study	- 153 patients with SSD (38 schizoaffective, 77 schizophrenia, 38 schizophreniform) - 125 HCs	- NEO-FFI - SCID - GAF - Q-LES-Q-SF	- Investigating the relationship between traits, global functioning, and quality of life in patients with SSD and HCs	- SSDs had a lower E and higher N than HCs - High N was significantly and negatively associated with lower quality of life, while high E was associated with better quality of life
5	van Dijk et al.	2018	Multicenter, Longitudinal Naturalistic Cohort Study	Participants at baseline and after 3 years: - 186 SZs - 126 HCs Participants after 6 years: - 85 (46%) SZs - 41 (33%) HCs	- NEO-FFI - PANSS - SWN-K	- Evaluating the association between personality traits, subjective well-being, and its course	- N was negatively associated with subjective well-being, and E was positively associated with subjective well-being over three years, extending to 6 years in both groups - Subjective well-being in SZs over the course of 6 years, was associated with PTs and with the influence of positive, negative and depressive symptom
6	Nillson et al.	2016	Case-Control Study	- 23 SZs (4 of the patients were antipsychotic naïve and 19 patients were treated with second-generation antipsychotics) - 14 HCs	- KSP - PANSS	- Examining the role of personality traits in patients with schizophrenia and in healthy controls	- SZ reported elevated scores in N and P related scales of KSP as compared to HC - SA, MT and DET showed correlation with the PANSS general psychopathology subscale. - DET was high in both groups

Table 1. *Continued*

7	Sevilla-Llewellyn-Jones et al.	2018	Consecutive Cohort Study (3 years of follow-up)	- 40 help-seeking individuals at HR - 40 HV	- MCMI-III - PANSS	- Exploring clinically significant personality traits in HRs compared to HVs - The relationship of clinically significant personality traits with clinical symptoms, and possible transitions to psychosis in HRs	-HRs showed depressive, borderline, and masochistic; followed by avoidant, dependent, negativistic and schizotypal as more clinically significant PTs - HVs showed a prevalence of narcissistic and histrionic PTs - After 3 years, only 2 of HRs experienced a First Episode Psychosis.
8	Schultze-Lutter et al.	2012	Prospective Cohort Study (16 months of follow-up)	- 50 at-risk patients who had developed a DSM-IV first-episode psychosis - 50 at-risk patients without conversion within a follow-up period of at least 12 months	- SAMPS - SPI-A - SIPS	- Exploring the role of PDs and PAs in the conversion to first-episode psychosis in a sample considered at risk mainly by APS	- Cluster B and C did not differ in Converters and Non Converters - Cluster A was more pronounced in Converters - Conversion was best predicted by Schizoid Pas.
9	Moore et al.	2012	Case-Control Study	- 549 individuals with a diagnosis of schizophrenia or schizoaffective disorder according to ICD-10 - 572 HAs	- IPDEQ - DIP - GAF	- Examining aberrant personality features and global functioning in SZ individuals, compared to HAs	- SZs exhibit more frequently PDs, in more than one PD Cluster, compared to HAs. Cluster B seemed associated with suicidal behaviors, lower cognitive performances, and adverse experiences in childhood. Cluster C was associated with affective blunting in SZ
10	Schroeder et al.	2012	Cross-Sectional Study	- 45 patients with SSD: 31 with schizophrenia, and 14 with a schizoaffective disorder	- SCID-II - SCID-II-PQ - SCID II (consequently for the positively answered items) - PANSS	- Identifying the prevalence of personality disorders and maladaptive personality traits in patients with SSD	- About 20% of all patients showed a PD (more frequently OBSC, ANT, BOR) - Correlations were found between AVO and PANSS DEP, DEPR and PANSS DEP, PAR and PANSS EC, SCHYT and PANSS POS - Paranoid, schizoid, schizotypal traits correlated with PANSS positive subscales
LEGEND	SZ: Schizophrenia individuals; HC: Health Control; HR: High-risk individuals; HV: Healthy Volunteer; HA: Healthy Adult PD: Personality Disorder; PT: Personality Trait; PA: Personality Accentuations; SSD: Schizophrenia Spectrum Disorders; N: Neuroticism; E: Extraversion; A: Agreeableness; C: Conscientiousness; O: Openness to experience; D: Detachment; P: Psychoticism; OBSC: Obsessive-Compulsive PD; ANT: Antisocial PD; BOR: Borderline PD; AVO: Avoidant PD; DEPR: Depressive PD; PAR: Paranoid PD; SA: Somatic Anxiety; MT: Muscolar Tension; DET: Detachment; NEO-FFI: NEO Five-Factor Inventory; PANSS: Positive And Negative Syndrome Scale; PANSS DEP: PANSS depressive subscale; PANSS EC: PANSS excited component; PANSS POS: PANSS positive subscale. BFI: Big Five Inventory; SNAP: Schedule for Nonadaptive and Adaptive Personality; SAPS: Scale for the Assessment of Positive Symptoms; SANS: Scale for the Assessment of Negative Symptoms; GAF: Global Assessment of Functioning Scale; DUP: Duration of Untreated Psychosis; Q-LES-Q-SF: Quality of Life Enjoyment and Satisfaction Questionnaire - Short Form; SWN-K: Subjective Well-being under Neuroleptics Scale - Short Form; KSP: Karolinska Scales of Personality; MCMI-III: Millon Multiaxial Inventory, Version III; SAMPS: Selbstbeurteilung nach der Aachener Merkmalsliste für Persönlichkeitsstörungen; SPI-A: The Schizophrenia Proneness Instrument, Adult Version; SIPS: The Structured Interview for Prodromal Syndromes; APS: Attenuated Psychotic Symptoms; DIP: Diagnostic Interview for Psychosis; SCID: Structured Clinical Interview for DSM; SCID-II: Structured Clinical Interview for DSM-IV diagnoses, axis-II disorders; SCID-II-PQ: Self-rating Personality Questionnaire						

Lastly, van Dijk et al. (2018) examined a group of patients with schizophrenia and healthy control subjects over six years. It is relevant to state that the study of Schultze-Lutter et al. (2012) and Sevilla-Llewellyn-Jones et al. (2018) are prospective cohort studies like the one of van Dijk et al. (2018).

It is necessary to emphasize that the reported studies show a variety of instruments aimed at examining personality. The instrument shown by some of the included studies is the NEO-FFI - NEO Five-Factor

Inventory (Saucier, 1998), which is a personality self-report questionnaire composed by 60-item frequently used, that derives from the NEO-PI-R (Costa & McCrae, 1992).

Boyette et al. (2013) used the Dutch version of the NEO-FFI (Hoekstra et al., 1996) for examining the relationship between the five domains of The Five-Factor Model of personality (FFM) and psychotic experiences. Compton et al. (2015) took all the data for 104 participants, except for one patient that missed only one conscientiousness item, while Ridgewell et al. (2017) in his study mainly centered the investigation on the personality traits of Neuroticism and Extraversion of the NEO-FFI. Also, van Dijk et al. (2018) focused mainly on Neuroticism and Extraversion, concentrating on these two dimensions because of their association with subjective well-being both in healthy populations and in patients with schizophrenia. In this study, they adopted the Dutch version of the NEO-FFI as Boyette et al. (2013) and Cicero et al. (2019) used the Big Five Inventory – BFI (John et al., 1999).

All other studies in this review use a separate scale for the personality assessment.

In the study of Schroeder et al. (2012), they assessed PDs using a combination of both self-rating questionnaire and a diagnostic interview, including both the Structured Clinical Interview for DSM-IV diagnoses, axis-II disorders (SCID-II) and a self-rating personality questionnaire (SCID-II-PQ). Consequently, they focused on the items with positive answers using the SCID-II interview (Wittchen et al., 1997).

Among the other measurements used by the others studies, Sevilla-Llewellyn-Jones et al. (2018) assessed personality using the Millon Multiaxial Inventory, Version III (MCMI-III) (Millon & Davis, 1997), which is a self-report questionnaire that values fourteen personality traits /disorders as well as ten clinical syndromes according to the DSM-IV (1994).

Nillsson et al. (2015) referred to the Karolinska Scales of Personality - KSP, which is an inventory standardized in Sweden (Gustavsson, 1997), which consists of 135 items gathered in 15 scales. These are Somatic Anxiety (SA), Psychic Anxiety (PA), Muscular Tension (MT), Psychasthenia (PSA), Impulsiveness (IMP), Monotony Avoidance (MA), Socialization (SO), Verbal Aggression (VA), Indirect Aggression (INDA), Irritability (IRR), Suspicion (SU), Guilt (GU), Inhibition of Aggression (INHA), Social Desirability (SD) and Detachment (DET).

Schultze-Lutter et al. (2012) used the 'Selbstbeurteilung nach der Aachener Merkmalsliste für Persönlichkeitsstörungen' (SAMPS) (Woschnik et al., 1994), a German self-rating questionnaire at 108 items which is the self-report version of the Aachener Merkmalsliste für Persönlichkeitsstörungen (AMPS) (Saß 1989; Saß et al., 1994), an interview that evaluates the Personality Disorders (PDs) and Personality Accentuations (PAs) according to DSM-III-R and ICD-10.

Lastly, Moore et al. (2012), among the variety of the instruments used, applied the International Personality Disorder Examination Questionnaire – IPDEQ (Loranger et al., 1997), which is a screening instrument for both DSM-IV and ICD-10. This self-report questionnaire assesses nine ICD-10 PD dimensions: paranoid, schizoid, dissocial, impulsive, borderline, histrionic, anankastic, anxious, and dependent.

In addition to the instruments above-mentioned to value personality, all the studies included in this review use as many instruments for assessing schizophrenia.

The Positive and Negative Syndrome Scale - PANSS (Kay et al., 1987) is a medical scale commonly used to assess the severity of schizophrenia, as its use is demonstrated in most of the studies included in this review (Schroeder et al., 2012; Boyette et al., 2013; Compton et al., 2015; Nilsson et al., 2016; van Dijk et al., 2018; Sevilla-Llewellyn-Jones et al., 2018). The 30 items which compose the instrument are rated on a 7-point Likert scale ranging from a minimum of 30 to a maximum of 210. Other usual scales used for evaluating psychotic symptoms are the Scale for the Assessment of Positive Symptoms (SAPS) composed by 31 items that encompass four symptoms domains (Andreasen, 1984) and the Scale for the Assessment of Negative Symptoms (SANS) that contains 19 items assessing five domains (Andreasen, 1983). Both scales rate clinical symptoms on a range scale from 0 to 5, where 0 means none and 5 means severe. One of the included studies in this review used these two instruments (Cicero et al., 2019). They even used The Schedule for Nonadaptive and Adaptive Personality (SNAP) for measuring the schizotypy (Clark, 1993).

Ridgewell et al. (2017) used the Structured Clinical Interview of the DSM-IV-TR (SCID) (First et al., 2002) to check present or past psychiatric illness both in clinical and healthy groups. Moore et al. (2012) used The Diagnostic Interview for Psychosis (DIP) (Castle et al., 2006), a structured clinical interview intended to be used by practitioners with a clinical background.

Lastly, Schultze-Lutter et al. (2012) included two semi-structured interviews designed to be administered by trained clinicians and with the purpose of evaluating prodromal symptoms of schizophrenia: one is The Schizophrenia Proneness Instrument, Adult Version (SPI-A) (Schulze-Lutter et al., 2007) that is composed of two criteria aiming at identifying basic symptoms: the at-risk criterion psychosis predictive Cognitive-Perceptive Basic Symptoms (COPER) and Cognitive Disturbances (COGDIS). In the clinical diagnostic protocol inherent of this study, they used the SPI-A for COPER. The other measurement is the Structured Interview for Prodromal Syndromes (SIPS) (Miller et al., 1999). This interview diagnoses three types of prodromal syndromes, which are gathered in the following groups: Attenuated Positive Symptom Syndrome (APS), Brief Intermittent Psychotic Symptom Syndrome (BIPS), and Genetic Risk and Deterioration Prodromal Syndrome (GRDS).

Among the studies included in this review, some explored other relevant aspects too. However, we decided to include only some of them, those we thought being more pertinent for our investigation. Moore et al. (2012), Compton et al. (2015) and Ridgewell et al. (2017) used the Global Assessment of Functioning Scale (GAF) used to assess general functioning which is presented and described in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000). Additionally, Ridgewell et al. (2017) assessed the perceived quality of life by using the Quality of Life Enjoyment and Satisfaction Questionnaire, Short Form – Q-LES-Q-SF (Endicott et al., 1993). Van Dijk et al. (2018) measured subjective well-being using the Subjective Well-being under Neuroleptics scale short form – SWN-K (Naber, 1995).

Main findings of the studies

After the explanation of the measures, we will show the main findings of the included studies.

Boyette et al. (2013) starts from what Andersen and Bienvenu (2011) conceptualized, and so that the link

between the Five Factor model (FFM) personality traits and clinical phenomena in schizophrenia patients is complex and needs to be deeply explored. The study conducted by Boyette et al. (2013) investigated the relationship between personality traits according to the Five-Factor Model (FFM) and clinical, subclinical psychotic symptoms in three populations: patients, siblings, and healthy controls. Results are in line with previous findings suggesting a link between Neuroticism and the risk for psychosis, but not only high Neuroticism seems to be displayed by patients with psychotic disorders, but also low Extraversion and low Agreeableness. Patients exhibit differences from their siblings and the control group; besides, slight differences in Neuroticism exist between siblings and controls, where this trait is higher in the first group; contrarily, Extraversion was lower in siblings compared to controls, even if this result did not reach statistical significance. Lastly, Openness was a personality trait found to be more related to subclinical than clinical psychotic symptoms. The recent study from Cicero et al. (2019) gives a contribution to the understanding of symptoms and traits linked to psychosis, developing a 2-spectra model, which conceptualizes heterogeneity within psychotic disorders and interprets their comorbidities. Detachment, which seems associated with the prediction of the first onset of psychosis, appears highly correlated with negative symptoms, negative schizotypy, and low Extraversion confirming what already found on Extraversion from Boyette et al. (2013). This spectrum model moves from (low) Extraversion to detachment/negative schizotypy to negative symptoms. The other spectrum highlighted by the study includes psychoticism (characterized by mistrust), positive schizotypy, and positive symptoms. Another significant finding is how mistrust is more related to psychoticism trait more than other traits, thus making even clearer the connection of pathological mistrust with paranoia and persecutory delusions. All of these confirm mistrust as a continuum with subclinical suspicious thoughts in personality disorders. Before Cicero et al. (2019), Compton et al. (2015) investigated how some specific personality traits affect both the duration of untreated psychosis (DUP) and positive/negative psychotic symptoms severity. They found a negative correlation between Extraversion, Agreeableness and DUP (with shorter DUP for those who are more socially engaged and linked to the external world), and a positive correlation between Neuroticism and DUP (a longer DUP for those who are more prone to feel vulnerability to stress and irritability). Again, this confirms that Extraversion seem to represent both a protective (when is high) and dysfunctional (when is low) factor for psychosis. More emotional instability, reactivity, major vulnerability to stress, irritability, mood swings and negative emotion reactions (i.e. Neuroticism) mean a significantly longer DUP while it is shorter in those who are more socially engaged, more talkative and more open to the external world (i.e. Extraversion). Also, Conscientiousness was negatively associated with DUP. Concerning negative and positive symptoms, they found that Agreeableness was negatively associated with positive symptom severity, so that those showing higher Agreeableness tended to display lower positive symptoms severity. At the same time, Neuroticism was not significant as they were expecting before the findings. Moreover, low negative symptom severity seemed to be associated with higher Extraversion and Conscientiousness and the relationship between Neuroticism and negative symptom severity was inversely associated and Openness uncorrelated. This study provides evidence that if we aim to understand early-course phenomenology better, we cannot forget the role of measurable personality domains, which keeps on enhancing the main goal of this review. Again, the role of personality traits with a focus on Neuroticism and Extraversion and these differences between psychotic patients and controls were found by Ridgewell et al. (2017), who studied the relationship between traits, global functioning, and quality of life in patients with schizophrenia spectrum disorders and healthy controls. Schizophrenia patients exhibited higher Neuroticism (compared to controls) in association with the lowest quality of life, suggesting that Neuroticism is a central trait to take into account in clinical practice for its implication in patients' life. Besides, in healthy controls and patients, low Neuroticism was associated with a better quality of life, with a more substantial effect on healthy controls, as well low Extraversion seems to be associated with lower perceived quality of life. Similarly, the multicenter longitudinal naturalistic cohort study of van Dijk et al. (2018) explored the personality traits and the subjective well-being in patients with schizophrenia and healthy controls over six years confirming this relationship. Although the number of participants decreased by more than 50% at the six-year follow-up, this extensive study highlighted that, in both groups, subjective well-being was negatively associated with Neuroticism, and it was positively associated with Extraversion over three years, extending to six years. Those patients having a stable low subjective well-being showed higher levels of Neuroticism and lower of extraversion in comparison to those patients who showed higher subjective well-being. It is interesting to notice that Neuroticism and Extraversion often recur in studies that focus mainly on personality traits and schizophrenia/psychosis, suggesting that personality characteristics such as anxiety, angry hostility, vulnerability, or being less outgoing, sociable and energic, can occur in this typology of patients.

The case-control study of Nilsson et al. (2016) studied the role of personality traits in patients with schizophrenia and healthy controls. Results revealed that schizophrenia patients reported elevated scores in Neuroticism- and Psychoticism-related scales of Karolinska Scales of Personality (KSP) as compared to controls. Specifically, patients had higher scores in Somatic anxiety (SA), Psychic anxiety (PA), Muscular Tension (MT), and Psychasthenia (PSA), and they also had lower scores in socialization (SO) compared to healthy controls, while Somatic Anxiety, Muscular Tension, and Detachment showed correlation with the PANSS general psychopathology subscale. To conclude, highly significant elevations in the scale of Neuroticism such as Somatic Anxiety, Psychic Anxiety, Psychasthenia, Muscular Tension, Detachment, Irritability, Suspicion, Guilt and Inhibition of aggression, were the most relevant finding of the study while Socialization scores were low. Moreover, this study confirms what is already shown from the previous evidence, such as the importance of considering Neuroticism and Extraversion as fundamental personality traits in assessing schizophrenia/psychosis, since they seem to be associated with higher levels of positive symptoms, social impairment, and dysfunctional coping.

Moving from the relationship between FFM traits and schizophrenia/psychosis, we found some evidence in personality traits under clusters of personality disorders. The consecutive cohort study of Sevilla-Llewellyn-Jones et al. (2018), lasted three years,

examined clinically significant personality traits in young-adult help-seeking individuals at High Risk for psychosis (HR) compared to young-adult Healthy Volunteers (HV). The principal aim of this study was to investigate the relationship between personality traits and clinical symptoms, which would lead to the transition to psychosis in HRs. Nevertheless, after three years only 2 (5%) of HR experienced a First Episode Psychosis. First of all, they found that clinically relevant personality traits were prevalent in those at high risk for developing psychosis, where the relevant clinical traits that emerged from the study for HR individuals are depressive, borderline, or schizotypal, but also masochist (and this last can be justified by the presence of traumatic events in childhood and adolescence) making an explanation for the comorbidity with anxiety and depression in help-seeking individuals HR. Contrarily, HV showed a prevalence of narcissistic and histrionic personality traits. Furthermore, negative clinical symptoms seemed associated with schizoid, avoidant, and paranoid personality traits corroborating previous evidence of the association between schizoid traits and negative symptoms, while other links are not well documented. Further studies dealing with these aspects are needed, but this study confirms the significance of understanding the influence that personality traits have on psychiatric morbidity and the maintenance of these mental states and on impact functioning. Regarding people at high risk of developing psychosis, also the study of Schultze-Lutter et al. (2012) highlighted the importance of personality assessment in 50 subjects at the early or late risk of developing psychosis. Outcomes revealed that Cluster B and Cluster C of PDs were the most prevalent clusters with the presence of Borderline (21%), Antisocial (14%) and Avoidant (20%) PDs. On the other hand, Cluster A was less frequent with a low percentage regarding Schizoid (3%) and Schizotypal (7%) PDs, while the most prevalent was the paranoid PD (9%). Concerning PAs, they did not find differences on Cluster B and C between Converters and Non-converters, while Cluster A was more pronounced in Converters. Moore et al. (2012) studied aberrant personality features and global functioning in schizophrenia individuals relative to healthy controls. They found that aberrant personality features occurred in a high proportion of individuals with schizophrenia relative to HCs, and abnormal co-occurrence of personality traits across DSM-IV clusters was evident in a significant proportion of individuals with schizophrenia, and that these personality features impacted significantly on global functioning of schizophrenia individuals. Individuals with schizophrenia showed cumulative anomalous personality traits in more than one PD Cluster (with substantial overlap between clusters) with a chance of 8 times to screen positive for any PD. Specifically, 5 times more likely to screen positive for Cluster A, 6 times to screen positive for Cluster B, and 6 times to screen positive for Cluster C. This seems to have an impact on an inclination for worse clinical outcomes, including diminished cognitive functioning and higher risk for suicidal attitudes so studies that would account the evolution to psychosis from childhood using measures of Axis II disorders would be helpful to understand the relationship in terms of timing between trauma, personality traits connected to trauma and the development of clinical and cognitive characteristics of psychotic disorders.

To conclude, the cross-sectional study of Schroeder et al. (2012) carried on 45 adult partially remitted patients with Schizophrenia Spectrum Disorders (SSD), 31 with schizophrenia, and 14 with a schizoaffective disorder, aimed to identify the prevalence of personality disorders in this population. In this study, they aimed to the investigation of the dimensional personality traits and not only its categorical aspects while they also examined implications regarding the changes proposed in DSM-5. Among the disorders that can be diagnosed in 20% of all patients, the more prevalent that emerged as the most frequent from the investigation are Obsessive-Compulsive, Antisocial, and Borderline; but also Depressive, Avoidant, and Dependent. Considering dimensional personality traits and correlating SCID-II scales with PANSS, this study highlights the correlation between traits and PANSS subscales. PANSS positive subscale compared with schizotypal trait, PANSS excited component with paranoid traits and PANSS depressive subscale with avoidant and depressive traits. The authors claimed that in this case, the aspect of causation does not matter because, independently from this, dysfunctional personality traits cause problems for patients even after remission of SSD symptoms and thus implying that treatments of patients with SSD should automatically include elements from psychotherapy techniques that focus on personality disorders. What about the proposed changes of DSM-5? As seen in our introduction, the changes proposed in DSM-5 through the implementation of the AMPD, transform the approach that used to consider personality only through a categorical assessment, into a hybrid model. As underlined by Schroeder et al.2012, the changes in DSM-5, other than personality disorders, include impairment of self and interpersonal functioning. As stated in the introduction, patients with an SSD will meet most of the proposed diagnostic criteria for PD, such as impaired self or interpersonal functioning, trait stability across time and situations that don't belong to culturally normative personality features or are caused directly via physiological effects of a substance or a general medical condition. Moreover, as the accentuation of one of the personality trait domains from "quite a bit" to "extremely", and the associations between psychopathology and PD showed in our data would be enough to the diagnosis of a PD, the DSM-5 criteria presumably can lead to an increased rate of PD diagnosis in SSD patients. However, such criteria should be further discussed as topic of future research.

Discussion

This systematic review attempts to collect evidence that explains the influence of personality (traits and disorders) in schizophrenia and psychosis, but the literature that should investigate this link further is still not extensive. As mentioned before, since personality is a broad field to study in psychology, it is important to conclude that evidence of the chosen articles can be gathered together for the similarities and differences between them. According to the gathered results, some personality traits can enhance the risk for psychosis or increase the distress in those patients. Indeed, as seen in Boyette et al. (2013) and Ridgewell et al. (2017) that report higher levels of Neuroticism, this is the Big-Five personality trait mostly associated with a feeling of anxiety, guilt, depressed mood and loneliness. Also, it seems to link with this mental disorder, and people with schizophrenia that report higher levels of this trait are more prone to experience a lower quality of life. However, it is necessary to underline that these studies show some limitations because the first one (Boyette et al., 2013) valued personality traits after the psychotic

onset, and this makes difficult to understand if the results obtained from the evaluation of the personality are affected by the course of the illness. Additionally, this study is also cross-sectional, and this, as also mentioned by the authors may not give evidence of causality. However, their findings are relevant because they corroborate what has already been seen from previous studies that show how personality traits affect the outcome of psychotic disorders in patients with this symptomatology, and Neuroticism, according to the results, seems to be a key trait in patients with such symptomatology. They evidence that findings have a small to moderate effect in contributing to symptom expression and so they recommend investigating how symptoms (particularly the negative ones) are associated with FFM levels. Moreover, assessing Neuroticism can also contribute to the understanding of quality of life in patients with schizophrenia; in fact, as found from Ridgewell et al. (2017), which show that when this trait is high seems to be linked to a worse quality of life, they make more robust the idea that treatment targeting negative emotions, affect and high reactivity (core aspects of Neuroticism) can be useful in clinical practice. It is central to point out, among the limitations of this study, that quality of life was assessed referring to the moment of the self-report administration, and for this reason, during the illness, changes in the relationship between traits and quality of life can occur. Also, using only self-report measurements can be a limitation in assessing evidence due to their self-report bias.

Neuroticism also seems a central aspect also on influencing the duration of psychosis, as showed by Compton et al. (2015), where psychiatric patients showing stress, irritability, and negative mood (features belonging to Neuroticism), also exhibited a longer duration of psychosis. The study shows some limitations too, because it included patients coming from acute psychiatric settings, which means that personality domains and symptoms did not refer to a period of clinical stability. Despite the limitations, it provides interesting findings about how personality domains are crucial in predicting DUP, proving that there is a positive correlation between Neuroticism and DUP but a negative correlation between Extraversion, Agreeableness and DUP.

Cicero et al. (2019), with its limitations, demonstrate and explain the common structure of personality, schizotypy, and schizophrenia symptoms since all these disorders host two fundamental spectra: psychoticism dimension defined by mistrust, positive schizotypy and positive symptoms, and detachment dimension spanning (low) extraversion, negative schizotypy and negative symptoms. The two spectra model can help conceptualizing heterogeneity within psychotic disorders and to understand their comorbidities Neuroticism has been established for long as the core of internalizing disorders, while (low) Conscientiousness and (low) Agreeableness underpin externalizing disorders. Researchers and clinicians would benefit from the comprehension of traits in psychotic disorder and even from brief personality assessments underlined in this study.

Furthermore, it is interesting to note that personality traits link to schizophrenia outcomes in terms of symptomatology and quality of life, with this association remaining stable over time (Van Dijk et al. 2018). This quality of life seems to be associated with high levels of Neuroticism and low levels of Extraversion, and the explanation can be found in the negative affective states connected to a tendency to emotional lability that characterize Neuroticism. One of the limitations acknowledged in this study is the small number of participants involved and the assessment of subjective well-being only three times in 6 years, making it difficult to know how the variation of trajectories changes during these 6 years. Despite this, these findings underline the need for a specific focus on Neuroticism for therapeutic interventions in patients with schizophrenia with therapies that would reduce negative affectivity and improve quality of life. High elevations of aspects related to Neuroticism, which is the most relevant finding obtained from the investigation, and lower scores in Extraversion related scales are reported by Nilsson et al. (2016). This study has a small sample size and is cross-sectional, so both represent limitations of the reported evidence, but it confirms how patients with schizophrenia tend to be more neurotic and introverted than healthy subjects.

The importance of exploring clinically significant personality traits and their influence on psychiatric morbidity was also underlined by Sevilla-Llewellyn-Jones et al. (2018), that compare people at High Risk (HR) with Healthy Volunteers (HV), proving that certain clinical personality traits were significantly more prevalent in HR individuals than in HV. The interesting point is that these clinical personality traits seem to contribute to various clinical symptoms and affect these people's lives. Although this study shows some limitations, such as the use of self-reports that partially limit the investigation, it strengthens the need for interventions that would focus on traits underlying personality. Besides, longer follow-ups might have discovered more developments in psychotic disorders in their HR sample, which could have allowed significant personality confrontations with non-converters. PDs are relatively frequent in patients symptomatically at risk of psychosis but, beyond schizotypal PD, have rarely been considered in early detection and intervention research. Based on the idea that PDs are frequent in patients that exhibit a risk of psychosis, Schultze-Lutter et al. (2012) wanted to explore not only the schizotypal PD, considered as a well-known predictor in early detection, but also other PDs. They suggest considering early detection and building new interventions to focus on avoidant and schizoid traits (such as borderline) and develop innovative assessments, keeping in mind these PDs, not only schizotypal. Personality traits also impact clinical and cognitive features, and, as suggested by Moore et al. (2012), a high number of schizophrenia patients show aberrant personality features compared to controls. Underlining the need for longitudinal studies that would account for and clarify the temporal relationship between trauma and the emergence of psychotic disorders, their results suggest that abnormal co-occurrence of personality traits across DSM-IV clusters is visible in many schizophrenia patients. Maladaptive personality traits and personality disorders were also explored by Schroeder et al. (2012), that, despite the small number of patients in this pilot study, emphasize and reinforce what we aimed to investigate with our initial search, providing a link between SSD psychopathology and PDs. Furthermore, right before implementing the AMPD in 2013, they issued that DSM-5 criteria can increase PD diagnoses in SSD patients, proposing this argument as necessary to explore in future research. In fact, according to Schroeder et al. (2012), this belief comes from the fact that many patients with SSD will meet the proposed diagnostic criteria for PD *"impaired self or interpersonal functioning, trait stability across time and situations, not consisting of culturally normative personality features, and not being*

caused directly via physiological effects of a substance or a general medical condition)."

About this manuscript several limitations can be addressed. For instance, the choice of including only articles in English, as explained in the method section, according to the authors' linguistic competences, which means we could have missed some crucial findings. Also, since the topics considered in this work embrace many dimensions, it was critical to systematize and focus only on some specific aspects of these patterns, and to put them in relationship to each other. These fields contain and embrace a variety of other representative dimensions, and the presence of many measures in literature is responsible for additional challenges in making such a connection. In addition to this, the central dilemma of this work is, according to our search, that we could not provide studies updated to the DSM-5 that would use the AMPD in relation to schizophrenia and psychosis. The theoretical model proposed in the introduction is not reported in the studies' findings except for Schroeder et al. (2012), who wonder about making PDS diagnosis with DSM-5. This suggests that there could still be a lack of literature that use a hybrid model for assessing personality compared to other psychopathologies and for this reason, future studies may include other measures consistent with new updates. In accordance with the shift from old to new, employing refreshed methodologies in accordance with the DSM-5 will lead to further investigating personality functioning relative to some psychopathologies such as schizophrenia and psychosis. In particular, this concerns those updates described in the AMPD, concerning the need to include its founding aspects of self-others in the evaluation of personality. The findings suggest that it would be useful to enhance studies on this subject and further the assessment and treatment models, because this could also help new therapies refer to modernized models and implement them both in research and clinical practice.

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