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# PSYCHOTIC-LIKE EXPERIENCES IN NONCLINICAL ADOLESCENTS

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*Chapter 7*

# Psychotic-like Experiences in Nonclinical Adolescents

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Interest in psychotic-like experiences (PLEs), such as magical thinking, delusional ideation or hallucinatory experiences, in general and clinical populations has recently increased in the scientific community. Psychotic symptoms, particularly in the context of schizophrenia-spectrum disorders, have traditionally been viewed as categorical phenomena (i.e., either present or absent in an individual). However, the literature shows that PLEs can be found in the general population, even during adolescence, becoming in this way even more prevalent than the clinical phenotype itself. Thus, PLEs are understood as alterations in how one perceives and thinks about reality, in such a way that the individuals who experience these would present a certain bizarreness of thought, characterized by non-conventional logic. This group of experiences, also known as positive schizotypy, can be found, therefore, below the clinical threshold without necessarily being associated to a psychological, medical or any other type of alteration (Nelson & Yung, 2009; Scott, Chant, Andrews, & McGrath, 2006; Verdoux & van Os, 2002). From a dimensional point of view, it is assumed that the psychotic phenotype is distributed in the general population along a *continuum* of severity, with the psychotic disorder at its extreme end (van Os, Hanssen, Bijl, & Ravelli, 2000; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). In this regard, the expression of the psychotic phenotype would fluctuate from a normal state of functioning, going from the apparition of intermediate transitory states that precede the development of subsyndromal psychotic symptoms, toward its clinical manifestation in the form of psychosis. PLEs would be, therefore, located on a point of the continuum next to the transitory intermediate states,

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being understood as subclinical processes. In this manner, PLEs could be seen as an "intermediate" phenotype qualitatively similar to the symptomatology found in patients with psychosis, but quantitatively less severe, showing lower intensity, persistence, frequency of symptoms and associated impairment (Dominguez, Wichers, Lieb, Wittchen, & van Os, in press; Scott, Martin, Welham, Bor, Najman, O'Callaghan et al., 2009; Yung, Nelson, Baker, Buckby, Baksheev, & Cosgrave, 2009).

From an epidemiological perspective, the presence of psychotic experiences in nonclinical populations may represent the phenotypic expression of the increased proneness or risk for the development of psychotic disorders. Follow up studies conducted in nonclinical adolescents and adults selected from the general population have shown that the presence of PLEs increases the future risk of transiting toward a schizophrenia-spectrum disorder (Chapman, Chapman, Raulin, & Eckblad, 1994; Gooding, Tallent, & Matts, 2005; Poulton, Caspi, Moffitt, Cannon, Murray, & Harrington, 2000; Welham et al., 2009) or predicts delusional-like experiences in adulthood (Scott, Martin, Welham, Bor, Najman, O'Callaghan et al., 2009). A continuous dose-response risk function exists between subclinical psychotic experiences and later clinical disorder (van Os et al., 2009). However, it is equally true that most of the participants who report PLEs may be experiencing a transitory state or may never progress to clinical psychotic disorder, or may develop other types of disorders (e.g., depression or substance abuse) (Dhossche, Ferdinand, van der Ende, Hofstra, & Verhulst, 2002; Hanssen, Bak, Bijl, Vollebergh, & Van Os, 2005; Verdoux, van Os, & Maurice-Tison, 1999). Specifically, between 10 and 25% of these subclinical psychotic experiences can interact synergetically or additively with other environmental factors (i.e., genetic, trauma, cannabis, urbanicity, victimization, etc.) increasing the persistence of psychotic experiences and consequently becoming abnormally persistent, clinically relevant and in need of care (Bendall, Jackson, Hulbert, & McGorry 2008; Cougnard et al., 2007; Freeman & Fowler, 2009; Kelleher, Harley, Lynch, Arseneault, Fitzpatrick, & Cannon, 2008; Kelly, O'Callaghan, Waddington, Feeney, Browne, Scully, et al., 2010; Larkin & Morrison, 2006; Morgan & Fisher 2007; Spauwen, Krabbendam, Lieb, Wittchen, & van Os, 2006; van Os, Hanssen, Bak, Bijl, & Vollebergh, 2003; van Os & Poulton, 2009). In this regard, the prompt detection of these individuals with PLEs, and subsequent implementation of prophylactic treatments in early prevention programs is of particular interest. Likewise, their study allows us to explore and improve the comprehension of the risk or vulnerability markers toward psychosis and its related disorders and offer more evidence in support of the dimensional models of psychosis.

# The Explanation of Hallucinatory and Delusional Phenomena

The continuum model of PLEs is consistent with the symptom-based approach advocated by some researchers (Bentall, 2005), who argue that rather than approaching psychotic symptoms as expressions of a more general pathological process, they are best understood as discrete entities. The symptom-oriented approach implies that each symptom should be understood as an isolated complaint, with a focus on the pathogenesis of each individual complaint, possibly reflecting a core disturbance or a basic alteration of experience, or a basic

disruption of the relationship with the self and the world (Nelson, Yung, Bechdolf, & McGorry, 2008; Nelson & Yung, 2009; Sass & Parnas, 2003).

Hallucinatory experiences and delusional thoughts are derived from the distortion in the processes of perception (hallucinations) and analysis of reality (delusion). If, as is known, perception is an active process which requires the focalization of attention, the automatic discrimination or deliberate selection of environmental stimuli, and the recognition or attribution of meaning to these, it is reasonable to think that any alteration that affects both the capacity of sensory processing (i.e., bottom-up mechanisms), and the recognition or inference of meaning to the stimuli (top-down inferences) may produce as a result, a perceptual distortion of reality. Likewise, it is assumed that both components of sensory processing and of attribution of meaning are also implicated in the origin of delusional beliefs. Human beings are characterized by the natural necessity of searching for explanation and meaning (search for meaning), and of interpreting or attributing meaning to the signals received from the external and internal environment itself. Nonetheless, the thought processes implicated in delusional beliefs are considered to be similar to those implicated in normal thought, differing from non-delusional beliefs only quantitatively in a spectrum of degree of resistance to the modification due to evidences and disconfirming events, which endorses the idea of a continuous distribution of these experiences.

It has also been verified that hallucinatory experiences (a) are usually more likely to be present during periods of anxiety and psychological stress, that is, after threatening experiences or intense emotional states; suggesting that they are related to fluctuations in psychophysiological activation; (b) can be influenced by environmental circumstances such as sensory deprivation or social isolation, the exposure to "white noise" or other forms of ambiguous or unstructured stimulation; (c) can be induced through suggestion, lack of sleep, reinforcement or motivational factors; (d) are occasionally present during stressful states, in the transition from vigilance to sleep or sleep to vigilance, as well as in diverse disorders of the central nervous system and organic diseases such as toxic states, cortical injuries, epilepsy, tumors, dementias, etc. ; and (e) are usually related to the concealed activity of the speech muscles or sub-vocalization, and can be blocked or inhibited by other concurrent tasks, such as reading, talking, singing, etc. (Morrison, Wells, & Nothard, 2000).

With regard to the mechanisms implicated, it is agreed that hallucinations take place when the experiences or private or mental events are not recognized as one's owns and originating from the inner domain, but rather, on the contrary, are attributed to an external source (mistakes in external attribution). This explains why the content of hallucinations holds such as strong relationship with the interests, concerns or conflicts of the person who is experiencing them. The explanation of the origin of hallucinations has led, however, to several probably complementary and not mutually exclusive theories that refer to the presence of *deficit* in the perceptual processes referred to (the abovementioned bottom-up influences) (Frith, 1992; Goldman-Rakic, 1991; Hemsley, 1994; Nuechterlein & Dawson, 1984; Posner, 1982), or the existence of cognitive *biases* which affect the interpretation of the phenomena of internal origin (or top-down influences) (Bentall, 2003; Bentall, Haddock, & Slade, 1994; Morrison, Haddock, & Tarrier, 1995).

**Table 1. Prevalence of PLEs in adolescent populations according to studies**

| Study | Type | Sample N; M (SD) | Measurement instrument | Prevalence/results |
|---|---|---|---|---|
| (Wigman et al., in press) | T | 1 = 5422;14 years (1.3) 2 = 2230;11.1 years (.6) Dutch | CAPE | 1) 95% endorsed at least one psychotic experience at least ''sometimes'' 43% endorsed at least one experience ''often'' or ''almost always.'' 2) 94% endorsed at least one CAPE experience at least ''sometimes.'' 39% endorsed at least one experience ''often'' or ''nearly always.'' |
| (Yung et al., 2009) | T | 875; 15.6 years (.5) Australian | CAPE | Between 10.9%-91.5% reported some psychotic symptoms at least "sometimes" Between 0.9%-9.1% reported some psychotic symptoms "always/nearly always" |
| (Scott, Martin, Bor et al., 2009) | T | 1261; 14.8 years (1.2) Australian | CBCL; YSR; DISC-IV | 8.4 % of the adolescents experienced visual and/or auditory hallucinations |
| (Kelleher et al., 2008) | T | 211; 12-15 years Irish | K-SADS | 6.6% reported experiencing psychotic symptoms |
| (De Loore et al., 2008) | L | 1903; 13-14 years Dutch | SDQ | 5.3% reported baseline hallucinatory experiences, and 28.7% persisted after 2 years |
| (Horwood et al., 2008) | T | 6455; 12.9 years English | 12 items Halluc. Exp. DISC-IV | 38.9% reported one or more psychotic symptoms in previous 6 months 18.2% reported more than two symptoms in previous 6 months 13.7% reported one or more symptoms observer-rated assessment |
| (Spauwen et al., 2006) | L | 918; 15.1 years (1.1) German | M-CIDI; SCL-90-R | 16% respond affirmatively to at least one item on the M-CIDI |
| (Yoshizumi et al., 2004) | T | 791 ; 11-12 years Japanese | Ad hoc questionnaire of Halluc. Exp. | 21.3% reported some hallucinatory experience 9.2% reported auditory hallucinations and 5.5% visual hallucinations 6.6% reported both hallucinatory experiences |

T: Transversal; L: Longitudinal; CAPE: *Community Assessment* of Psychotic Experiences; CBCL: Child Behavior Checklist; YSR: Youth Self Report; DISC-IV: Diagnostic Interview Schedule for Children; K-SADS: Schedule for Affective Disorders and Schizophrenia for school-Age Children; M-CIDI: Munich-Composite International Diagnostic Interview; SDQ: Strengths Difficulties Questionnaire; SCL-90-R: Symptom Checklist-90-Revised. Halluc. Exp.: Hallucinatory experiences

In regard to delusional beliefs, the nature and content of these show great diversity in aspects such as the degree of conviction with which these are held, the cultural congruence, their systematization and structure, the concern they generate or the relevance they may have in an individual's life. For this reason, it is improbable that such phenomenological diversity can be explained by one single casual factor; consequently, it is necessary once again to consider several determinants which can be potentially present in their apparition. In addition to the explanations that presume the existence of possible cognitive deficits or neuropsychological anomalies implicated in the mere perception and interpretation of reality (Cummings, 1985; Gazzaniga, Ivry, & Mangun, 1998), the etiology of delusions has generally been attributed to "motivational" and "defectual" factors, without both points of view being mutually exclusive. The motivational explanations presuppose that delusions fulfill a function of compensating or balancing the emotional life of the person who holds them, as they arise due to a necessity of explaining bizarre experiences (e.g., hallucinations themselves), threatening events for the person's self-esteem, unpredictable or simply incomprehensible phenomena (Maher, 1992; Maher & Spitzer, 1993). The defectual explanations regarding the origin of delusions presume the existence of latent anomalies or cognitive-attentional deficits in reasoning or in the formation of beliefs and opinions, which would lead to a distorted interpretation of reality (Freeman & Fowler, 2009; Freeman, Garety, & Fowler, 2008; Garety, Kuipers, Fowler, Freeman, & Bebbington, 2001).

## Prevalence of Psychotic-like Experiences in Nonclinical Adolescents

The expression of psychosis is more common in young people and declines with age, whether it be full-blown psychosis (prevalence 1%), isolated psychotic symptoms (prevalence around 5%) or broadly defined psychotic experiences (mean prevalence around 15%) (Cougnard et al., 2007; van Os et al., 2009). Therefore, this group of experiences constitutes a fairly common psychological phenomenon in the general population with prevalences ranging from 10% to 25% according to different studies (Aleman, Nieuwenstein, Boker, & De Haan, 2001; Scott et al., 2008; Tien, 1991; Verdoux & van Os, 2002; Young, Bentall, Slade, & Dewey, 1986).

In particular, the percentage of self-reported PLEs in adolescents is more prevalent than that found in studies with adults in both clinical and general population samples (Fonseca-Pedrero, Lemos-Giráldez, Paino, Sierra-Baigrie, Villazón-García, & Muñiz, 2009). As can be observed in Table 1, the prevalence of PLEs varies considerably across epidemiological studies. It must be mentioned that strict comparison among studies is limited by the type of instrument and the characteristics of the sample used as well as by the statistical criteria employed to determine the prevalence of these experiences. This consideration must be kept in mind when interpreting and comparing the results obtained in different investigations.

In this regard, Yung et al. (2009), using a sample of 875 Australian adolescents, found that around 28% of the assessed participants reported hearing voices sometimes, and 1.9% reported always or nearly always experiencing this. In another study, Scott et al. (2009), analyzing a sample of 1,261 Australian adolescents, found that 8.4% of these reported having experienced some visual or auditory hallucinatory experience on some occasion. On their part, Kelleher et al. (2008), using the *Schedule for Affective Disorders and Schizophrenia for*

*school-Age Children* (K-SADS), in a sample of 211 Irish participants, found that 6.6% reported some psychotic symptom. In another investigation by De Loore and cols. (2008) conducted in a sample of 1,903 Dutch adolescents, the results showed that 5.3% of the participants reported some hallucinatory experience. Higher percentages were found in the study by Horwood and cols. (2008), who, using a sample of 6,455 English adolescents, found that 38.9% scored positively on more than one item regarding psychotic experiences, although when these experiences were assessed through an observer-rated method, the percentage decreased to 13.7%. Similarly, Spauwen et al. (2006), analyzing a sample of 918 German adolescents, found that 16% scored positively on at least one item regarding hallucinatory or delusional experiences. In another study conducted in a sample of 761 Japanese children (non-western society), Yoszhumi and cols. (2004) found that 21% of these reported some hallucinatory experience. Finally, Wigman et al. (in press)  in two representative samples of Dutch adolescents (*n* = 5422; *n* = 2230), using the *Community Assessment of Psychotic Experiences* (CAPE), found that approximately 95% of both samples endorsed at least one positive psychotic experience at least "sometimes" and between 39-43% endorsed at least one experience at level "often" or "nearly always".

Recently, our research team has conducted an empirical study with the aim of examining the distribution of PLEs in a representative sample of the adolescent general population. In this investigation, a total of 1,438 students participated, 691 males (48.1%), belonging to 28 different high schools and 91 classrooms in the Principality of Asturias, a region in northern Spain, and selected using a stratified random sampling at classroom level. The mean age was 15.92 years (*SD* = 1.17), ranging from 14 to 18 years. Ten items included in the *Oviedo Questionnaire for Schizotypy Assessment* (ESQUIZO-Q) that assess aspects related to magical thinking, unusual perceptual experiences and paranoid ideation were used (Fonseca-Pedrero, Muñiz, Lemos-Giráldez, Paino, & Villazón-García, 2010). The ESQUIZO-Q is a questionnaire of recent construction for the assessment of schizotypal personality traits in adolescents. The number and percentage of participants who gave an "*I agree quite a bit*" (4) or "*Completely agree*" (5) answer to the 10 selected items in the ESQUIZO-Q are presented in Table 2. As can be seen, between 3.2 and 7.2% of the adolescents reported symptoms related to magical thinking (items 1 to 3); between 1.2 and 8.8% reported having experienced some Unusual perceptual experience (items 4 to 7); finally, between 1.3 and 13.2% of the studied adolescents were found to report paranoid ideation symptoms (items 8 to 10).

## Influence of Gender and Age in the Expression of Psychotic-like Experiences

The phenotypic expression of PLEs in adolescents seems to vary as a function of gender or age. Regarding gender, and similarly to what happens in adults, adolescent females usually report a higher number of positive psychotic symptoms (e. g., ideas of reference or paranoid ideation) than males ( Fonseca-Pedrero, Lemos-Giráldez, Paino, Villazón-García, Sierra-Baigrie, & Muñiz, 2009; Wigman et al., in press; Yung et al., 2009); however, other studies have found contradictory results, failing to find such association (Fonseca-Pedrero, Paino-Piñeiro, Lemos-Giráldez, Villazón-García, & Muñiz, 2009; Scott, Martin, Welham, Bor, Najman, & O'Callaghan, 2009), or even other studies have found that there is a greater percentage of males that report such experiences than females (Kelleher et al., 2008). In

relation to age, younger participants usually obtain higher scores in measures of PLEs compared to older participants (van Os et al., 2009) although, when only groups of adolescents were compared, some studies did not confirm this finding (Scott, Martin, Welham, Bor, Najman, & O'Callaghan, 2009) or even obtained findings in the opposite direction (Fonseca-Pedrero, Lemos-Giráldez, Muñiz, García-Cueto, & Campillo-Álvarez, 2008). A global analysis of the different studies regarding the variability in PLEs as a function of gender and age, therefore, indicates that there are certain inconsistencies and incongruencies in the results. Thus, it would be interesting to continue examining the role played by these two sociodemographic variables in the expression of PLEs in the general adolescent population where developmental processes may be playing an interesting role.

## Prediction and Temporal Persistence of PLEs in Adolescents across Longitudinal Studies

PLEs are risk or vulnerability markers for psychosis and its related disorders. Longitudinal studies using nonclinical adolescents have shown that the presence of these experiences at these ages increases the future risk of transiting toward a schizophrenia-spectrum disorder (Dominguez et al., in press; Poulton et al., 2000; Welham et al., 2009) or predicts delusional-like experiences in adulthood (Scott, Martin, Welham, Bor, Najman, O'Callaghan et al., 2009). Poulton et al. (2000), in a follow-up study conducted in New Zealand in a sample of children from the general population, found that more than 25% of the participants who had reported such experiences at the age of 11, developed a schizophreniform-type disorder at the age of 26. Similarly, Welham et al. (2009) also conducted a longitudinal study where information was obtained from both parents and adolescents at different moments, and found that the presence of auditory hallucinatory experiences was associated, after 14 years, to a greater risk for the later development of non-affective psychosis. More recently, Dominguez and cols. (in press), in an 8-year-longitudinal study conducted in a sample of 845 German adolescents, found that of the participants who had been considered as clinical cases of psychosis at the end of the assessment period, 38.3% had previously presented at least one psychotic experience, and 19.6% of these cases had been preceded by at least two subclinical-psychotic experiences.

In addition to the predictive validity of subclinical-psychotic experiences, another extremely interesting issue is to determine its degree of continuity and temporal persistence as well as delimit the factors that make these experiences transitory or, on the contrary, persistent over time evolving into a state of impairment and need for care. In general terms, the temporal persistence of these experiences during adolescence and adulthood is around 10-40% (De Loore et al., 2008; Dominguez et al., in press; van Os et al., 2009). For example, Loore and cols. (2008) examined a sample of 1,903 adolescents, and found that after 2 years, psychotic experiences persisted in 28.7% of the cases that had reported such experiences in the basal period (5.3% of the adolescents). However, Dominguez et al. (in press) found that in 30-40% of the cases, the attenuated-psychotic symptoms persisted and re-occurred over time; moreover, the greater the temporal persistence of the subclinical-psychotic symptoms was, the greater the risk of transiting toward a psychotic disorder after 8 years in a dose-response fashion.

**Table 2. Number (and percentage) of participants who obtained high scores (values of 4 or 5 on the *Likert* scale) on ten items of the *Oviedo Questionnaire for Schizotypy Assessment* (ESQUIZO-Q) assessing PLEs**

| Items | Total (*n* = 1438) | Men (*n* = 691) | Women (*n* = 747) |
|---|---|---|---|
| 1."I believe that the things that are on the radio or television have a special meaning to me, that my friends don't understand" | 54 (3,8) | 30 (4,3) | 24 (3,2) |
| 2."I think that there are some people who can read other people's minds" | 96 (6,7) | 50 (7,2) | 46 (6,2) |
| 3."I believe there are people who can control the thoughts of others" | 94 (6,5) | 40 (5,8) | 54 (7,2) |
| 4."Being alone at home, I have had the feeling that someone was talking to me" | 86 (6,0) | 40 (5,8) | 46 (6,2) |
| 5."I hear voices that others can't hear" | 26 (1,8) | 17 (2,5) | 9 (1,2) |
| 6."When I am alone, I have the feeling that someone is whispering my name " | 38 (2,6) | 16 (2,3) | 22 ( 2,9) |
| 7."I have thoughts which are so real that it seems as if someone was talking to me" | 126 (8,8) | 60 (8,7) | 66 (8,8) |
| 8."I think that someone is planning something against me" | 83 (5,8) | 50 (7,2) | 33 (4,4) |
| 9."Somebody has it in for me " | 165 (11,5) | 91 (13,2) | 74 (9,9) |
| 10."My classmates are against me" | 21 (1,5) | 11 (1,6) | 10 (1,3) |

As can be observed, the great majority of adolescents experience PLEs of a transitory nature and do not necessarily evolve toward a psychotic disorder; for only a small percentage of adolescents, these experiences evolve unfavorably and reach its clinical expression causing clinically significant impact and the need for care (Dominguez et al., in press; van Os et al., 2009; Welham et al., 2009). Specifically, these experiences have to interact in a synergic or additive manner with other early environmental (e.g., cannabis, urbanicity, traumatic events etc.), genetic (e.g., presence of first degree relatives with a psychotic disorder) and/or psychological factors (e.g., depression, coping strategies) to surpass the subclinical threshold and evolve into a psychotic disorder. In this regard, the possible evolutionary trajectories toward psychotic disorders may be heterogeneous and diverse, and therefore, the mere presence of PLEs at early stages does not necessarily implicate the apparition of a severe psychopathological alteration in the future.

## Relationship between Psychotic-like Experiences and Other Clinical Symptoms in Adolescents

PLEs in adolescents have been linked to the presence of diverse psychological problems such as anxiety, dissociation, distress, depression, impaired social functioning (Scott, Martin, Bor et al., 2009; Wigman et al., in press; Yoshizumi et al., 2004; Yung et al., 2009), childhood trauma, and increased likelihood of receiving an Axis I psychiatric diagnosis (Kelleher et al., 2008). For example, Yoshizumi and cols. (2004) found that those participants

with auditory and visual hallucinations scored significantly higher on measures of anxiety and dissociation compared to those who did not report said symptoms. On their part, Scott et al. (2009) found that those adolescents with auditory and/or visual hallucinations presented higher levels of depressive symptoms in comparison to the control group. Yung et al. (2009) found that a high presence of PLEs was associated to self-reported depressive symptomatology, as well as worse social functioning. On the other hand, in a study by Kelleher et al. (2008), a greater prevalence of physical and sexual abuse as well as a greater number of Axis psychiatric diagnoses, particularly depressive disorders, were found in adolescents with PLEs. These data suggest that nonclinical adolescents with PLEs frequently present, although to a lesser degree, affective and behavioral alterations similar to those found in patients with schizophrenia.

## Gaps in Knowledge

The study of psychotic experiences is a field that is in clear expansion where several extremely interesting questions still remain unsolved. On the one hand, the role of PLEs at an early age in the prediction of psychotic disorders should continue to be explored in greater depth through independent longitudinal studies in both nonclinical adolescent populations and in adolescents at risk (e.g., offspring of one or two parents with schizophrenia). On the other hand, the exploration of the type of relationship that these psychotic experiences have with biochemical, physiological, environmental and psychosocial variables is also very interesting, as well as their interaction with several psychological variables such as depressive symptomatology or coping strategies, with a view to understanding which factors determine the transition or not toward a psychotic state.

Recent research from Nelson and Yung (2009) indicates that PLEs do not constitute a unitary phenomenon; in fact, it seems that there are different types of PLEs with different likely trajectories and underlying causes. Data from nonclinical samples and nonpsychotic clinical samples indicates that Bizarre Experiences, Perceptual Abnormalities and Persecutory Ideas may be more malignant forms of PLEs and confer a greater risk of developing psychotic disorder than Magical Thinking (Yung et al., 2009). Likewise, this research indicates that PLEs might either be: (a) an expression of meta-cognitive deficits in discriminating between self-generated and external sources of information, in combination with cognitive faults in self-monitoring, such as an underlying basic self-disturbance resulting in a person experiencing their body as an external object (Sass, 2003); (b) clinical "noise" around a non-psychotic syndrome and not necessarily associated with distress or disability (e.g., a patient with depression, who on questioning admits to hearing voices occasionally which do not bother him), and (c) present in nonclinical "normal" individuals, not associated with distress or disability or increased vulnerability to psychotic disorder.

A theoretical model of psychotic vulnerability was also proposed by Yung et al. (2007), indicating that, in terms of clinical care, PLEs belonging to a first category would be of greatest concern, probably belonging to a categorically separated class of psychopathology known as schizotaxia (Lenzenweger, 2006; Meehl, 1990), followed by PLEs in the second category; however, PLEs in the third category may reflect a form of "happy" or "benign" schizotypy (McCreery & Claridge, 2002), particularly prone to mystical experiences, lucid

dreams and creativity, and probably do not warrant clinical attention. These authors consider that clinical attention for these forms of PLEs may have a counter-productive effect by raising anxiety about essentially benign experiences.

At present, the identification of which of the three subtypes of PLEs is manifested in different clinical presentations remains poor; this is reflected in our limited capacity to predict which at-risk individuals with attenuated psychotic symptoms will go on to develop full-blown psychotic disorders (Lemos-Giráldez et al., 2009). Central to the psychological approach is the notion that the response to PLEs is cognitively mediated by beliefs or appraisals. Thus, the mere experience of voices itself does not lead to full-blown psychotic symptoms, but attributing the voice to an external source and giving it personal significance does (Freeman, 2007).

Additionally, as previously mentioned, it may be that the presence of PLEs in combination with other factors, such as traumatic experiences (Larkin & Morrison, 2006), cannabis use (Henquet, Di Forte, Murray, & Van Os, 2008; Schiffman, Nakamura, Earleywine, & LaBrie, 2005; Weiser & Noy, 2005; Barkus & Murray, 2010), marked functional decline (Yung et al., 2006), high levels of distress (Hanssen, Krabbendam, de Graaf, Vollebergh, & van Os, 2005), maladaptive coping style (Krabbendam, Myin-Germeys, Bak, & van Os, 2005), self-disturbance (Nelson et al., 2008), depressed mood (Birchwood, Mason, MacMillan, & Healy, 1993; Smith et al., 2006), or low IQ (Horwood et al., 2008) may enhance an individual's risk of full-blown psychotic disorder. This may in turn shed light on the conceptual and construct validity of schizophrenia and other psychotic disorders, their essential psychopathological features, and phenotypic boundaries. However, a continuum-threshold approach to psychosis-proneness was proposed by Hafner (1992), assuming that PLEs exist along a continuum, but that at a certain level of intensity/severity beyond a critical threshold they are associated with clinical symptoms and functional decline, likely resulting in a psychotic disorder. In this regard, explanatory models in psychosis are still a topic for discussion (Linscott & van Os, 2010).

# To Sum up

The study of PLEs in adolescence and their relationship to the subsequent risk for schizophrenia-spectrum disorders has become an area of interest within the current research. The study of PLEs opens the possibility of examining and understanding the possible risk or vulnerability markers prior to the clinical expression of the disorder with a view to improving early detection strategies and aiding in the possible implementation of prevention programs. In the present chapter we have had the opportunity to verify that: a) PLEs in adolescents are relatively common psychological phenomena and characteristic of the maturational processes of development; b) are not necessarily related to a psychopathological alteration or to subsequent greater risk for the development of psychotic disorders; c) most of these experiences are transitory and discontinuous although it is true that, in a small percentage of individuals, these experiences may persist or evolve unfavorably over time and that in their interaction with genetic, psychological and/or psychosocial variables may lead to a psychotic disorder; finally, d) the evidences indicate that the psychotic phenotype appears to be distributed along a severity continuum, at which extreme end we would find psychosis; this

dimensional point of view seems to go beyond the frontiers proposed by the international classification systems given that only a part of this continuum is represented by the "clinical" case.

This continuum-threshold approach has not yet been contemplated in the international classification systems, however, the adequacy of including a *''Risk syndrome for psychosis''* category in future editions is currently a subject of debate (Carpenter, 2009; Woods et al., 2009), particularly when PLEs are a cause of distress, dysfunction and/or disability; said syndrome would therefore be characterized by symptoms such as bizarre perceptual experiences or delusional ideation (e.g., distrust/suspiciousness) in the absence of functional deterioration or dysphoria, and without meeting the criteria for a clinical disorder. Little is known, however, about the mechanisms that mediate the relationship between nonclinical psychotic experience and subsequent clinical disorder; but the interpretation, not the experience of voices themselves, probably causes the associated distress and disability, thereby increasing the risk of developing need for treatment.

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