



HAL
open science

The healthy side of positive schizotypy may reflect positive self-report biases

Henri Chabrol, Patrick Raynal

► **To cite this version:**

Henri Chabrol, Patrick Raynal. The healthy side of positive schizotypy may reflect positive self-report biases. International Journal of Psychology and Psychological Therapy, 2018, 18 (1), pp.55-64. <hal-03191643>

HAL Id: hal-03191643

<https://hal.science/hal-03191643v1>

Submitted on 7 Apr 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

The healthy side of positive schizotypy may reflect positive self-report biases

Henri Chabrol^a, Patrick Raynal^{a*}

^a Centre d'Etudes et de Recherches en Psychopathologie et Psychologie de la Santé, Université de Toulouse, UT2J, France

Authors' email address:

Henri Chabrol: chabrol@univ-tlse2.fr

* Corresponding author: Patrick Raynal, Laboratoire CERPPS, Université de Toulouse-Jean Jaurès, 5 allées Antonio Machado, 31058 Toulouse, France. Phone number: 33 561 22 52 90. Fax number: 33 561 25 70 93. E-mail: patrick.raynal@inserm.fr

RUNNING TITLE: Self-report bias in positive schizotypy

The healthy side of positive schizotypy may reflect positive self-report biases

Abstract

The concept of "healthy schizotypy", characterized by positive schizotypy symptoms in the absence of negative or disorganized schizotypy, raises questions regarding whether the contrast between its healthy appearance and its relatively high level of impairment might be due to self-reported advantages. Using cluster analysis, we aimed at typifying a positive schizotypy group in a large nonclinical sample of young adults to examine its association with depressive symptoms, cannabis use, academic performance, well-being and serendipity, while controlling for variables inducing positive self-report biases: self-deceptive denial, wishful thinking, social desirability and narcissistic traits. We thus identified a pure positive schizotypy cluster (P) and a positive and disorganized cluster (PD) which had the highest level of the positive factor. Both clusters were characterized by a contrast between a high level of well-being, life satisfaction and self-reported serendipity (similar to a low schizotypy cluster) with elevated level of impairment markers (lower academic performance, higher depressive symptoms and cannabis use), comparable with clusters high in negative schizotypy. Moreover P and PD had elevated levels of variables susceptible to induce positive self-report biases (denial, wishful thinking, social desirability, narcissistic traits), while the clusters high in negative schizotypy had lower levels. We conclude that the relative high level of well-being and life satisfaction observed in groups with elevated positive and low negative schizotypy may in fact be linked to positive self-report biases.

Keywords: cluster analysis; schizotypal traits; wishful thinking; narcissistic traits; subjective well-being.

Novelty and Significance:**1. What is already known about the topic?**

- Schizotypy, a personality trait related to schizophrenia with lesser severity, is composed of three dimensions: positive (unusual perceptual experiences...), negative (social withdrawal...) and disorganized thoughts.
- Schizotypy is associated with moderate impairment and psychopathology but "healthy schizotypy" was proposed in individuals displaying positive schizotypy without other dimensions.
- A healthy appearance of individuals with positive schizotypy contrasts with a relatively high impairment.

2. What this paper adds?

- We examined whether this contrast was due to biases in self-report questionnaires.
- Individuals with positive schizotypy have higher levels of variables susceptible to induce positive self-report biases.
- The relative well-being reported by these persons could be associated with positive self-report bias.

Introduction

Multiple factor analytic studies (Kocsis-Bogar, Nemes, & Perczel-Forintos, 2016; Kwapil, Gross, Silvia, & Barrantes-Vidal, 2013) supported that the symptoms of schizotypy and schizophrenia could be grouped in three dimensions: positive (unusual experiences, odd beliefs, and magical thinking), negative (anhedonia, apathy, social anxiety and social withdrawal) and disorganized (eccentricity, odd behaviour and speech).

These dimensions have been used in cluster analytic studies of schizotypy aimed at identifying distinct groups of individuals that could be associated differentially with psychopathology, impairment, and risk of developing schizophrenia-spectrum disorders. Five cluster analytic studies were conducted on large samples of adolescents or college students. They typically found positive, negative, mixed, and low schizotypy clusters (Barrantes-Vidal, Fananas, Rosa, & Obiols, 2003; Barrantes-Vidal, Lewandowski, & Kwapil, 2010; Raynal, Goutaudier, Nidetch, & Chabrol, 2016; Suhr & Spitznagel, 2001; Tabak & de Mamani, 2013).

The three latter studies explored whether clusters differed on behavioural correlates and found that high positive schizotypy clusters tended to display less impairment than the other clusters with significant schizotypy symptoms. Barrantes-Vidal et al. compared clusters on history of depression, substance abuse, social adjustment and dimensions of the Five-Factor Model of personality: the positive schizotypy cluster was open to experience and extraverted but had a history of depression and substance abuse (Barrantes-Vidal et al., 2003; Barrantes-Vidal et al., 2010). Others found that the high positive cluster presented similar levels of well-being as the low schizotypy cluster (Tabak & de Mamani, 2013). And recently our group observed that the positive schizotypy cluster had high levels of perceived positive quality of social relationships but was also characterized by high levels of personality disorder traits and psychopathological symptoms, and low academic achievement, confirming an unhealthy side to positive schizotypy (Raynal et al., 2016).

These results challenged the concept of “healthy schizotypy”, characterized by the presence of positive schizotypy symptoms in the absence of negative or disorganized schizotypy symptoms (McCreery & Claridge, 2002) and by the association with adaptive traits and favourable functioning such as subjective wellbeing, flexible/unconventional thinking and creativity, fantasy-proneness and openness to experience, raising the question of the evolutionary advantages of schizotypy (C. Mohr & Claridge, 2015; Schofield & Claridge, 2007). However, several studies reported associations between positive schizotypy and mood disorders, substance abuse, and the need for psychiatric treatment (Barrantes-Vidal et al., 2010; Chapman, Chapman, Kwapil, Eckblad, & Zinser, 1994; Dinn, Harris, Aycicegi, Greene, & Andover, 2002; van Os & Linscott, 2012). Moreover positive schizotypy was reported to be associated with high neuroticism, frequency of alcohol use, impairment (Barrantes-Vidal et al., 2010) and with impulsivity and antisocial behaviours (Dinn et al., 2002).

Recently we suggested that some self-reported advantages, such as high subjective well-being, that were attributed to positive schizotypy, may reflect either lack of insight and/or the tendency to deform reality and adapt it to one's own wishes, which are associated to magical thinking, a key component of positive schizotypy (Raynal et al., 2016). Supporting this view, Fonseca-Pedrero et al. observed that in non-clinical samples of adolescents, individuals with psychotic-like experiences used avoidance coping

strategies including wishful thinking more frequently than adolescents who did not experience psychotic-like symptoms (Fonseca-Pedrero, Paino, Sierra-Baigrie, Lemos-Giráldez, & Muñiz, 2012). Other mechanisms may be involved. As high scorers on positive schizotypy have been found to have high levels of perceived positive quality of social relationships (Raynal et al., 2016; Tabak & de Mamani, 2013), they may be more susceptible to social desirability biases. Another possibility is that high levels of positive schizotypy symptoms is perceived as being different and superior, that leading to the development of narcissistic traits, such as grandiosity, that may be expressed by overestimation of well-being (Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004) or overestimation of own talents (e.g., self-reported serendipity).

The aim of the present study was to explore the typology of schizotypal traits in a large nonclinical sample of young adults to investigate whether a positive schizotypy group would emerge and to examine its association with depressive symptoms, cannabis use, objective academic performance, self-reported well-being, life satisfaction and serendipity, while controlling for variables inducing positive self-report biases such as denial, wishful thinking, socially desirable responding and narcissistic traits.

Materials and methods

Participants

Potential participants were informed about the study via social networks and the official websites of French universities. Informed consent was obtained from all participants before completing the study. Potential participants were provided with information regarding the aims of the study and were informed that answers to the questionnaires would remain confidential and be analysed according to scientific intentions. No compensation was offered to participate in the study, following a standard procedure of the institution. The participants were provided with the possibility to contact one of the authors via email for further information or to receive referral. Personal information (e.g., age, gender) was gathered. The variable "academic level" was obtained by asking students their enrolment in one of the following programs: undergraduate (first, second or third year), Master's degree (first or second year) or Ph.D. Elevated scores indicate high degrees. 976 individuals (790 females [80.9%], 186 males [19.1%]) aged between 18 and 24 (mean age of females = 20.18 \pm 1.65; males = 21.04 \pm 1.76) completed the questionnaire.

Schizotypy measure

Schizotypal traits were assessed using the French version of the Schizotypal Personality Questionnaire-Brief (SPQ-B), a self-administered scale including 22 dichotomous items (Raine & Benishay, 1995; Raynal et al., 2016). The three following dimensions of schizotypal personality are assessed: cognitive-perceptual deficits ("Positive"; 8 items), interpersonal deficits ("Negative"; 8 items) and disorganisation (6 items). Each item (e.g., "People sometimes find me aloof and distant") is scored 0/1 (no/yes). However studies suggested caution with respect to the proposed SPQ-B subscales and recommended to use factor analytic techniques to study the SPQ-B latent structure in specific samples (Compton, Goulding, Bakeman, & McClure-Tone, 2009).

Variables inducing positive self-report biases

Self-deceptive denial was assessed with the 20-item relevant subscale of the Balanced Inventory of Desirable Responding (Paulhus & Reid, 1991). An item example is: "I have never felt joy over someone else's failure". Items are scored from 1 (totally untrue) to 7 (totally true).

Wishful thinking was assessed with the 8-item relevant subscale of the Ways of Coping Checklist (Vitaliano, Russo, Carr, Maiuro, & Becker, 1985). An item example is: "I wished for a miracle to happen". Responses are scored on a 4-point Likert scale ranging from 0 (never used) to 3 (frequently used).

Narcissistic traits were measured using the relevant 9-item subscale of the Personality Diagnostic Questionnaire-4 (Hyler, Rieder, Williams, Spitzer, & Lyons, 1988). An item example is: "I like to have people pay attention to me". Items are scored from 1 (strongly disagree) to 4 (strongly agree).

Socially desirable responding was assessed with the 10-item Marlowe-Crowne Social Desirability scale (Strahan & Gerbasi, 1972). An item example is: "I have never intensely disliked anyone". Items were scored 0 (false) or 1 (true), except for the specific items that required inverse scoring.

Psychopathology

Depressive symptoms were measured using the Patient Health Questionnaire PHQ-9 (Kroenke & Spitzer, 2002). An example of item is: "Over the last 2 weeks, how often have you been bothered by feeling down, depressed, or hopeless". The measure is scored from 0 (never) to 3 (almost every day) with total score ranging from 0 and 27.

Suicidal ideations were assessed using a 3-item scale (e.g., "I felt life was not worth living") (Garrison, Addy, Jackson, Mckeown, & Waller, 1991). Responses are scored on a 4-point scale (0=never, 3=very often). Total scores range from 0 to 9.

The frequency of cannabis use was assessed as described (Simons, Correia, Carey, & Borsari, 1998). Students were asked to report on a 9-point rating scale ranging from 0 (no use) to 8 (more than once a day) their frequency of cannabis use in the last 3 months.

Other variables

Subjective well-being was assessed using the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), a 5-item scale (e.g., "In most ways my life is close to my ideal") scored from 1 (strongly disagree) to 7 (strongly agree). We also measured well-being using three subscales (positive relations, self-acceptance and personal growth; each contains 7 items) of the Psychological Well-Being Scale (Ryff, 1989). An item example is: "Most people see me as loving and affectionate". Responses are scored on a scale ranging from 1 (strongly disagree) to 6 (strongly agree).

The self-assessed ability for serendipity (i.e., the capacity to creatively take advantage of an unexpected observation) was measured using the 7-item Serendipity Quotient (McCay-Peet & Toms, 2011). An item example is: "I had unexpected revelations about old ideas". Responses are scored on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The variable "Academic results" was obtained by asking students their overall grade for the last semester (Failed; Passed with grade $\geq 10/20$ and $< 12/20$; Passed with grade $\geq 12/20$ and $< 14/20$; Passed with grade $\geq 14/20$ and $< 16/20$; Passed with grade $\geq 16/20$).

For all scales used in this study, high scores indicate an elevated level of the respective variable.

Results

Factorial analyses

A confirmatory factor analysis (CFA) was used to test the Raine and Benishay's 3-factor model (Raine & Benishay, 1995). Multiple fit indices were used to evaluate the model fully, based on the following recommended indices (Tabachnick & Fidell, 2007): 1) the model chi square divided by the degree of freedom (χ^2 / df); this value should be smaller than 2.00; the lower this value is, the better the fit), 2) the Goodness-of-Fit Index (GFI; this value should be 0.90 or higher for a good fit; the higher this value is, the better the fit), 3) the Root Mean Square Residual (RMR; this value should be 0.05 or lower; the lower this value is, the better the fit), 4) the Root Mean Square Error of Approximation (RMSEA; this value should be 0.08 or lower; the lower this value is, the better the fit), 5) the Akaike information criterion (AIC, the lower this value is, the better the fit). The Raine and Benishay's 3-factor model fitted the data poorly ($\chi^2/df=5.81$, GFI=0.9, RMR=0.065, RMSEA=0.074, AIC=1.14). Then a principal component analysis using an Equamax rotation (which is the most adequate rotation method for dichotomous data) was conducted on the 22 SPQ-B items to identify a more relevant model based on two criteria: the scree test and the total proportion of variance accounted for (O'Rourke & Hatcher, 2013). The eigenvalue curve suggested either a 3-, or 4-factor solution. The 4-factor solution, accounting for 39% of the variance, was rejected as one of its factor was composed of a single item. The 3-factor solution accounting for 33.4% of the variance was thus chosen (Table 1). Each item was assigned to one of the three factors if this item

Suggested location of Table 1

loaded greater than 0.30 on that factor and if there was a difference of at least 0.20 between the loading of this item for this factor and the loading of this item for any other factors. The factors were called: "Negative schizotypy" (items 1, 11, 15, 21 and 22; e.g., "People find me aloof and distant"), "Positive schizotypy" (items 2, 5, 12 and 17; e.g., "Sense some person or force") and "Disorganized schizotypy" (items 3, 4, 6 and 13) dominated by eccentricity (e.g., "I use words in unusual way"; "unusual mannerisms and habits"; "People think I am very bizarre"). Factors were weakly correlated, with r varying from .09 to .26. As the total amount of the variance accounted for was not high, a CFA was conducted to test the fit of the novel model, which showed better fit indices ($\chi^2/df=4.67$, GFI=0.96, RMR=0.05, RMSEA=0.06, AIC=0.33) compared with the Raine and Benishay's model.

Cluster analysis

A cluster analysis was then conducted in two steps to generate profiles based on the novel model. In the first step, a hierarchical cluster analysis was conducted (Ward's method with Euclidean distance). Based on the dendrogram and the aggregation curve, a six-cluster solution was identified. In the second step, K-means clustering was used to assign individuals to one of the identified clusters. A discriminant analysis showed clear differences between clusters (Wilks' $\lambda= 0.04$, $p<0.001$) with 97.7% of cases

correctly classified. Each cluster was named according to the schizotypy factor(s) that scored above the sample mean with respect to this cluster (Figure 1; Table 2). This led to the five following clusters: High schizotypy (H); Positive schizotypy (P); Negative schizotypy (N); Disorganized schizotypy (D); Positive and Disorganized (PD). The sixth cluster was named Low (non schizotypy, L) as it scored below the mean on all schizotypy dimensions.

Suggested location of Figure 1

Using one-way analysis of variance, the clusters were compared on levels of schizotypy traits, depressive symptoms and cannabis use, academic achievement, variables sensitive to positive self-report biases (subjective well-being, life satisfaction, self-reported serendipity) and variables related to positive self-report biases (self-deceptive denial, wishful thinking, social desirability, and narcissistic traits; Table 2). Firstly, important intercluster differences were observed regarding the three schizotypy factors, which validated the classification. In addition the clusters displayed contrasted levels when considering the other variables.

Suggested location of Table 2

The schizotypic clusters overall displayed lower academic performance and higher levels of depressive symptoms, suicidal ideations and cannabis use compared with L. The clusters high in the positive factor (P and PD) had similar levels of well-being and life satisfaction than the L cluster while the clusters high in the negative factor (H and N) showed lower subjective well-being and life satisfaction compared with all other groups. Regarding self-reported serendipity, the PD group had the highest scores while the P group did not differ from the other clusters.

Self-deceptive denial in the P and PD groups were more elevated when comparing with other schizotypic clusters. In addition, the P and PD groups showed an intermediate level of wishful thinking, both being significantly higher in P and PD than in L. The L cluster had the highest level of socially desirable responding, followed by the clusters high in the positive factor (P and PD), although these differences were not significant. On the contrary, all schizotypic clusters had significantly higher levels of narcissistic traits than the L cluster. The P and PD groups showed an intermediate level of narcissistic traits, significantly higher in P and PD than in L.

Discussion

In this study we observed that the clusters with high scores of positive schizotypy and low levels of negative schizotypy (namely P and PD clusters) were characterized by a contrast between elevated scores of impairment markers (lower academic performance, higher depressive symptoms and cannabis use) with a high level of well-being, life satisfaction and self-reported serendipity. Thus these “high positive - low negative” schizotypy clusters displayed a relatively good quality of life, comparable to non-schizotypic individuals, in association with significant signs of impairment.

This contrast may reflect positive self-report biases. Indeed, the P and PD clusters had elevated scores for all variables susceptible to induce positive self-report biases (self-deceptive denial, wishful thinking, socially desirable responding, narcissistic traits) while the clusters high in the negative factor (H and N) had lower scores. This suggests that the relative high levels of well-being, life satisfaction, and self-reported serendipity, observed in group with high levels of positive schizotypy and low levels of the

negative dimension, may in fact be linked to positive self-report biases. In addition this is consistent with a previous study in which responses biases have been investigated in relationship with positive or negative schizotypy trait (Christine Mohr & Leonards, 2005). This study showed, by manipulating the context of in which a test was administered, that defensive response biases were more likely to affect positive traits scores than negative traits.

Of note, our study confirms the link between diminished subjective wellbeing and negative schizotypy (Abbott, Do, & Byrne, 2012; Cohen & Davis, 2009). Indeed the two groups with elevated negative schizotypy (namely H and N) displayed lower scores of life satisfaction and wellbeing, compared with all the other clusters that are low in negative schizotypy.

This study is based on an exploratory factor analysis of SPQ-B data which produced a 3-factor structure (positive, negative and disorganized) already reported in college students (Axelrod, Grilo, Sanislow, & McGlashan, 2001; Compton et al., 2009; Raine & Benishay, 1995). Based on these factors, a cluster analysis identified six clusters. The identified clusters were reminiscent of those described in earlier reports (Barrantes-Vidal et al., 2003; Barrantes-Vidal et al., 2010; Suhr & Spitznagel, 2001) and the fact that the P and PD clusters showed levels of well-being and satisfaction with life similar to the L group is consistent with an earlier report (Tabak & de Mamani, 2013). Moreover a large number of significant intercluster differences were observed in our sample.

Regarding the representativeness of our sample, the total mean score (9.4 ± 4.3) for the SPQ-B in our sample is very close to the mean value of 9.6 ± 3.9 reported in a sample of college students (Raine & Benishay, 1995). Similarly the total mean score (9.72 ± 5.36) for PHQ-9 in our study is close to the mean value of 10.44 ± 5.7 found in a sample of U.S. college students (Garlow et al., 2008).

Our report has several limitations. First this study is cross-sectional and results are data-driven and may be not generalizable, considering that participants were generally healthy, high-functioning female students. Regarding the exploratory factor analysis, there are differences between the items composing the factors in the literature (Axelrod et al., 2001; Compton et al., 2009; Raine & Benishay, 1995) and we had to eliminate some items to obtain more specific dimensions. Another limitation is the fact that scales showed suboptimal Cronbach's alphas ranging between 0.60 and 0.70, even though this can be considered as an acceptable level of consistency (Schmitt, 1996).

In conclusion, this study suggests that the healthy appearance of positive schizotypy may in fact be linked to positive self-report biases. This emphasizes the necessity of measuring potential advantages of positive schizotypy using methods that are more objective than self-report questionnaires which may be too sensitive to positive self-report biases among individuals with high levels of positive schizotypy features.

Acknowledgments

We thank Victoria Nidetch for help in data collection.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

- Abbott, G. R., Do, M., & Byrne, L. K. (2012). Diminished subjective wellbeing in schizotypy is more than just negative affect. *Personality and Individual Differences, 52*(8), 914-918.
- Axelrod, S. R., Grilo, C. M., Sanislow, C., & McGlashan, T. H. (2001). Schizotypal personality questionnaire-brief: Factor structure and convergent validity in inpatient adolescents. *Journal of Personality Disorders, 15*(2), 168-179.
- Barrantes-Vidal, N., Fananas, L., Rosa, A., & Obiols, J. E. (2003). Neurocognitive, behavioural, and neurodevelopmental correlates of schizotypy clusters in adolescents from the general population. *Schizophrenia Research, 60*(1), 123-123.
- Barrantes-Vidal, N., Lewandowski, K. E., & Kwapil, T. R. (2010). Psychopathology, social adjustment and personality correlates of schizotypy clusters in a large nonclinical sample. *Schizophrenia Research, 122*(1-3), 219-225.
- Chapman, L. J., Chapman, J. P., Kwapil, T. R., Eckblad, M., & Zinser, M. C. (1994). Putatively Psychosis-Prone Subjects 10 Years Later. *Journal of Abnormal Psychology, 103*(2), 171-183.
- Cohen, A. S., & Davis, T. E. (2009). Quality of life across the schizotypy spectrum: findings from a large nonclinical adult sample. *Comprehensive Psychiatry, 50*(5), 408-414.
- Compton, M. T., Goulding, S. M., Bakeman, R., & McClure-Tone, E. B. (2009). An examination of the factorial structure of the Schizotypal Personality Questionnaire-Brief (SPQ-B) among undergraduate students. *Schizophrenia Research, 115*(2-3), 286-289.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49*(1), 71-75.
- Dinn, W. M., Harris, C. L., Aycicegi, A., Greene, P., & Andover, M. S. (2002). Positive and negative schizotypy in a student sample: neurocognitive and clinical correlates. *Schizophrenia Research, 56*(1-2), 171-185.
- Fonseca-Pedrero, E., Paino, M., Sierra-Baigrie, S., Lemos-Giráldez, S., & Muñiz, J. (2012). Psychotic-like experiences, emotional and behavioral problems and coping strategies in nonclinic adolescents. *Anuario de psicología/The UB Journal of psychology, 42*(3), 295-307.
- Garlow, S. J., Rosenberg, J., Moore, J. D., Haas, A. P., Koestner, B., Hendin, H., & Nemeroff, C. B. (2008). Depression, desperation, and suicidal ideation in college students: results from the American Foundation for Suicide Prevention College Screening Project at Emory University. *Depression and Anxiety, 25*(6), 482-488. doi:10.1002/da.20321
- Garrison, C. Z., Addy, C. L., Jackson, K. L., Mckeown, R. E., & Waller, J. L. (1991). A Longitudinal-Study of Suicidal Ideation in Young Adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*(4), 597-603.
- Hyer, S. E., Rieder, R. O., Williams, J. B., Spitzer, J. H., & Lyons, M. (1988). The Personality Diagnostic Questionnaire: Development and preliminary results. *Journal of Personality Disorders, 2*(3), 229-237.

- Kocsis-Bogar, K., Nemes, Z., & Perczel-Forintos, D. (2016). Factorial structure of the Hungarian version of Oxford-Liverpool Inventory of Feelings and Experiences and its applicability on the schizophrenia-schizotypy continuum. *Personality and Individual Differences, 90*, 130-136.
- Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals, 32*(9), 509-515.
- Kwapil, T. R., Gross, G. M., Silvia, P. J., & Barrantes-Vidal, N. (2013). Prediction of Psychopathology and Functional Impairment by Positive and Negative Schizotypy in the Chapmans' Ten-Year Longitudinal Study. *Journal of Abnormal Psychology, 122*(3), 807-815.
- McCay-Peet, L., & Toms, E. G. (2011). The serendipity quotient. *Proceedings of the American Society for Information Science and Technology, 48*(1), 1-4.
- McCreery, C., & Claridge, G. (2002). Healthy schizotypy: the case of out-of-the-body experiences. *Personality and Individual Differences, 32*(1), 141-154.
- Mohr, C., & Claridge, G. (2015). Schizotypy-Do Not Worry, It Is Not All Worrisome. *Schizophrenia Bulletin, 41*(suppl 2), S436-S443.
- Mohr, C., & Leonards, U. (2005). Does contextual information influence positive and negative schizotypy scores in healthy individuals? The answer is maybe. *Psychiatry Research, 136*(2), 135-141.
- O'Rourke, N., & Hatcher, L. (2013). *A step-by-step approach to using SAS for factor analysis and structural equation modeling.* : Sas Institute.
- Paulhus, D. L., & Reid, D. B. (1991). Enhancement and Denial in Socially Desirable Responding. *Journal of Personality and Social Psychology, 60*(2), 307-317.
- Raine, A., & Benishay, D. (1995). The SBQ-B: A brief screening instrument for schizotypal personality disorder. *Journal of Personality Disorders, 9*(4), 346-355.
- Raynal, P., Goutaudier, N., Nidetch, V., & Chabrol, H. (2016). Typology of schizotypy in non-clinical young adults: Psychopathological and personality disorder traits correlates. *Psychiatry Research, 246*, 182-187.
- Ryff, C. D. (1989). Happiness Is Everything, or Is It - Explorations on the Meaning of Psychological Well-Being. *Journal of Personality and Social Psychology, 57*(6), 1069-1081.
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment, 8*(4), 350-353.
- Schofield, K., & Claridge, G. (2007). Paranormal experiences and mental health: Schizotypy as an underlying factor. *Personality and Individual Differences, 43*(7), 1908-1916.
- Sedikides, C., Rudich, E. A., Gregg, A. P., Kumashiro, M., & Rusbult, C. (2004). Are normal narcissists psychologically healthy?: Self-esteem matters. *Journal of Personality and Social Psychology, 87*(3), 400-416.
- Simons, J., Correia, C. J., Carey, K. B., & Borsari, B. E. (1998). Validating a five-factor marijuana motives measure: Relations with use, problems, and alcohol motives. *Journal of Counseling Psychology, 45*(3), 265-273.
- Strahan, R., & Gerbasi, K. C. (1972). Short, homogeneous versions of the Marlow-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 28*(2), 191-193.

- Suhr, J. A., & Spitznagel, M. B. (2001). Factor versus cluster models of schizotypal traits. I: A comparison of unselected and highly schizotypal samples. *Schizophrenia Research*, *52*(3), 231-239.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics*. Boston, MA.: Pearson Education.
- Tabak, N. T., & de Mamani, A. G. W. (2013). Latent profile analysis of healthy schizotypy within the extended psychosis phenotype. *Psychiatry Research*, *210*(3), 1008-1013.
- van Os, J., & Linscott, R. J. (2012). Introduction: The Extended Psychosis Phenotype-Relationship With Schizophrenia and With Ultrahigh Risk Status for Psychosis. *Schizophrenia Bulletin*, *38*(2), 227-230.
- Vitaliano, P. P., Russo, J., Carr, J. E., Maiuro, R. D., & Becker, J. (1985). The Ways of Coping Checklist - Revision and Psychometric Properties. *Multivariate Behavioral Research*, *20*(1), 3-26.

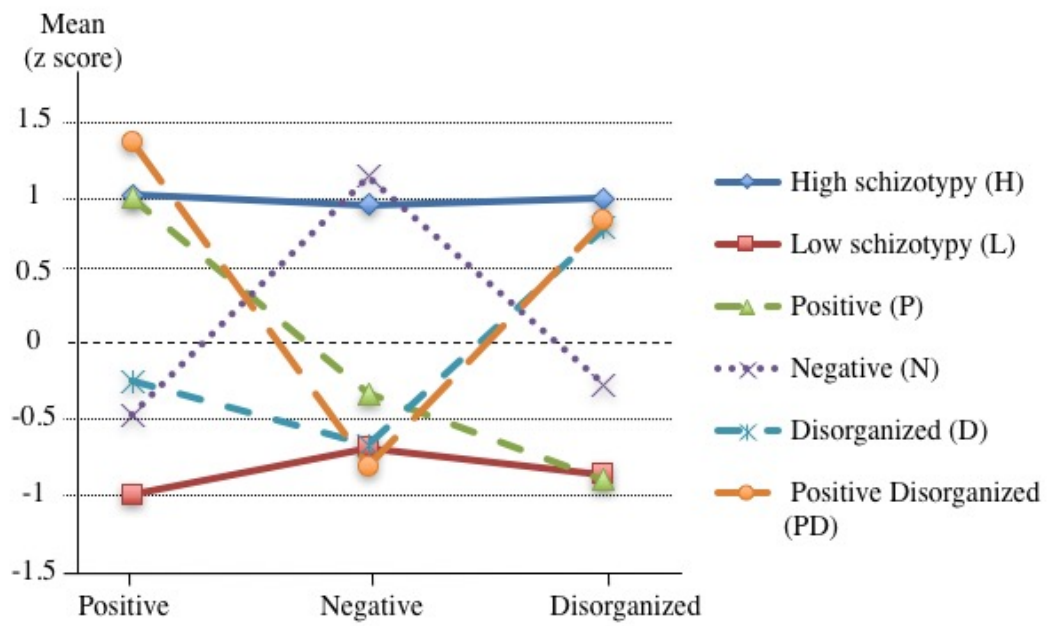


Figure 1. Six-cluster solution based on the three factors of schizotypal traits indicated on the x-axis.

Table 1
Principal component analysis of 22 SPQ-B items

item	Factor loadings		
	1 Negative schizotypy	2 Positive schizotypy	3 Disorganized schizotypy
1. people find me aloof and distant	<u>0.55</u>	0.08	0.1
2. sense some person or force	-0.05	<u>0.55</u>	0.14
3. unusual mannerisms and habits	0.03	0.19	<u>0.59</u>
4. people can tell what you're thinking	-0.12	0.06	<u>0.31</u>
5. noticed special signs for you	-0.03	<u>0.58</u>	0.14
6. people think I am very bizarre	0.08	0.29	<u>0.52</u>
7. on my guard even with friends	0.45	0.46	-0.03
8. people find me vague and elusive	0.38	-0.14	0.52
9. often pick up hidden threats	0.32	0.36	0.13
10. people are taking notice of you	0.25	0.36	-0.01
11. discomfort with unfamiliar people	<u>0.71</u>	-0.01	-0.04
12. astrology, UFOs, ESP, sixth sense	-0.11	<u>0.54</u>	0.03
13. I use words in unusual ways	0.07	-0.16	<u>0.65</u>
14. not let people know about you	0.45	0.25	0.09
15. tend to keep in the background	<u>0.69</u>	0.02	0.03
16. distracted by distant sounds	0.06	0.28	0.44
17. stops people from taking advantage	0.21	<u>0.42</u>	0.13
18. unable to get "close" to people	0.47	0.27	-0.03
19. I am an odd, unusual person	0.01	0.41	0.36
20. hard to communicate clearly	0.52	0.14	0.32
21. very uneasy talking to people	<u>0.71</u>	-0.05	-0.02
22. tend to keep my feelings to myself	<u>0.4</u>	-0.03	0.04
Eigenvalues	3.93	2.05	1.33
Explained variance	14.7%	9.78%	8.79%

Values >0.3 are in bold

Items retained in the model are underlined

Table 2
Typology of individuals on three dimensions of schizotypy. Cluster comparison using ANOVA and post-hoc test.

	Sample <i>N</i> =976 <i>M</i> (<i>SD</i>)	Range	alpha	MIC	Cluster <i>M</i> (<i>SD</i>)					<i>F</i>	Significant comparisons	
					High schizot. <i>n</i> =157 16%	Low schizot. <i>n</i> =209 21%	Positive <i>n</i> =110 11%	Negative <i>n</i> =226 23%	Disorganized <i>n</i> =197 20%			Posit. Disorg. <i>n</i> =77 8%
Total schizotypy	9.40 (4.34)	0-22	0.85	0.22	14.94 (2.96)	4.18 (2.35)	8.83 (2.76)	10.89 (3.08)	8.42 (2.19)	11.16 (2.51)	322.6*	H>N,PD>P,D>L
Positive schizotypy	1.60 (1.18)	0-4	0.66	0.34	2.78 (0.78)	0.40 (0.49)	2.76 (0.72)	1.04 (0.74)	1.3 (0.61)	3.21 (0.41)	450.4*	PD>H,P>D>N>L
Negative schizot.	2.48 (1.61)	0-5	0.82	0.51	3.95 (0.88)	1.33 (0.93)	1.92 (1.2)	4.26 (0.78)	1.36 (0.9)	1.13 (0.78)	426.5*	N>H>P>D,PD,L
Disorganized schizot.	1.79 (1.18)	0-4	0.54	0.24	2.9 (0.78)	0.75 (0.72)	0.71 (0.46)	1.45 (0.89)	2.68 (0.72)	2.73 (0.75)	280.2*	H,D,PD>N>L,P
Academic results	1.85 (1)	0-4	n.a.	n.a.	1.58 (1.05)	2 (0.96)	1.72 (1.05)	1.88 (0.96)	1.81 (1)	1.89 (0.99)	3.68*	L>H
Academic level	2.43 (1.3)	1-6	n.a.	n.a.	1.98 (1.06)	2.71 (1.27)	2.25 (1.26)	2.34 (1.22)	2.39 (1.28)	2.1 (1.2)	7.18*	L>H,P,N,PD D>H
Depressive sympt.	9.72 (5.36)	0-25	0.82	0.35	13.08 (5.83)	6.84 (4.22)	9.11 (4.64)	10.5 (5.33)	9.36 (4.71)	10.17 (5.36)	29.74*	H>P,N,D,PD>L
Suicidal ideations	0.89 (1.85)	0-9	0.87	0.7	1.68 (2.46)	0.18 (0.65)	0.67 (1.24)	1.18 (2.06)	0.73 (1.7)	1.09 (2.25)	14.76*	H,N,D,PD>L H>P,PD
Cannabis use	0.78 (1.75)	0-8	n.a.	n.a.	0.81 (1.89)	0.58 (1.44)	0.83 (1.83)	0.5 (1.3)	1.07 (1.98)	1.31 (2.32)	4.306*	D,PD>N PD>L
Life satisfaction	22.24 (7.21)	5-35	0.86	0.55	19.61 (7.54)	25.07 (6.2)	23.35 (6.84)	19.85 (7.11)	23.19 (6.74)	22.88 (7.29)	18.46*	L,P,D,PD>H,N
Well-being	82.91 (9.83)	39-109	0.61	0.07	78.26 (8.21)	87.53 (9.49)	85.14 (8.61)	77.58 (9.56)	85.50 (8.64)	85.66 (8.08)	41.89*	L,P,D,PD>H,N
Serendpity	25.85 (6.39)	7-35	0.89	0.53	26.47 (6.4)	24.9 (6.52)	25.76 (6.46)	24.88 (6.48)	26.5 (6.14)	28.4 (5.3)	5.25*	PD>L,N
Denial	82.69 (13.87)	42-125	0.68	0.09	77.39 (13.19)	87.02 (13.74)	84 (14.65)	82.72 (13.97)	80.94 (12.39)	83.23 (14.2)	9.05*	L>H,N,D,P,N>H
Wishful thinking	15.95 (4.44)	0-24	0.74	0.07	17.82 (4.17)	13.37 (4.65)	16.51 (4.44)	16.31 (3.86)	16.02 (4.06)	17.12 (3.91)	23.93*	H>N,D>L P>L
Narcissistic traits	17.55 (4.09)	9-31	0.64	0.17	19.35 (4.1)	16 (3.86)	17.99 (4.21)	17.31 (3.9)	17.13 (3.69)	19.19 (4.08)	16.7*	H,PD>N,D>L P>L
Social desirability	4.43 (1.8)	0-9	0.42	0.08	3.95 (1.71)	4.74 (1.88)	4.51 (1.71)	4.45 (1.74)	4.37 (1.88)	4.57 (1.74)	3.68*	L>H

MIC: mean interitem correlation; n.a.: not applicable; * $p < 0.05$

D: Disorganized schizotypy cluster; H: High schizotypy cluster; L: Low schizotypy cluster; N: Negative schizotypy cluster; P: Positive schizotypy cluster;

PD: Positive and Disorganized schizotypy cluster