Internal encoding style and schizotypy: towards a conceptually-driven account of positive symptoms

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Abstract

Perception results from a combination of actual data and interpretative schemata based on pre-existing knowledge. Thus, ensuing subjective experience depends on the dynamic interplay between data-driven and conceptually-driven processing. A chronic imbalance between these two sources of stimulus encoding is likely to be maladaptive and could underlie cognitive and behavioral disturbances similar to that observed in schizotypy, especially if the balance is tipped too far towards conceptually-driven processing (i.e., Internal encoding style). This study aimed to examine the relationships between encoding style and various dimensions of schizotypy, by using a questionnaire that evaluates the extent to which pre-existing schemata (versus cues from the outside world) affect encoding processes. Consistent with previous findings, our results revealed that both Cognitive-Perceptual and Disorganization dimensions were related to an internal mode of encoding, suggesting that individuals with these features may be characterized by a disposition to biases at early stages of encoding.

1. Introduction

As is the case with numerous psychopathological symptoms, those observed in schizophrenia can also be viewed on a continuum with normal experiences, ranging from non maladaptive peculiar experiences to extreme, psychosis-like states. Based on such a dimensional view, schizotypy has been suggested to lie somewhere between these two extremes, and could thus be conceptualized as an attenuated manifestation of schizophrenic-like states. This proposal is supported by numerous studies examining cognitive and psychological mechanisms, symptom dimensions, social and genetic factors, and demographic risk factors (see Cuesta, Ugarte, Goicoa, Eraso, & Peralta, 2007). On a phenomenological level, both schizotypy and schizophrenia imply peculiar experiences, including delusional beliefs, magical ideation, unusual perceptual experiences, odd thinking and speech, constricted affect, peculiar behavior, lack of close friends, and social anxiety. Numerous studies suggest that symptoms of schizophrenia and schizotypy in non-clinical samples are associated with similar neurocognitive dysfunction (for a review, see Siever & Davis, 2004). The goal of the present study was to better understand schizotypal phenomena in the context of frequently encountered peculiar experiences, such as pareidolia (i.e., perceiving objects or faces in random stimulus) and apophenia (i.e., perceiving connections between unrelated stimuli or events), which are thought to arise from universal laws of human perception and cognition.

Several studies have shown that people with schizophrenia are more prone to detect meaningful patterns in meaningless noise (i.e., *pareidolia*; e.g., Vercammen, De Haan, & Aleman, 2008) and to see connections between unrelated events (i.e., *apophenia*; e.g., Fyfe, Williams, Mason, & Pickup, 2008). Both pareidolia and apophenia are psychological phenomena that are frequently encountered in the general population. These phenomena may appear because our perceptual system is biased towards detecting the presence of patterns and other agents (i.e., animals, humans) in the environment (Barrett, 2000), and because our

cognitive system is prone to attribute meaning to what is perceived. More specifically, what we perceive results from a combination of the objective external data (physical inputs) and the internal (subjective), interpretive schemata (pre-existing representations). The dynamic interplay between the integration of these two kinds of information may determine the way in which we construe our environment (Johnston & Hawley, 1994; Lewicki, 2005). For instance, recent research on apophenia and pareidolia in non-psychiatric samples has revealed that peculiar cognitive or perceptive experiences frequently encountered in the general population may be the consequence of a normal mechanism in the cognitive system involving the use of pre-existing representations to quickly process the environment with few resources needed (e.g., Voss, Federmeier, & Paller, 2012).

Furthermore, some research has revealed the existence of individual differences in how preexisting, internal schemata (versus actual data) affect perception (Lewicki, 2005). These differences relate to how 'hasty' (or 'internal', i.e., based on internal encoding categories) versus 'conservative' (or 'external', i.e., based on data from external stimuli) the encoding processes are (Lewicki, 2005). According to Lewicki (2005), encoding style can be conceptualized as the relative amount of supportive evidence a perceiver needs to accumulate before imposing an interpretive category on a cue (i.e., the threshold amount necessary to trigger an interpretive schema). More specifically, encoding processes imply that the cognitive system imposes preexisting categories on stimuli (i.e., interpretive schemata) even if the stimuli do not match the categories very well. However, in order for an interpretive schema to be imposed on the stimulus, the match between the stimulus and the schema does not have to be perfect, but that there always needs to be a particular minimum amount of direct or indirect evidence (supportive of selecting the particular interpretive schema) available to the perceiver before the schema can be instantiated. Theoretically, the "required" threshold amount of such evidence (necessary to instantiate an interpretive schema) can represent a trade-off between speed and accuracy: The lower the threshold (i.e., the minimum

amount of evidence) necessary to trigger the use of an encoding schema, the faster the encoding (at the expense of accuracy - because the hastily selected schema may not be the most appropriate one). On the other hand, the higher the threshold (i.e., the maximum amount of evidence) necessary to trigger the instantiation of an encoding schema, the more accurate the selection of the schema (at the expense of speed). In other words, when stimuli are ambiguous, encoding algorithms may unconsciously impose preexisting interpretative categories on these stimuli even if they objectively do not match those categories very well. However, people generally remain able to give up an encoding category when it appears to be inadequate. The problem in people with an inflated internal encoding style would be in their inability to abandon an encoding disposition when it appears to be inadequate, and further to switch to a new one. Research indicates that high levels of internal encoding increases the probability that the environmental cues will be interpreted in terms of preexisting (internal) encoding schemata, thus providing support for those representations and contributing to their reinforcement through the process of 'self-perpetuation' (e.g. Lewicki, 2005).

Encoding style can be assessed by means of the Encoding Style Questionnaire (ESQ; Lewicki, 2005). This scale was constructed on the basis of the assumption that the threshold of instantiation of schemata may determine the probability and, therefore, the frequency of experiencing the commonly observed phenomenon 'split second illusions' (i.e., the erroneous impression that one has recognized something specific, only to realize a moment later that it was something else). Because internal encoders are more likely to more hastily impose (even erroneous) internal schemata in the course of perception, they should experience split second illusions more frequently when identifying certain known objects or phenomena. Recent studies have confirmed that encoding style is a continuum extending from extremely internal to extremely external, as scores on the ESQ were found to be normally distributed (Belayachi & Van der Linden, 2010; Billieux, D'Argembeau, Lewicki, & Van der Linden, 2009). Internal encoding as measured by the ESQ was found to be related to better recognition performances

in tachistoscopic presentations of everyday objects or incomplete displays of letters, and with more self-perpetuation of newly acquired encoding algorithms (see Lewicki, 2005).

On a more clinical note, other studies have suggested that a disposition to impose internal personal schemata on stimuli may have dysfunctional long-term consequences (i.e., the self-perpetuation of maladaptive schemata) and may even lead to psychopathological symptoms (Lewicki, 2005). This idea has been supported in various studies showing that high internal encoding scores are related to depression, anxiety (Lewicki, 2005), impulsiveness (Billieux et al., 2009), obsessive-compulsive symptoms (Belayachi & Van der Linden, 2010) and symptoms connected with delusional experiences, such as fantasy proneness, paranoia (Lewicki, 2005) and schizotypy (Badoud, Billieux, Van der Linden, Eliez, & Debbané, 2013). In the Badoud et al. (2013) study, the authors examined the relationships between encoding style (as measured with the ESQ) and schizotypy proneness in an adolescent sample. They observed that the unusual perceptive and cognitive experiences (i.e., positive symptoms) dimensions of schizotypy were related to an extremely high internal mode of encoding. It remains, however, to replicate these findings in adult participants with schizotypy proneness. Additionally, however, the positive-symptom dimensions of schizotypy are strongly associated with anxiety and depression (Lewandowski et al., 2006). Therefore, knowing that both anxiety and depression have also been shown to be connected with an internal encoding style (Lewicki, 2005), these affective components could have influenced the observed relation between encoding style and positive schizotypal symptoms, which was not taken into account in the Badoud et al. (2013) study.

The aim of the present study was thus to re-examine the relationship between internal encoding style and schizotypy proneness albeit in adulthood, and furthermore to explore whether the relationship between encoding style and schizotypy is secondary to the presence of mood comorbidities (i.e., anxiety and depression). The different schizotypal dimensions are also compared with the encoding style measure. Indeed, schizotypy encompasses various

dimensions, namely interpersonal deficits, unusual cognitive and perceptual experiences and disorganized behaviors, which may be distinguished according to their neurocognitive correlates (e.g., Siever & Davis, 2004). Considering that phenomena potentially reflecting increased conceptual processing has generally been connected with positive symptoms (e.g., Kapur, 2003), we expected the cognitive-perceptual and disorganized dimensions to be specifically associated with internal encoding, as compared to the negative symptoms (i.e., the interpersonal dimension).

2. Method

2.1. Participants

One hundred and eighty-four undergraduate students aged between 18 and 30, participated in the study. Participants were randomly recruited from various faculties at the University of Liège and were not compensated for their participation. Data from seven participants had to be discarded as they appeared to be critical outliers (see the Results section). The reported results are from the remaining 177 participants (71 males and 106 females). The mean age of the sample was 22 years (SD=1.93) and the mean number of years of education was 14.23 (SD=1.59).

2.2. Assessments

2.2.1. Encoding Style Questionnaire (ESQ)

Encoding style was assessed using the ESQ (Lewicki, 2005). This scale consists of 21 items: only six items (numbers 5, 8, 11, 15, 18, and 21) are target items and the remaining 15 items are included to disguise the focus of the test. Representative target items include, 'Sometimes when I'm driving, I see a piece of paper or a leaf being moved by the wind, and for a split second think that it might be an animal (e.g., a squirrel or a cat)'. Participants respond to each item using a 6-point Likert type scale, ranging from 1 (Strongly disagree) to 6 (Strongly agree). Total scores range from 6 to 36. A high score on the ESQ reflects an internal encoding style. The French version of the ESQ demonstrated good overall psychometric

properties and a factorial structure that is identical to that observed in the original English version (see Billieux et al., 2009).

2.2.2. Schizotypal Personality Questionnaire-Brief (SPQ-B).

The presence of schizotypal proneness was assessed with the brief version of the Schizotypal Personality Questionnaire (SPQ-B;(Raine & Benishay, 1995), which was developed to cover features of the schizotypal personality disorder, based on DSM-III-R criteria. This tool is a reliable self-report instrument that assesses various schizotypal related experiences, especially for dimensional research on the correlates of schizotypal features in the normal population. The SPQ-B consists of 22 items describing experiences (symptoms) similar to those encountered in schizophrenia. This self-report questionnaire is a multidimensional construct, it contains three factors which appear to parallel the factors that have been reported for schizophrenic symptomatology (e.g., Raine & Benishay, 1995): The Cognitive-Perceptual (made up of Magical Thinking, Unusual Perceptual Experiences), Interpersonal (Social Anxiety, Blunted Affect, Paranoid Ideation), and Disorganization (Odd Behavior, Odd Speech) factors. Participants are asked to determine if the situation described in each particular statement applies to them or not (i.e., a Yes/No format). Each question answered affirmatively receives a score of 1, so that total scores can range from 0 to 22; the Cognitive-Perceptual and Interpersonal subscales scores both range from 0 to 8, while the Disorganization subscale range from 0 to 6. In this study, a French version validated in college students was used (Belayachi et al., in prep). The French version of the SPQ-B demonstrated good overall psychometric properties and a factorial structure that is identical to that observed in the original English version.

2.2.3. State-Trait Anxiety Inventory (STAI).

The STAI (Spielberger, Gorsuch, & Lushene, 1970) was administrated in order to measure the severity of anxiety symptoms. The French version of the STAI (Bruchon-Schweitzer & Paulhan, 1993) is composed of 40 items that measure two aspects of anxiety.

The first set of 20 items assesses the respondents' state of anxiety at the time of the testing session (i.e., STAI-S), while the last 20 items constitute a self-reported measure of general anxiety (i.e., STAI-T). The current study will only focus on general anxiety (i.e., STAI-T). Each statement is rated on a 4-point scale (1 = "not at all" to 4 = "very much so"); 9 items of the STAI-T are reverse-scored. Scores are summed, with total possible scores ranging from 20 to 80.

2.2.4. Center for Epidemiological Studies Depression Scale (CES-D).

The presence and severity of current depression was assessed by the CES-D (Radloff, 1977). This self-report measure consists of 20 items describing states of happiness or depressed mood. For each item, participants are asked to indicate how often they have felt the way described in the statement during the last week, by using a 4-point Likert scale ranging from "Never, rarely (less than one day)" (scored 0) to "Frequently, all the time (from 5 to 7 days)" (scored 3). Total scores range from 0 to 60. The French version of the CES-D has demonstrated good overall psychometric properties and a factorial structure similar to that observed in the original English version (see Fuhrer & Rouillon, 1989).

2.3. Procedure

Informed consent was obtained from all participants following a full explanation of the experimental procedure. Detailed written and oral instructions explained that participants would be asked questions about different aspects of their everyday experiences and feelings. They were participating anonymously and on a volunteer basis. The study was approved by the local ethics committee. The participants were tested in group sessions (up to six participants at a time), lasting from 30 to 45 minutes. They all completed the ESQ, SPQ-B, STAI and CES-D, as well as other questionnaires unrelated to the present study. All these measures were presented in a counterbalanced order across participants.

3. Results

3.1. Preliminary analyses

Based on Cook's distance index, preliminary analyses identified 7 participants as multivariate outliers (i.e., participants with a Cook's distance greater than the cutoff of 4/[number of cases − number of predictors − 1] are generally defined as multivariate outliers; Fox, 1991). These participants were therefore excluded from the data-set.

Table 1 summarizes the mean scores and SD for the encoding style, schizotypy, depression and anxiety measures. Statistical tests of homogeneity confirmed that the mean score on the ESQ obtained in this study did not differ from that observed in a sample of 308 undergraduates students in a previous study (Belayachi & Van der Linden, 2010) (p = .159). When compared with SPQ-B scores obtained in an English-speaking sample of 824 undergraduates students in the Compton, Goulding, Bakeman, & McClure-Tone (2009) study, statistical tests of homogeneity revealed that the Cognitive-Perceptual and the Disorganization mean scores from our sample are lower than those reported by Compton et al. (2009) (ps < .001); whereas the Interpersonal and the SPQ-B total scores were comparable across the two studies (ps > .069). It should be noted that participants in our sample with scores within the top quartile of the distribution of the SPQ-B total score (score > 10; N = 40) had Cognitive-perceptual subscores (M = 3.95; SD = 1.56) and Interpersonal subscores (M = 4.67; SD = 1.68) comparable to those observed among 34 inpatients with personality disorder ($M_{Cognitve\text{-}Perceptual}$ = 3.10; $SD_{Cognitive\text{-}Perceptual}$ = 2.40; $M_{Interpersonal}$ = 4.70; $SD_{Interpersonal}$ = 2.40) reported by Axelrod et al. (2001) (ps > .05). However, our extreme participants had disorganization subscores (M = 3.95; SD = 1.17) and SPQ-B total scores (M = 12.57; SD = 1.71) that are significantly greater than those reported by Axelrod et al. (2001) ($M_{Disorganisation}$ = 2.90; $SD_{Disorganisation}$ = 1.90; $M_{SPQ\text{-}B\ Total}$ = 10.60; $SD_{SPQ\text{-}B\ Total}$ = 5.80) (ps < .05).

Cronbach's alphas indicated acceptable to strong internal consistency for the encoding style (ESQ: .70), schizotypy (SPQ-B Total score: .87; Cognitive-Perceptual: .75; Interpersonal: .83; Disorganization: .70), depression (CES-D: .90), and anxiety (STAI-T: .90)

measures. Finally, age and education did not correlate with any of the variables included in the study (*p*s > .123 and *p*s > .368, respectively). However, there was a gender effect on some SPQ-B variables (see section 3.2.).

--PLEASE INSERT TABLE 1 HERE--

3.2. Relationship between encoding style, schizotypal dimensions and mood comorbidities

Pearson correlations were first performed in order to examine the intercorrelations between the measures of encoding style (i.e., ESQ), schizotypal symptoms (i.e., the three SPQ-B dimensions and the SPQ-B Total score), depression (i.e., CES-D) and anxiety (i.e., STAI-T). To correct for multiple comparisons, a Bonferroni correction of (0.05/21) = 0.002 was used. Results are summarized in Table 2. As expected, the encoding style measure correlated (positively) with all four of the schizotypy symptom measures, as well as with the measures of anxiety and depression. Further, these correlations ranged from moderate to large in magnitude, according to Cohen's criteria, except for the correlation between the Interpersonal subscale and internal encoding style, which was small in magnitude.

--PLEASE INSERT TABLE 2 HERE--

As noted above, preliminary analyses showed a gender effect on some variables (see Table 1 for mean scores and SDs of each gender group on the measures of interest). T-tests performed for the measures of encoding style, schizotypy, depression and anxiety showed that men scored significantly higher than women on the Cognitive-Perceptual [$t(175) = 3.93$, $p < .001$] and Disorganization [$t(175) = 4.09$, $p < .001$] scores, as well as on the SPQ-B Total score [$t(175) = 3.67$, $p < .001$]. Whereas there were no gender differences for encoding style ($p = .135$), the Interpersonal schizotypal dimension ($p = .401$), depression ($p = .460$) and anxiety ($p = .129$). Next, we compared the strength of the relationships of encoding style with the schizotypy measures in each gender group to determine whether these correlations differed significantly in magnitude, by means of Fisher's *Z* transformation method for

independent correlations (Fisher, 1921). As can be seen in Table 3, correlations between encoding style and each schizotypy dimension did not differ significantly in magnitude across gender, suggesting that there is no gender effect on the observed encoding style−schizotypy relationship.

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3.3. Impact of mood factors on the encoding style−schizotypy relation

We also examined the possibility that anxiety and depression, which have been shown to be connected with internal encoding style, may have accounted for the relationship between internal encoding style and the schizotypy measures. We therefore computed four separate partial correlations in order to re-examine the relation between each schizotypy dimension and encoding style, while controlling for anxiety and depression. These analyses revealed that correlations between internal encoding style and the Cognitive-Perceptual subscale (r =.40, p < .001), the Disorganization subscale (r=.38, p < .001) and the SPQ-B Total score (r =.41, p < .001) remained significant when partialling out anxiety and depression ratings. However, the relationship between internal encoding style and the Interpersonal dimension was no longer significant after controlling for anxiety and depression (r =.09, p =.238).

3.4. Specific relationships between schizotypal dimensions and internal encoding

Considering the potentially confounding influences of the intercorrelations between the SPQ-B dimensions, zero-order correlations cannot determine the independent contribution of each schizotypal dimension (i.e., once the effect of the other subscales has been removed). Hence, in order to investigate the specific relationship between internal encoding style and the various SPQ-B subscales, we performed a regression analysis with the encoding style measure as a dependent variable and the three SPQ-B subscales scores (entered simultaneously) as independent variables. A Breusch-Pagan Test (χ^2 =4.39, p = 0.222) suggests that the assumption of homoscedasticity is satisfied, and tolerance values (ranging from .77 to .82) and variance inflation factor (VIF) values (ranging from 1.22 to 1.31) suggest that there was

no sign of multicollinearity (VIF values > 2.5 and tolerance < .40 are considered as problematic; Allison, 1999). According to this regression analysis, the Cognitive-Perceptual (t = 4.89, p < .001, β =.35) and Disorganization (t = 4.06, p < .001, β = .29) dimensions emerged as significant independent predictors of internal encoding style, whereas, the Interpersonal dimension (t = 0.42, p = .966, β =.003) did not explain a significant proportion of the variance of encoding style.

4. Discussion

The objective of the present study was to examine the relationship between internal encoding style and schizotypy proneness in adulthood and to explore whether the relationship between encoding style and schizotypy is mediated by mood comorbidities. As expected, the main finding of the present study was that internal encoding style as measured by the ESQ was related, in general, to schizotypy as measured by the SPQ-B Total score in our sample of young adults. Consistent with previous findings (Badoud et al., 2013), we observed that the Cognitive-Perceptual and Disorganization dimensions, and to a lesser extent the Interpersonal dimension, were associated with an internal mode of encoding style. However, the weak correlation between the Interpersonal dimension and encoding style no longer remained significant after controlling for mood factors (i.e. depression and anxiety), suggesting an important influence of mood comorbidities only in the Interpersonal-encoding style relation. Finally, results of the regression analysis revealed that both Cognitive-Perceptual and the Disorganization symptom dimensions seemed to have an independent relationship with an internal mode of encoding. These results replicate previous findings obtained in a sample of adolescents and showing that internal encoding may characterize only the so-called positive symptoms of schizotypy (i.e., the Cognitive-Perceptual and the Disorganization dimensions) (Badoud et al., 2013). Moreover, the fact that internal encoding is specifically connected with positive symptoms and not with the Interpersonal dimension (i.e., negative symptoms) further supports the idea that the various dimensions of the schizophrenia spectrum may be connected

with distinct cognitive mechanisms (Siever & Davis, 2004). Additionally, as the impact of affective factors such as anxiety and depression were controlled for in this study, we can rule out the possibility that these factors may have accounted for the relationship between the internal mode of encoding and the positive dimensions of schizotypal proneness.

Knowing that an internal encoding style may lead to a dysfunctional progression in maladaptive thinking and beliefs (Lewicki et al., 1989; Lewicki, 2005), our results are consistent with the fact that belief in magical or delusional thinking style characterizing schizotypy is most strongly related to traits tapped by unusual perceptual and cognitive experiences (Peters, Joseph, Day, & Garety, 2004). On a phenomenological level, the subjective experience connected with internal encoding style (i.e., "split second illusion") is comparable to that experienced by people with positive schizotypal features. According to the encoding style theory, an internal mode of encoding in the course of perception leads individuals to have a strong feeling of seeing things that are not obviously there (Lewicki, 2005). Extreme internal encoding may lead one to have an immediate subjective experience similar to that one could undergo if confronted with the actual presentation of the same things, and this could also help explain why distorted perception in people with schizotypal symptoms are experienced as real. Our results are consistent with a recent study on visual illusions, according to which the high propensity of schizophrenic patients for illusory perception may reflect an increased reliance on conceptually-driven processing (Schneider et al., 2002). Our results are also consistent with previous studies on apophenia in schizotypy. Indeed, by using the 'moving triangles task' it has been found that participants with schizotypy features were more prone towards ascribing meaning to random movements of geometrical figures (e.g., Fyfe et al., 2008). Knowing that finding meaning in ambiguous stimuli in non psychiatric population may imply a cortical network that is similar to that activated for real object perception (i.e., based on pre-existing knowledge) (Voss et al., 2012),

one could argue that unusual perceptive and cognitive experiences in schizotypy might be connected with an exaggeration of a normal process.

Our results also fit with the Kapur's (2003) aberrant salience hypothesis, according to which positive symptoms of the schizophrenia spectrum (such as delusions and hallucinations) are seen as reflecting an impaired mechanism leading to unusual or incorrect assignments of salience, significance, or importance to ambiguous stimuli. Based on the idea that dopamine plays a key role in mediating the "salience" of environmental events and internal representations, it is maintained that an excessive dopaminergic transmission in people with symptoms of schizophrenia spectrum is responsible for an abnormal salience of the internal representations, which in turn leads to disturbed perception and interpretation of the external reality. Interestingly, inflated dopaminergic transmission has been observed in patients with schizophrenia (e.g., Abi-Dargham et al., 1998), in people diagnosed with schizotypal personality disorder (e.g., Abi-Dargham et al., 2004) and in healthy individuals with schizotypy proneness (e.g., Chen et al., 2012). All these studies reveal that this particularity in dopaminergic transmission may be specifically related to positive symptoms. In light of this framework, one could argue that inflated dopaminergic transmission may shorten the threshold of instantiation, which in turn triggers an imbalance between data-driven and conceptually-driven processing that is potentially responsible for aberrant perceptual and cognitive experiences. This suggestion deserves to be examined in future studies.

Finally, although our results are consistent with previous empirical studies and theoretical frameworks suggesting that conceptually-driven processing may lead to schizotypal and schizophrenic symptoms, it is important to emphasize the fact that the cross-sectional nature of our study does not clarify the nature of the relationship between internal encoding and schizotypy. Indeed, what remains unclear is whether internal encoding leads people to be more prone to have peculiar experiences, which in turn leads to high schizotypy

proneness, or whether schizotypy per se may be responsible for an increased internal mode of encoding. Further studies are therefore needed in order to disentangle this issue.

To sum up, it is assumed that perceptual processing of surroundings is both data-driven by physical inputs and conceptually-driven by interpretative schemata. Although it is normal that people do not experience objective reality in the same manner, some individuals experience a world that is too distant from the objective reality and an extreme internal mode of encoding may account for this. Further, this may be particularly the case for people with schizotypal features. The present study showed that an imbalance in the dynamic interaction between conceptually- and data driven-processing, as measured with the ESQ, is strongly related to abnormal perceptual and cognitive experiences in schizotypy. Further studies should be conducted in order to better grasp the causal connection between internal encoding and schizotypy, as well as to replicate these findings in people with more severe positive symptoms (i.e., in people with a schizophrenia diagnosis).

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Table 1. Mean scores, SDs and range for encoding style, schizotypy, depression and anxiety measures for the whole sample and for each gender group.

Dependent variables	Whole sample	Men	Women
Encoding style (ESQ)	17.48 (5.12)	18.18 (5.13)	17.01 (5.08)
	Range: 6−30	Range: 6−30	Range: 6−29
Schizotypal dimensions (SPQ-B)			
SPQ-B Cognitive-Perceptual	2.01 (1.71)	2.61 (1.86)	1.60 (1.49)
	Range: 0−7	Range: 0−7	Range: 0−6
SPQ-B Interpersonal	2.66 (2.01)	2.82 (1.85)	2.56 (2.12)
	Range: 0−8	Range: 0−7	Range: 0−8
SPQ-B Disorganization	2.34 (1.58)	2.92 (1.71)	1.96 (1.37)
	Range: 0−6	Range: 0−6	Range: 0−6
SPQ-B Total score	7.02 (4.05)	8.34 (4.08)	6.13 (3.80)
	Range: 0−18	Range: 1−18	Range: 0−15
Depression (CES-D)	14.47 (9.32)	13.42 (7.79)	14.42 (9.46)
	Range: 0−45	Range: 0−36	Range: 1−45
Anxiety (STAI-T)	41.51 (9.61)	39.93 (9.42)	42.10 (9.15)
	Range: 21−71	Range: 21−62	Range: 22−71

Note: SD: standard deviation

Table 2. Pearson Correlations between schizotypy, anxiety, depression and Encoding Style Measures

	Encoding style (ESQ)	SPQ-B Cognitive-Perceptual	SPQ-B Interpersonal	SPQ-B Disorganization	SPQ-B Total score	Depression (CES-D)
Encoding style (ESQ)						
SPQ-B Cognitive-Perceptual	0.47					
SPQ-B Interpersonal	0.23†	0.33				
SPQ-B Disorganization	0.44	0.41	0.38			
SPQ-B Total score	0.49	0.75	0.79	0.75		
Depression (CES-D)	0.25	0.39	0.49	0.37	0.55	
Anxiety (STAI-T)	0.29	0.39	0.50	0.32	0.54	0.72

Note: All correlations were significant at a corrected alpha level of $p < .002$, except the correlation value marked by † ($p = .002$).

Table 3. Comparing correlations of encoding style and schizotypy measures across gender

Correlation with encoding style (ESQ)	Men	Women	Z
SPQ-B Cognitive-Perceptual	0.52	0.42	0.88 (p = 0.379)
SPQ-B Interpersonal	0.23†	0.22†	0.06 (p = 0.952)
SPQ-B Disorganization	0.45	0.42	0.21 (p = 0.834)
SPQ-B Total score	0.53	0.44	0.78 (p = 0.435)

Note: All correlations were significant at $p < .0001$, except the correlation value marked by † ($p \leq .052$).