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**Effects of a cognitive schema account on the stigma of schizophrenia: An exploratory study in a French university student sample**

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## **Abstract**

**Background:** Amongst people with psychiatric disorders, people experiencing schizophrenia are among those who are victims of high levels of stigmatization.

**Aims:** The present study explored how educational strategies emphasizing different types of etiological accounts of schizophrenia may help reduce the level of stigma towards the pathology.

**Methods:** A total of 378 students were randomly assigned to one of four groups. Three experimental groups were presented with a vignette which introduced one out of three different etiological accounts of schizophrenia (Cognitive distortion, Cognitive Schema, or Biogenetics). The fourth group was presented with a vignette unrelated to schizophrenia. The participants completed questionnaires which measured their attitudes, empathic concern and social distance towards people with schizophrenia, before and after reading the vignette.

**Results:** The “Cognitive Schema” etiological account, which emphasized maladaptive cognitive schemas, was the only one which led to a significant decrease in stigma. The latter decrease was mostly driven by an increase in the level of empathic concern towards people with schizophrenia.

**Conclusions:** The results of the present study suggest that using cognitive-schema cues may be a promising avenue to reduce the stigmatization of schizophrenia. Future research is warranted which will explore the many factors jointly that explain schizophrenia for use in anti-stigma campaigns.

**Keywords:** Stigma, causal attributions, empathic concern, maladaptive cognitive schema

## **1. Introduction**

About one in four people will suffer from a psychiatric disorder in their lifetime (World Health Organization, 2001). Not only do individuals with psychiatric disorders have to deal with their symptoms, but they must also cope with the stigmatization that they generally suffer from (Corrigan & Watson, 2002a). Stigmatization is a process of exclusion leading an individual, on the basis of a given characteristic that does not conform to a social norm, to be identified as abnormal or deviant, and reduced to this characteristic (Crocker & Major, 1989; Goffman, 1963).

Levels of stigmatization differ a lot, and are mainly function of the diagnosis (Parle, 2012): among all psychiatric disorders, people experiencing schizophrenia are victims of high levels of rejection and stigmatization (Angermeyer & Schulze, 2001; Castillo et al., 2008; Pescosolido et al., 2010). They are commonly perceived by lay people as dangerous, incompetent, and unpredictable (Angermeyer & Dietrich, 2006; Angermeyer & Matschinger, 2004; Corrigan et al., 2001; Crisp et al., 2000; Dietrich et al., 2004; Graves et al., 2005; Link et al., 1999). Schizophrenia is frequently and intimately associated with the term "violence" and is perceived as the "model of madness" by society (Castillo et al., 2008). Consistent with this observation, some of the symptoms of schizophrenia, such as inappropriate affect and the propensity to talk aloud to oneself, are manifest indicators of a psychiatric disorder and may lead to stigmatizing reactions (see Corrigan, 2000).

Stigmatization is likely to have detrimental consequences for people with schizophrenia. The consequences of stigmatization can be observed either within the psychological sphere (Berge and Ranney, 2005), the social and professional sphere (Daumerie et al., 2012), the family sphere (González-Torres et al., 2007), or the sphere of medical care (Demyttenaere et al., 2004; Fung et al., 2008). In the specific case of France, recent studies

have confirmed that the levels of stigmatization of schizophrenia are high (Angermeyer et al., 2013; Durand-Zaleski et al., 2012; Lampropoulos et al., 2017).

According to attribution theory (Corrigan, 2000; Weiner et al., 1988; Weiner, 1995), an important factor that may contribute to the stigmatization of a disorder is the etiological account that people attribute to this disorder. Specifically, level of control (i.e., the extent to which people can actively act on their disease) and stability of the disorder (i.e., the extent to which the disorder is maintained over time) are thought key elements of stigma. Anti-stigma campaigns which have emphasized biogenetic or psychosocial factors to account for the development of schizophrenia, have had mixed effects on measured levels of stigma (see the meta-analyses of Kvaale et al., 2013a; Kvaale et al., 2013b). Endorsing biological factors as the cause of schizophrenia was associated with a greater desire for social distance, i.e., the desire not to interact with them (Angermeyer & Matschinger, 2005; Dietrich et al., 2004). Biogenetic explanations may reinforce feelings of dangerousness and therefore the desire for social distance (Corrigan and Watson, 2004; Mehta & Farina, 1997; Phelan, 2005; Phelan et al., 2006). Biogenetic causal beliefs are also positively related to prejudice and fear (Read et al., 2006). It is possible that biogenetic accounts promote the idea that the person may be considered to have little control over his/her behavior, which may lead to expectations of higher levels of unpredictable behaviors and may increase fear responses in lay people (Angermeyer & Matschinger, 2003).

Likewise, psychosocial accounts of mental disorders (e.g., accounts such as stress, death of a loved one, insults at school) have generally shown mixed effects on the level of stigma (see the systematic review and meta-analysis of Schomerus et al., 2012). Stress-related accounts of mental disorders have sometimes been shown to be associated with greater tolerance of the disorders (Martin et al., 2000; Schnittker, 2008; Van 't Veer et al., 2006), but

not in all studies (Bag et al., 2006; Jorm & Griffiths, 2008; Martin et al., 2007). Similar mixed results have been observed with early-stressor accounts (Dietrich et al., 2004; Schnittker, 2008; Van 't Veer et al., 2006). According to Schomerus et al. (2014), lay people may infer from some psychosocial accounts that people experiencing schizophrenia are responsible for their disorder (e.g., with accounts such as the use of psychoactive substances), and this may increase stigma as a result. On the other hand, other psychosocial accounts (e.g., childhood sexual abuse) may reduce the perceived level of personal responsibility and, consequently, improve social acceptance. However, psychosocial explanations, such as childhood sexual abuse, may drive lay people to consider schizophrenia as incurable, and this may increase stigma as a result.

In an attempt to reduce stigma, the use of cognitive accounts of schizophrenia have been largely overlooked. It appears that, so far, such accounts have been mobilized mainly in the context of depression (Botha & Dozois, 2015). Yet, cognitive factors – for instance cognitive distortion factors and maladaptive cognitive schemas – are known to hold an important role in the development of symptoms in schizophrenia (Bortolon et al., 2013; Sundag et al., 2016). Early maladaptive schemas develop during childhood, via interpersonal interactions, and form a template that guides the interpretation of later experience. They are extremely stable, considered to be more unconditional, automatic, and to increase the risk of developing a mental disorder (Schmidt et al., 1995). Cognitive models of schizophrenia suggest that exposure to negative life events during childhood (e.g., school harassment) promotes the development of maladaptive cognitive schemas, including a threatening worldview, external attribution of negative events and experiences, which may favor the development of schizophrenia, and more specifically, paranoid delusions (Bentall et al., 2009; Garety et al., 2001; Howes and Murray, 2014). Early maladaptive schemas are higher people experiencing

schizophrenia (Boyda et al., 2018; Giblin et al., 2004; Khosravani et al., 2019; Sundag et al., 2016). Negative schemas ease up the development of delusions and hallucinations, including a decrease in performance at reality tests (Beck & Rector, 2005; Birchwood et al., 2000; Garety et al., 2001).

Cognitive distortions refer to erroneous interpretations of situations (e.g., minimizing positive accomplishments, personalizing neutral events; Beck, 1979). Cognitive distortions are important early risk factors for psychosis (de Paula et al., 2015; Gawęda et al., 2018). More precisely, an exaggerated tendency to pay attention to threat (Gawęda et al., 2015; Prochwicz & Klosowska, 2017), external attribution bias (So et al., 2015), jumping to conclusions (Ross et al., 2015; McLean et al., 2017) or bias against disconfirmatory evidence (Zawadzki et al., 2012) are important factors driving delusions. In the same way, deficits in recognizing the source of information plays a central role in hallucinations (see the meta-analysis of Waters et al., 2012).

Because cognitive distortions may be perceived by lay people as controllable (Cook & Wang, 2011; Goldstein & Rosselli, 2003), accounts based on such factor may *increase* public stigma. On the other hand, maladaptive cognitive schemas emerge during childhood, through experiences of harmful events (e.g., critical, abusive or neglectful events which do not meet the needs of the child) (Young et al., 2003). Thus, cognitive schema accounts emphasize the importance of external factors as causes of the disorder, they support the idea that patients have a reduced control over the disorder and, as a result, cannot be responsible for their pathology (Schomerus et al., 2014). Cognitive schema accounts may therefore *reduce* public stigma. Table 1 summarizes the characteristics of the Biogenetic, Cognitive Distortion, and Cognitive schema accounts.

Insert Table 1 here

The present research explored how lay people's beliefs regarding the causes of schizophrenia shape the stigmatization of people experiencing this disorder. To this end, we exposed a sample of French university students to three different etiological accounts of the pathology (Cognitive Distortion, Cognitive Schema, or Biogenetic explanation), and we measured the effect of this exposition on their level of expressed stigma (stigmatizing attitude, desire for social distance, and empathic concern), compared to a control group. We expected the largest decrease in stigma in participants exposed to the Cognitive schema account, a lower or no decrease in participants exposed to the Cognitive Distortion and Genetic accounts, and no decrease in the control group.

## **2. Method**

### **2.1. Participants**

An a priori power analysis was conducted using Gpower (Erdfelder et al., 1996). The analysis indicated that a sample size of 332 participants (83 participants per group) would be sufficient to detect a significant interaction between our text conditions and moment of measurement (pre/post text exposure), with a power of .95 and an alpha of .05, based on a small effect size of 0.05 ( $\eta_p^2$ ). Anticipating drop out and exclusion issues, a total of 415 students were recruited from an undergraduate introductory psychology course from [omitted for masked review] University, and randomly assigned to one of the four conditions of our experimental manipulation (Cognitive Distortion, Cognitive Schema, Biogenetic, or Control condition). The participants completed the questionnaire in the lecture hall before lecture started. Thirty-seven participants did not complete the questionnaire and were excluded from the analyses, leaving a final sample of 378 participants (263 females, 2 undefined) aged



between 16 and 58 ( $M_{\text{age}} = 19.90$  years;  $SD_{\text{age}} = 4.68$  years), assigned to the following conditions: Cognitive Distortion condition ( $N = 99$ ), Cognitive Schema condition ( $N = 106$ ), Biogenetic condition ( $N = 107$ ), or Control condition ( $N = 66$ ).

## **2.2. Compliance with Ethical Standards**

All participants signed a consent form before participation and were informed that their answers would remain anonymous and that their participation was voluntary and could be withdrawn at any time. All the data were stored on a secure university computer. We respected the ethical principles of psychologists and the code of conduct of the American Psychological Association (American Psychological Association, 2002).

## **2.3. Measures**

In the absence of validated tools in French language for our variables of interest, all scales used were translated in French via a back-and-forth translation procedure. Firstly, the English version was translated into French by an English native speaker specialized in this research field. Then, a French native speaker translated this document back into English. The two translations (English to French and French to English) were compared in order to ensure that they were both faithful to the original and that the items in the French version were clear.

### **2.3.1. Familiarity with schizophrenia and mental illness**

To assess people's familiarity with schizophrenia, we used a French translation of the Familiarity with mental illness scale (Corrigan et al., 2003). This 7-item questionnaire measures participants' familiarity with schizophrenia through everyday encounters with the pathology

(e.g., interaction in the workplace, presence of people experiencing the pathology in the entourage or at home). Participants answered using a dichotomous "Yes"/"No" response to each item. Scores ranged from 0 to 7 and higher scores indicated higher familiarity with schizophrenia. We also included two additional questions in order to assess participants' general familiarity with mental illnesses: "Do you have a diagnosis of mental disorder" and "Do you have a member of your family with a diagnosis of mental disorder". Both questions were answered using a dichotomous "Yes"/"No" response.

### **2.3.2. Attitudes**

We used a French translation of the Brief Version of the Attribution Questionnaire (AQ-9) (Corrigan et al., 2002) in order to assess attitudes towards people experiencing schizophrenia. Each item from the attitude questionnaire assesses a reaction towards people with schizophrenia, exploring the domains of blame, anger, pity, help, dangerousness, fear, avoidance, segregation, and coercion (e.g., How angry do persons with schizophrenia make you feel?). Participants gave their answer using 9-point Likert scales (ranging from 1: "Not at all" to 9: "Very much"). Scores ranged from 9 to 81, and higher scores indicated more negative attitudes towards people with schizophrenia. For the sake of comparability with the other measures, we subsequently reversed the questionnaire score and transformed it into a percentage, leading to a percentage score of positive attitude (from 0 to 100). The scale showed acceptable internal consistency (Cronbach's  $\alpha$  at T0 = .71 and T1 = .73).

### **2.3.3. Social Distance**

In order to evaluate social distance, we used a French translation of the Social Distance Items (Link et al., 1987), which is the most used tool for assessing social stigma of

schizophrenia (Lampropoulos et al., 2018). It includes seven items displaying social situations (e.g., renting a room) and participants are asked to indicate the extent to which they would be willing to accept to share these situations with people experiencing schizophrenia, using a 4-point Likert scale ranging from 1 ("Definitely willing") to 4 ("Definitely unwilling"). Scores ranged from 7 to 28, and higher scores indicated a preference for greater social distance. Scores were then reversed and transformed into a percentage, leading to a percentage score of social proximity (from 0 to 100). The scale showed very good internal consistency (Cronbach's  $\alpha$  at T0 = .86 and T1 = .89).

#### **2.3.4. Empathic concern**

In order to measure empathic concern, we used a French translation of the emotional response scale (Batson, 1987; Batson, 1991). Participants were instructed to indicate how much they felt each of six emotions (sympathy, soft-hearted, warm, compassionate, tender and moved) towards individuals experiencing schizophrenia, using a 7-point Likert scale ranging from 1 ("Not at all") to 7 ("Very much"). Scores ranged from 6 to 42, and higher scores indicated greater empathic concern. Scores were then transformed into a percentage score of empathic concern (from 0 to 100). The scale showed very good internal consistency (Cronbach's  $\alpha$  at T0 = .87 and T1 = .90).

#### **2.4. Causal explanations of schizophrenia**

Four texts were developed in French language and presented to the participants. Three of the texts detailed a specific factor identified as the main cause for the development of schizophrenia: biogenetics, cognitive distortion, or cognitive schema. As it was the case in the vignettes designed by Botha and Dozois (Botha & Dozois, 2015), these three texts were

presented in the form of a (fictitious) scientific article, recently published in the "Journal of Behavioral and Cognitive Therapy" (for the Cognitive Schema and Cognitive Distortion conditions) or the "Journal of Molecular Biology and Genetics" (for the Biogenetics condition) by a fictitious researcher, known worldwide and specialized in the field of schizophrenia. In the article, the researcher emphasized that all the data collected over the past thirty years indicate that schizophrenia is caused by factors related to biogenetics/cognitive distortion/cognitive schema (depending on the condition). All three texts had identical structures and similar contents, except for the target sentences regarding the cause of schizophrenia, that differed according to each condition (see Appendix A1 for the full version of the texts). A fourth text, unrelated to schizophrenia and presenting a topic related to quantum physics, was used in the control condition.

## **Procedure**

After giving their consent, participants provided their basic sociodemographic data (age, sex) and indicated their familiarity with schizophrenia. Next, all participants read a short description of the daily life of an individual experiencing schizophrenia (the description is displayed in the Appendix), in order to prime a correct and realistic conception of the disorder (see Corrigan et al., 2017). Then, participants completed the questionnaires about attitudes (Corrigan et al., 2002), empathic concern (Batson, 1987; Batson, 1991), and social distance (Link et al., 1987) towards people experiencing schizophrenia. In the next step, they were randomly assigned to one of the four conditions: Biogenetics, Cognitive Distortion, Cognitive Schema or Control, and read the vignette relevant to their condition. Finally, they completed for a second time the questionnaires about attitudes, empathic concern and social distance towards people experiencing schizophrenia.

Following the experiment, participants were informed about the purpose of the study. We took caution to emphasize that each scenario they were presented with displayed only one etiological account (Biogenetics, Cognitive Distortion, Cognitive Schema or Control). Then, they received exhaustive information about causal attributions of schizophrenia and the multiple etiological accounts of the disorder.

## **2.5. Statistical analysis**

We conducted a mixed-design analysis of variance using Measure (positive attitude, social proximity, and empathic concern; within-subject), Text condition (Cognitive Schema, Cognitive Distortion, Biogenetics, Control; between-subject), and Moment of measurement (pre-text measure vs. post-text measure; within-subject) as the independent variables, and percentage score (for attitude, social proximity, and empathic concern) as the dependent measure. In addition, we added familiarity, self-reported psychiatric disorder, and self-reported psychiatric disorder in the participant's family as control variables in the analysis. Data were analyzed using the SPSS software (version 24).

## **3. Results**

Figure 1 displays the detailed results distinguishing the effect of text condition for each of the measures and moment of measurement (see also Table 2 for the full descriptive statistics). A main effect of Measure was observed,  $F(1.70, 608.56) = 4.83, p = .012, \eta_p^2 = .013$ . Most importantly, with regards to our current purpose, the Moment of measurement x Text condition interaction was significant,  $F(3, 358) = 4.42, p = .005, \eta_p^2 = .04$ . Before exploring the origin of this interaction with pairwise comparisons, and because Measure did not significantly interact with any of our independent variables, we computed a composite score of *acceptance*

(by averaging the percentage scores of positive attitude, social proximity, and empathic concern). Pairwise comparisons using paired sample *t*-tests showed that only the Cognitive Schema condition yielded an increase in acceptance of schizophrenia between T0 ( $M_{\text{acceptance}} = 57.52$ ;  $SD_{\text{acceptance}} = 15.02$ ) and T1 ( $M_{\text{acceptance}} = 60.22$ ;  $SD_{\text{acceptance}} = 15.75$ ),  $t(105) = 4.41$ ,  $p < .001$ , Cohen's  $d = 0.18$ . No significant difference was observed between T0 and T1 in the Cognitive Distortion, Biogenetics, or Control condition (all  $t$ s  $< .99$ , all  $p$ s  $> .32$ ; see Table A1, in appendix, for full descriptive statistics).

Insert Table 2 and Figure 1 here

#### **4. Discussion**

Amongst people with psychiatric disorders, people experiencing schizophrenia are among those who are victims of high levels of stigmatization (Angermeyer & Schulze, 2001; Castillo et al., 2008; Corrigan & Watson, 2002a; Durand-Zaleski et al., 2012; Graves et al., 2005; Schomerus et al., 2014). A research effort is necessary to identify new strategies that may help reduce the public stigma of schizophrenia, and the associated multiple negative consequences for people experiencing this mental disorder. To date, the few researches that exist on this topic have highlighted mixed effects. Educational interventions using biogenetics or psychosocial accounts of the development of schizophrenia do not always lead to a decrease in stigma, and may even sometimes lead to an increase in stigma (Bag et al., 2006; Jorm & Griffiths, 2008; Kvaale et al., 2013a; Kvaale et al., 2013b; Schomerus et al., 2012). In the context of schizophrenia, educational strategies using cognitive accounts have never been evaluated, yet studies performed in the context of depression have shown these strategies to be promising (Botha and Dozois, 2015). The present study addressed this issue and compared

the effect on public stigma of three different educational strategies, based on cognitive distortion, maladaptive cognitive schema, and biogenetics. In line with our expectations, the information that emphasized the role of maladaptive cognitive schemas in the development of schizophrenia was the only one that led to a significant decrease in stigma. In contrast, our results showed that none of the other two accounts of schizophrenia impacted stigma, and neither did stigma vary in the control condition.

Why should a Cognitive Schema account of schizophrenia be more efficient in reducing stigma? In light of attribution theories (Corrigan, 2000; Weiner et al., 1988; Weiner, 1995), level of stigma may depend on etiological account, specifically on control and stability criteria. Previous studies have shown strong positive relationships between patients' control or responsibility in the development of their particular disorder and public stigma towards the disorder in question (Dietrich et al., 2004; Lincoln et al., 2008; Schomerus et al., 2013). In addition, studies have highlighted a positive link between stability of the disorder (i.e., the impossibility to treat or reduce it) and public stigma (Phelan, 2005; Phelan et al., 2006). Because Cognitive Schema accounts of schizophrenia emphasize the importance of external factors (e.g., childhood experiences, such as humiliations at school) as causes of the disorder, they highlight its low controllability. In addition, Cognitive Schema accounts draw attention to the fact that the joint experience of similar situations experienced in childhood (during which cognitive schema is built) and adulthood (during which cognitive schema is activated) is partly responsible for schizophrenia symptoms, putting light on the unstable nature of the disease over time.

The Cognitive Schema exposure effect was driven mainly by an increase in the level of empathic concern towards people experiencing schizophrenia. According to Batson et al., (2007), level of empathy for another person in need depends on three dimensions: perceiving

that the other is in need, valuing the other's welfare, and adopting the other's perspective. In the Cognitive Schema condition, the example given in the vignette was related to a child being humiliated at school, which is a common situation that the participants may have themselves experienced during childhood. This may have increased their propensity to adopt the other's perspective, and, as a result, empathic concern. This result is all the more important given that much research has evidenced that a high empathic concern is an important factor for prosocial motivation and helping behaviors (Batson et al., 2007; Eisenberg & Miller, 1987). According to this idea, emotional changes may induce cognitive changes (i.e., decrease in negative attitudes) and behavioral changes (decrease in desire for social distance).

We believe that this first step of research may open new avenues for future research on the prevention of stigmatization of schizophrenia. First, the present results shed light on the necessity to raise public awareness of schizophrenia. Educational strategies based on etiological accounts of schizophrenia may be used, and they should emphasize both the low stability and low controllability in the disease. We see a great importance in the necessity to balance these two components in the explanation of schizophrenia, which is consistent with the multidimensional and balanced approach proposed by Corrigan and Watson (2004). If biogenetic-related explanations (associated with low control but high stability) are used, they may be accompanied by information about the efficacy of treatments, in order to reduce the feelings of dangerousness and bad prognosis induced by this kind of account. Second, our results call for the need to evaluate the effectiveness of the prevention methods used, the non-standardization of the different explanations being an important factor which possibly explains their mixed effects on stigma (Lamboy & Saïas, 2013).

Our present results, although promising, need to be taken with caution, for several reasons which we list here. First, it is worth noting that our effect is a small one. The significant



pairwise difference that we observed for the Cognitive Schema condition (between T0 and T1) showed only a small effect size (Cohen's  $d = .18$ ). We acknowledge that many other factors (and their interaction) contribute to explain stigma. Second, our research follows an experimental paradigm, and aims to untangle the effects of distinct educational strategies presenting different types of etiological accounts of schizophrenia. As a result, each scenario was designed to emphasize only one cause for schizophrenia. It stands to reason that the etiology of schizophrenia is multifactorial, and that maladaptive cognitive schema cannot be considered the only explanation for schizophrenia. Future research is warranted which will explore the many factors jointly that explain schizophrenia. Third, because cognitive schemas develop during childhood (Young et al., 2003), one may worry about the possibility that Cognitive Schema accounts of schizophrenia may drive the public to blame the social environment, and especially the parents, for the development of schizophrenia in a child. This would be an undesirable side-effect of an anti-stigma campaign. Fourth, although the present results show a promising effect of Cognitive Schema accounts in the short term, they need to be replicated in the long term. Because the three measures capturing stigma were obtained immediately after the anti-stigma treatment, one must refrain from overgeneralizing these findings as well as to consider that the positive effects would persist over time. Finally, our sample consisted of predominantly French female university students who are certainly sensitive to the issue of mental health. Consequently, replications need to be conducted with a more representative population before one may be able to generalize such findings.

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Table 1. Characteristics emphasized in the biogenetic, cognitive distortion, and cognitive schema accounts of Schizophrenia in terms of control of etiology and stability, and the resulting predictions formulated in the present study.

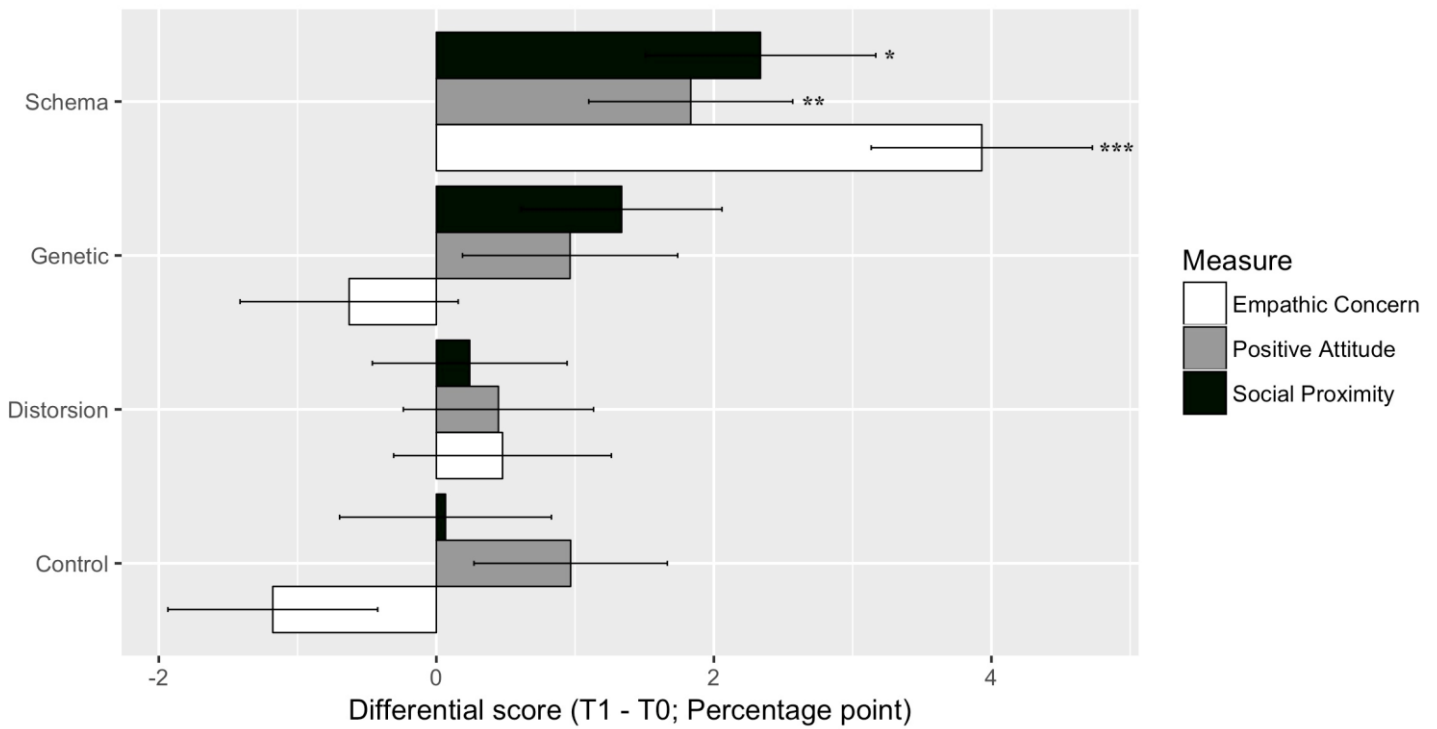
		Biogenetic account	Cognitive Distortion account	Cognitive Schema account
Etiological account	Control of etiology of the disorder	Low	High	Low
	Stability of etiology of the disorder over time	High	Low	Low
	Hypotheses from the present research regarding stigma	Increased	Increased	Decreased

Table 2. Mean (and SD) of positive attitude, empathic concern and social proximity regarding schizophrenia at T0 and T1, as a function of text condition.

Text Condition	Measure	T0	T1	Difference (T1-T0)
Cognitive Schema	Empathic	54.45 (20.68)	58.38 (21.43)	3.93
	Concern			
	Positive Attitude	71.72 (14.44)	73.55 (13.87)	1.83

*Effects of a cognitive schema account on the stigma of schizophrenia*

	<i>Social Proximity</i>	46.41 (22.50)	48.74 (24.54)	2.33
<b>Genetic</b>	<i>Empathic</i>			-0.63
	<i>Concern</i>	60.99 (19.89)	60.36 (21.59)	
	<i>Positive Attitude</i>	73.06 (12.79)	74.02 (14.06)	0.96
	<i>Social Proximity</i>	49.93 (20.54)	51.27 (22.28)	1.34
<b>Cognitive Distortion</b>	<i>Empathic</i>			0.48
	<i>Concern</i>	54.11 (17.98)	54.59 (20.30)	
	<i>Positive Attitude</i>	71.05 (12.78)	71.49 (13.82)	0.44
	<i>Social Proximity</i>	45.50 (20.75)	45.74 (21.94)	0.24
<b>Control</b>	<i>Empathic</i>			-1.18
	<i>Concern</i>	52.61 (17.22)	51.43 (18.50)	
	<i>Positive Attitude</i>	73.76 (12.72)	74.73 (12.92)	0.97
	<i>Social Proximity</i>	50.29 (21.48)	50.36 (23.16)	0.07



*Figure 1.* Differential scores (T1-T0) of positive attitude, empathic concern and social proximity regarding schizophrenia, as a function of text condition. The stars indicate a statistical difference between T0 and T1 (\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ ). Error bars indicate standard error of the mean.

## **Appendix**

### **A1. Short description of the daily life of an individual with schizophrenia**

Please read carefully the text below. Later, we will ask you a few questions regarding the content of this text.

"Some people may be affected by a serious mental illness called schizophrenia. These people can go to university, work in the field of justice and live in a self-contained apartment. They do not always present symptoms, but when they do, they can sometimes hear voices, or think that the CIA is watching them. Aside from these specific symptoms of schizophrenia, they can also feel very anxious, which can cause them to miss work on some days. People with schizophrenia are often hospitalized and take medication for their illness."

### **Control condition**

Please carefully read the article below. Later, we will ask you a few questions regarding the content of the article. This article was published in the August-28 edition of this year's "Journal of the American Academy of Quantum Physics". The "Journal of the American Academy of Quantum Physics" is a journal that covers the latest news about quantum physics. It is highly respected in its academic field.

"Fission is largely the result of electrostatic factors." This is the first conclusion of an article recently published in the Journal of the American Academy of Quantum Physics. The author of this article is Dr Morel Edouard from Paris-Sorbonne University, who is renowned worldwide for his expertise in quantum physics. Dr Morel and his collaborators have investigated the factors that may be involved in the appearance of antineutrons in the fission process. They concluded: "Taking into account all the data gathered over the past 30 years, we can conclude that fission is the phenomenon by which the nucleus of a heavy atom (nucleus that contains many nucleons, such as uranium and plutonium nuclei) is divided into several lighter nuclides, usually two nuclides. This reaction results in the emission of neutrons and antineutrons (usually two or three), and a very important release of energy." These results have been praised by many researchers working in quantum physics, more specifically on fission, who now base their work on the results obtained by Dr Morel and his collaborators."

### **Biogenetic condition**

Please carefully read the article below. Later, we will ask you a few questions regarding the content of the article. This article was published in the August-28 edition of this year's "Journal of Molecular Biology and Genetics". The "Journal of Molecular Biology and Genetics" is a journal that covers the latest news about genetics and the improvement of the well-being of the individual. It is highly respected in its academic field.



"Schizophrenia is largely the result of genetic factors." This is the first conclusion of an article recently published in the "Journal of Molecular Biology and Genetics". The author of this article is Dr Morel Edouard of Paris-Sorbonne University, who is renowned worldwide for his expertise in schizophrenia. Dr Morel and his collaborators have investigated the factors that may be involved in the onset of symptoms of schizophrenia. They concluded: "Taking into account all the data gathered over the past 30 years, we can conclude that genetic factors, linked to an excessive amount of neurotransmitters in the brain, a reduction of the volume of the grey matter, and abnormalities in some cortical circuits (all genetically predisposed), are the main causes of schizophrenia. For example, an individual with a parent experiencing schizophrenia has 30% risk of developing schizophrenia symptoms in their life." These results have been praised by many researchers working on schizophrenia, who now base their work on the results obtained by Dr Morel and his collaborators.

### **Cognitive distortion condition**

Please carefully read the article below. Later, we will ask you a few questions regarding the content of the article. This article was published in the August-28 edition of this year's "Journal of Behavioral and Cognitive Therapy". The "Journal of Behavioral and Cognitive Therapy" is a journal that covers the latest news about psychopathology and cognitive and behavioral therapy. It is highly respected in its academic field.

"Schizophrenia is largely the result of cognitive factors." This is the first conclusion of an article recently published in the "Journal of Behavioral and Cognitive Therapy". The author of this article is Dr Morel Edouard of Paris-Sorbonne University, who is renowned worldwide for its expertise in schizophrenia. Dr Morel and collaborators have investigated factors that may be involved in the onset of symptoms of schizophrenia. They concluded: "Considering all the data gathered over the past 30 years, we can conclude that reasoning errors largely influence the onset of schizophrenia symptoms. One example of reasoning error may be that if someone blames you, it means that everyone blames you, which is called over-generalization. When this type of thoughts develops over time and multiplies, the symptoms of schizophrenia may appear." These results have been praised by many researchers working on schizophrenia, who now base their work on the results obtained by Dr Morel and his collaborators.

### **Cognitive Schema Condition**

Please carefully read the article below. Later, we will ask you a few questions regarding the content of the article. This article was published in the August-28 edition of this year's "Journal of Behavioral and Cognitive Therapy". The "Journal of Behavioral and Cognitive Therapy" is a journal that covers the latest news about psychopathology and cognitive and behavioral therapy. It is highly respected in its academic field.

"Schizophrenia is largely the result of cognitive factors." This is the first conclusion of an article recently published in the "Journal of Behavioral and Cognitive Therapy". The author of this article is Dr Morel Edouard of Paris-Sorbonne University, who is renowned worldwide for its expertise in schizophrenia. Dr Morel and collaborators have investigated factors that may be involved in the onset of symptoms of schizophrenia. They concluded: "Considering all the data

gathered over the past 30 years, we can conclude that dysfunctional cognitive schemas, in other words errors of interpretation, which have their origin in events experienced during childhood, are the primary factors influencing the symptoms of schizophrenia. We can take the example of a child who is humiliated by his schoolmates. When this type of behavior is repeated in adulthood, the dysfunctional schema of mistrust built during childhood can then activate and generate very strong negative thoughts and emotions favoring the emergence of erroneous ideas that take the form of delusions. These results have been praised by many researchers working on schizophrenia, who now base their work on the results obtained by Dr Morel and his collaborators.