

Cognitive discrepancies, motivation and subjective well-being in people with schizophrenia

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ABSTRACT

Research indicates that people with schizophrenia often achieve similar levels of subjective well-being (SWB) compared to healthy controls despite prominent symptomatology and significant functional difficulties. Furthermore, compared to healthy controls, young-adult people with schizophrenia differ in the relative importance they place on values, or guiding life principles, associated with educational and occupational success (*openness to change*), suggesting that changing motivations may contribute to SWB and the apparent motivational deficits commonly reported in this population. The current study sought to better understand these relationships in middle-aged people with schizophrenia or schizoaffective disorder ($n=29$) versus a relatively healthy group of community controls ($n=23$). Participants completed measures of SWB and values. They also completed a cognitive battery and interviews concerned with mental and physical health. Patients reported similar levels of SWB compared to controls in the context of significant cognitive, social and vocational difficulties. Moreover, living consistently with values (*valued living*) predicted SWB in both groups. Lastly, internalized mental illness stigma was negatively associated with openness to change in the patient group. While encouraging from an emotional resiliency perspective, SWB and valued living in people with schizophrenia may hinder motivation towards treatment goals that could otherwise improve functional outcomes in this population.

1. Introduction

Sustained happiness and positive life appraisals, otherwise known as subjective well-being (SWB), are integral components of the healthy human experience (Vittersø, 2004). In general, a strong objective quality of life (QoL), which includes good physical and emotional health, strong social relationships, financial security, and fulfilling employment, is related to SWB in the general population (Doherty and Kelly, 2010). However, SWB is a complex and multi-faceted construct, with perhaps the most fundamental distinction made between hedonic and eudemonic well-being. Hedonia refers to the emotional experience of pleasure and happiness (i.e., strong positive affect, lack of negative affect, life satisfaction; Diener et al., 2013). Eudemonic well-being, on the other hand, refers to positive *functioning* in a variety of domains, such that happiness, autonomy, and pursuit of a purposeful life combine to create eudemonia or “good spirit” (Rosenbaum and Ronen, 2013).

Subjective well-being has been understudied in schizophrenia research, likely due to the seemingly intuitive inference that anhedonia and diminished functioning preclude the ability to experience and maintain SWB in this population. Although diminished cognitive, social and occupational functioning are a reality of the disorder, quasi-experimental studies suggest that the ability to experience pleasure ‘in the moment’ (i.e., consummatory pleasure) is intact in individuals with schizophrenia; a finding that has been described as one of the most robust results in anhedonia research (Edwards et al., 2015; Yan et al., 2012). Alternatively, several studies suggest that people with schizophrenia often achieve similar levels of SWB compared to controls (Agid et al., 2012, 2015; Fervaha et al., 2016; Palmer et al., 2014); a surprising result given the insidious course and nature of schizophrenia spectrum disorders. However, the finding that people with a chronic illness experience higher levels of SWB than what would be predicted by healthy others is by no means restricted to schizophrenia. This

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phenomenon, known as the *disability paradox*, has been noted in people with emphysema, breast cancer, kidney disease, and many other patient populations with varying degrees of illness severity and impediments to QoL (Albrecht and Devlieger, 1999; Ashby et al., 1994; Lacey et al., 2006; Ubel et al., 2005). Although different contributors to this paradox have been identified, one important component appears to be the tendency for patients to adapt to diminishing life circumstances through a recalibration of their values (Ubel et al., 2005).

Values, or the guiding principles that inform behaviour, attitudes and judgements of both events and people (including the self; Schwartz, 1992), are heavily influenced by culture, public and personal health, and overall QoL (Boer and Fischer, 2013). Given the culturally defined and accepted goals of young adults in Western societies—to begin a career, find a spouse, and establish independence—individuals in this age range tend to prioritize values aligned with self-direction, stimulation, and achievement (Arnett et al., 2014). However, Agid et al. (2015) found that young adults with schizophrenia, who reported being as happy and satisfied with their lives compared to controls, placed greater priority on the conservation values of tradition (acceptance of religious and/or cultural customs) and power (social status and control over others) and less priority on values of self-direction (independent thought and action) and stimulation (excitement, novelty and challenge in life; Schwartz, 1994). Self-direction and stimulation together form the higher order value of openness to change (Schwartz and Boehnke, 2004), which is generally highest in early adulthood and declines with age (Wrosch et al., 2000). Consequently, young adults with schizophrenia, who share physical and mental health challenges characteristic of older aged cohorts, also appear to endorse a value system that is more consistent with individuals in a later stage of life (Agid et al., 2015; Jeste et al., 2011; Robinson, 2013).

Multiple discrepancies theory (Michalos, 1985) is one such framework that may implicate a link between values and SWB. From this perspective, SWB results from cognitive appraisals of the discrepancies between individuals' perceived self in relation to who they would like to be in a variety of domains, with little-to-no discrepancies predicting high SWB in healthy populations (Blore et al., 2011). If pre-illness values and goals become impeded in schizophrenia (in this context, goals refer to the concrete behavioural intentions that manifest from abstract values), people with schizophrenia may shift their values to be more congruent with a diminishing QoL, which may be adaptive in bolstering SWB. From a psychotherapeutic standpoint, reducing cognitive discrepancies may have important implications for *valued living*, defined as the degree to which one lives in accordance with his or her values (Lundgren et al., 2008). Valued living is highly predictive of SWB in healthy and clinical samples. Thus, if adapting one's environment to bring the self in line with personal values becomes difficult or impossible for prolonged periods, then adapting values to be more in line with a reduced QoL may serve as an alternative route to achieving SWB (see Heckhausen et al., 2010).

Internalized stigma, defined as the internalization of stereotypic or stigmatizing views of the broader population, may significantly impact the hypothesized relationships between values and SWB (Corrigan and Watson, 2002; Fervaha et al., 2016). Schizophrenia is one of the most stigmatized of all health conditions, and internalized stigma in people with schizophrenia is highly prevalent (Boysen et al., 2020; Link et al., 2001; Viouleau et al., 2020). Research has also shown that internalized stigma has long-term negative consequences for the purposeful pursuit of important life goals and is inversely related to QoL, feelings of empowerment, self-esteem, and self-efficacy (Link et al., 1997; Gerlinger et al., 2013). Therefore, internalized stigma may exert an important influence on values in people with schizophrenia, especially those associated with educational and vocational success (i.e., openness to change).

The current study investigated QoL, SWB and value systems in a cohort of people with schizophrenia and community controls between 30 and 60 years old. By moving beyond first episode, this study sought to

build on Agid et al. (2015) by showing that people with schizophrenia continue to report comparable levels of SWB and differing value systems further along in the course of their illness. The degree to which patient values not only differ from controls, but also the degree to which perceived valued living contributes to SWB in both groups were tested. Consistent with multiple discrepancies theory (Michalos, 1985), we define QoL broadly as the objective aspects of participants' current life conditions, including finances, mental and physical health, and current functioning across a variety of domains (i.e., the objective conditions of one's life). On the other hand, we consider SWB, values, and internalized stigma as cognitive and emotional responses to one's QoL conditions that construct his or her circumstances. We hypothesized that, despite significant QoL differences, people with schizophrenia would report comparable levels of SWB across domains, but lower levels of eudemonia, relative to community controls; that people with schizophrenia would place less priority on openness to change values and greater priority on conservation values compared to controls; and that perceived valued living would positively predict SWB in people with schizophrenia and community controls.

2. Method

2.1. Participants

This study was approved by the Human Research Ethics Boards of the University of Toronto and the Centre for Addiction and Mental Health (CAMH). A power analysis using G*Power (Faul et al., 2007) suggested that 50 participants in each group were needed to achieve minimal statistical power of 0.80 to detect moderate to large value differences between groups. However, recruitment was interrupted due to the COVID-19 pandemic. As a result, 32 patients and 23 community controls took part in this study.

Remitted and stable patients between 30 and 60 years old with a Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5; American Psychiatric Association, 2013) diagnosis of schizophrenia or schizoaffective disorder were recruited from outpatient clinics at CAMH in Toronto, Canada. Patients were classified as stable if there were no inpatient hospitalizations or emergency room visits six months prior to recruitment and no changes to psychotropic medications three months prior to recruitment. Consistent with standard remission criteria in schizophrenia (Andreasen et al., 2005), we recruited patients reporting absent-to-mild positive symptom severity at the time of screening.

Community controls, matched with patients for sex and age (\pm five years), were recruited from the general population via flyers posted in the community, classified websites, as well as community-based research participant registries developed and maintained by CAMH and the University of Toronto. Patients and controls were excluded if they met criteria for a current major depressive episode or substance use disorder, or had a history of neurological illness (e.g., epilepsy, multiple sclerosis) or traumatic brain injury. Additional exclusion criteria for the control group included personal or family history of psychosis or use of antipsychotic medications. All eligible participants provided informed consent and individually completed the research protocol at CAMH.

2.2. Materials

2.2.1. Measures of SWB

The 29-item Well-Being Scale (WeBS; Lui and Fernando, 2018) was used to assess overall and domain-specific SWB: financial, physical, social, hedonic, and eudemonic well-being. The 4-item Subjective Happiness Scale (SHS; Lyubomirsky and Lepper, 1999) assessed global subjective happiness. The 5-item Satisfaction with Life Scale (SWLS; Diener et al., 1985) assessed subjective cognitive evaluations of participants' current life conditions. The 9-item Schizophrenia Hope Scale (SHS-9; Choe, 2014) assessed expectations for positive future outcomes. All measures of SWB demonstrate acceptable to excellent reliability and

validity in the measurement of their associated domains.

2.2.2. Measures of values

The Schwartz Value Survey (SVS; Schwartz, 1992) is a 57-item self-report assessment of 10 cross-culturally identified values: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. The 10 individual values form two sets of opposing higher-order values, which include openness to change versus conservation and self-enhancement versus self-transcendence. Higher scores on the SVS indicate greater participant-rated importance for each respective value domain. The SVS has been internationally validated with tens of thousands of participants (Boer and Fischer, 2013; Schwartz and Boehnke, 2004), and Agid et al. (2015) found it to be a valid measure of values for people with schizophrenia.

The Valued Living Questionnaire (VLQ; Wilson et al., 2010) was used to assess current valued living in people with schizophrenia and community controls. The VLQ asks participants to first rate the importance of 10 individual values on a 10-point scale. Then, participants rank the same 10 items in terms of how consistently they live in accordance with these values. A valued living composite score is then calculated as the product's average between corresponding importance and consistency items and serves as a weighted estimate of the degree to which participants are acting out important values in everyday life. The VLQ demonstrates adequate to strong reliability and validity in healthy and clinical populations and has been utilized in psychosis research (Gaudiano et al., 2013; Van Buskirk et al., 2012; Wilson et al., 2010).

2.2.3. Measures of QoL

The Mini-International Neuropsychiatric Interview Standard Version 7.02 for DSM-5 (MINI; Sheehan et al., 1998), the Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1990), the Functional Assessment Short Test (FAST; González-Ortega et al., 2010), and the Social and Occupational Functioning Assessment Scale (SOFAS; American Psychiatric Association, 2000) were used to assess mental health and current functioning in patients and controls. Both groups completed the Self-Administered Comorbidity Questionnaire (SCQ; Sangha et al., 2003), which is a 14-item self-report measure designed to assess current presence of acute and chronic physical ailments that are characteristic of middle age (e.g., heart disease, diabetes, cancer, arthritis).

2.2.4. Measure of neurocognition

Patients and controls completed the Brief Assessment of Cognition in Schizophrenia (BACS; Keefe et al., 2004) to assess neurocognitive functioning. The 30-min cognitive battery measures verbal memory, motor speed, attention, verbal fluency and executive functions. Composite (i.e., global) BACS scores are reported, which are calculated as an average of age and sex corrected *T*-scores across subscales. Scoring was based on normative data provided by Keefe et al. (2008).

2.2.5. Patient measures

Positive and negative symptom severity in people with schizophrenia were evaluated with the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1984) and the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1982), respectively. Illness insight was assessed with the Schedule for the Assessment of Insight (SAI; David et al., 1992). Patients also completed the 9-item Internalized Stigma of Mental Illness Inventory (ISMI-9; Hammer and Toland, 2017). All clinical measures demonstrate acceptable psychometric properties in the measurement of their associated domains.

2.2.6. Response validity

Reynolds' (1982) abbreviated version of the Marlowe-Crowne Social Desirability Scale (M-C Form C) was used to explore potential relationships between socially desirable responding (SDR) and self-report ratings. The 13-item true/false self-report measure demonstrates

acceptable levels of reliability and validity (Reynolds, 1982). Also, two instructed response items (e.g., *please choose '3' on the scale so that we know you are answering meaningfully*) were embedded within two self-report scales found at different points of the research protocol, to assess the degree to which respondents were actively engaged in the research project and to safeguard against response sets. These items followed the same response format as the scales within which they were embedded. Participants selecting an unprompted response on one or more of these items were removed from final analyses (for rationale, see Meade and Craig, 2012).

2.3. Statistical analyses

Data were analyzed with the Statistical Package for the Social Sciences Version 25.0 (SPSS; IBM Corp., 2017). Due to skewed distributions across several rating scales, hypothesis testing was conducted with bias corrected and accelerated (BCa) bootstrap confidence intervals, based on 1000 bootstrapped samples (Wright et al., 2011). Where Levene's test suggested unequal variance, results of Welch's *t*-tests are reported (Derrick et al., 2016). Bonferroni corrections were applied to control for type one error rates across analyses of conceptually related variables.

Because scale tendencies are a concern across cultures and groups in values research, individual SVS items were grand-mean centered as per standard scoring criteria (see Schwartz, 1992). Bivariate correlations were conducted between SDR and all self-report/interview scores. Depression severity, as rated with the CDSS, was significantly and negatively correlated with SDR in the control sample ($r = -0.41, p < .05$). No other correlations with SDR were statistically significant at the corrected or uncorrected significance thresholds. Three variables concerned with coping style are reported elsewhere (Krzyzanowski, 2020). Exclusion of these variables did not affect any results reported herein.

3. Results

3.1. Participant characteristics

Two people with schizophrenia and one with schizoaffective disorder were excluded due to failing one or more of the embedded response validity items, leaving a final sample of 29 patients and 23 age- and sex-matched community controls ($N = 52$; see Table 1 for demographic characteristics). Patients completed significantly fewer years of education ($t(32) = 3.31, p = .002, d = -0.92, \text{BCa } 95\% \text{ CI } [-3.382, -0.71]$) and had a lower annual income ($t(23.35) = 4.78, d = -1.52, \text{BCa } 95\% \text{ CI } [-43,360.10, -19,405.78]$) compared to controls.

Results of the clinical interview revealed a generally healthy control group, although one participant met criteria for current binge eating disorder, and another met criteria for current generalized anxiety disorder. Seventeen patients (59%) had experienced at least one past major depressive episode, and 13 patients (44.8%) had attempted suicide at least once in their lives (see Table 2 for patient clinical characteristics).

3.2. Quality of life and subjective well-being

Analyses revealed significant functional impairments, greater physical health conditions, and greater subclinical depression scores in people with schizophrenia relative to controls (see Table 3 for complete statistics). As predicted, regardless of these large QoL differences between groups, patients and controls did not significantly differ on domain specific or global SWB, life satisfaction, or hope. Partially inconsistent with our hypothesis, there were no significant differences in eudemonic SWB between groups. Next, bootstrapped bivariate correlations were conducted between global SWB, current functioning, and clinical variables (see supplementary file for correlation matrix). With the significance threshold corrected for multiple comparisons, greater SWB was significantly associated with higher levels of life satisfaction in both the patient ($r = 0.62$) and control groups ($r = 0.72$). Furthermore,

Table 1
Demographic characteristics of people with a schizophrenia spectrum disorder and controls.

Variable	People with SSD	Control participants
N	29 (24 SZ, 5 SA)	23
Age <i>M</i> (<i>SD</i>)	41.97 (8.62)	42.3 (9.22)
Proportion female (%)	44.8%	56.5%
Years of education <i>M</i> (<i>SD</i>)	14.38 (2.56)	16.57 (2.11)
Annual net income <i>M</i> (<i>SD</i>)	\$14,737 (7451)	\$44,957 (28,842)
Ethnicity (%)		
European/White	51.7%	26.1%
Asian	20.7%	56.5%
African/Black	20.7%	8.7%
Other	6.9%	8.7%
Born in Canada (%)	62.1%	56.5%
Marital status (%)		
Single	79.3%	65.2%
Married/common-law	6.9%	26.1%
Divorced/separated	13.8%	8.7%
Employment status (%)		
Unemployed	55.2%	13%
Employed part-time	31%	21.8%
Employed fulltime	13.7%	65%
Hours worked per week <i>M</i> (<i>SD</i>)	21.39 (14.28)	39.33 (10.91)
Father education level (%)		
Below grade 12	3.4%	13%
High-school or GED	24.1%	26.1%
Undergraduate degree	48.3%	30.4%
Graduate or professional degree	20.7%	30.4%
Mother education level (%)		
Below grade 12	14.8%	8.7%
High-school or GED	24.1%	39.1%
Undergraduate degree	51.7%	30.4%
Graduate or professional degree	3.4%	21.7%

Note. Mean hours worked per week calculated for employed individuals only. SSD=Schizophrenia spectrum disorders; SZ = People with schizophrenia; SA = People with schizoaffective disorder.

greater patient negative symptom severity was significantly associated with greater functional impairment ($r = 0.73$) as well as lower global SWB ($r = -0.5$) and life satisfaction ($r = -0.56$). Finally, greater internalized stigma in the patient group was significantly associated with reduced global SWB ($r = -0.47$) as well as greater depression severity ($r = 0.53$) and positive symptom severity ($r = 0.49$).

Table 2
Symptoms and medication status for people with a schizophrenia spectrum disorder.

	<i>M</i> (<i>SD</i>)	Mdn (IQR)
SAPS global scores		
Hallucinations	1.03 (1.55)	0 (3)
Delusions	1.24 (1.55)	0 (2)
Bizarre behaviour	0.31 (0.66)	0 (0)
Thought disorder	0.9 (0.98)	1 (2)
Total average	0.87 (0.86)	0.5 (1.75)
SANS global scores		
Affective flattening	1.83 (1.42)	2 (3)
Alogia	1 (1.25)	1 (2)
Avolition	1.9 (1.42)	2 (2)
Anhedonia	1.83 (1.33)	2 (2)
Inattentiveness	1.03 (1.09)	1 (2)
Total average	1.51 (0.88)	1.2 (1.3)
Insight (SAI)	9.61 (3.81)	10 (8)
Internalized stigma (ISMI)	1.95 (0.48)	2.11 (0.92)
Prescribed atypical AP (%)	96.6%	–
Prescribed typical AP (%)	3.4%	–
CPZ equivalence	485.5 (415.43)	370.27 (493.75)
Prescribed anti-depressants (%)	37.9%	–
Self-reported age at diagnosis	25.03 (7.84)	23 (11)

Note. SAPS=Scale for the Assessment of Positive Symptoms; SANS=Scale for the Assessment of Negative Symptoms; SAI=Scale for the Assessment of Insight; ISMI=Internalized Stigma of Mental Illness Scale; AP = Antipsychotic medications; CPZ = Chlorpromazine.

3.3. Values

Compared to controls, patients provided lower ratings for values associated with achievement, stimulation, and self-direction, and they provided higher ratings for values associated with tradition and security (see Fig. 1). Consistent with standard SVS scoring criteria (Schwartz, 1992), scores from individual value domains were averaged into the higher-order domains of openness to change (self-direction and stimulation), conservation (tradition, security, and conformity), self-transcendence (universalism and benevolence), and self-enhancement (power and achievement). As predicted, people with schizophrenia placed less priority on values associated with openness to change and more priority on values associated with conservation compared to controls ($p < .05$). However, these results did not survive a correction for multiple comparisons (see Table 4 for complete statistics).

3.4. Valued living and subjective well-being

As hypothesized, there were no between-group differences in valued living scores on the VLQ at corrected or uncorrected significance thresholds. Using linear regression analyses, we also tested the hypothesis that valued living positively predicts SWB in controls and people with schizophrenia. The equation for the control group was significant, $F(1,21) = 3.41$, $R^2 = 0.14$, R^2 Adj. = 0.1, $p = .04$, with greater valued living scores predicting higher SWB ratings, $\beta = 0.37$, BCa 95% CI [0.002, 0.031]. The equation for people with schizophrenia was also significant, $F(1,27) = 6.19$, $p = .01$, $R^2 = 0.21$, R^2 Adj. = 0.18, $p = .02$, with greater valued living scores predicting higher SWB ratings in the patient group, $t(28) = 2.69$, $\beta = 0.46$, BCa 95% CI [0.007, 0.031].

3.5. Individual differences and values

To explore potential relationships between demographic variables and values in people with schizophrenia and controls, bootstrapped bivariate correlations with the four higher-order value domains of the SVS and age, sex, years of education, employment status (employed or unemployed), proportion of life spent in Canada, annual salary, and parental education levels were conducted. Years of education were significantly and negatively associated with conservation values in the control group ($r = -0.46$, $p = .03$) but not the patient group ($r = -0.25$, $p = .20$), while years of education were significantly and positively

associated with openness to change values in the patient group ($r = 0.47$, $p = .01$) but not the control group ($r = 0.36$, $p = .09$). Also, to explore relationships between clinical variables and values among patients alone, we performed bootstrapped bivariate correlations between the four higher-order value domains of the SVS and chlorpromazine equivalent dosages, antidepressant status (prescribed or not prescribed), total SANS and SAPS scores, and internalized stigma scores. Internalized stigma was negatively associated with openness to change values in the patient group ($r = -0.42$, $p = .02$). No other statistically significant associations were observed.

4. Discussion

The current study aimed to better understand the relationships between QoL, SWB and values in middle-aged people with schizophrenia and schizoaffective disorder and a relatively healthy sample of community controls. Consistent with our hypothesis and past investigations of SWB in psychotic disorders (Agid et al., 2012; Agid et al., 2015; Fervaha et al., 2016; Palmer et al., 2014), people with schizophrenia reported comparable levels of happiness, hope for the future, life satisfaction, and SWB relative to controls; a striking result given that they also reported significantly lower employment rates, an average annual income considered to be under the poverty line in Canada (Statistics Canada, 2020), greater subclinical depression, lower functioning across virtually all functional domains assessed, and more physical health conditions compared to the control group. Also, SWB was significantly and negatively correlated with negative symptoms and internalized stigma in people with schizophrenia. Partially inconsistent with our hypothesis, people with schizophrenia did not report lower eudemonic SWB relative to control participants. Eudemonia refers to the experience of living an autonomous and purposeful life (Wood et al., 2010), and we reasoned that the prominent interruptions to autonomy observed in

people with schizophrenia might exert an especially powerful influence on this particular domain of SWB. This was not the case, indicating an even more robust sense of SWB in the patient group than expected.

Given these discrepancies in objective QoL and subjective well-being scores, we also tested the hypothesis that people with schizophrenia are motivated by different values in life. In a past study, young-adults remitted from their first episode of schizophrenia placed less priority on openness to change values and greater priority on conservation values relative to healthy controls (Agid et al., 2015) – a value system at odds with young adulthood and more consistent with older aged cohorts (Robinson, 2013). That is, young adulthood is typically a time of fast paced change, both socially and occupationally, and being open to change is functionally adaptive insofar as it facilitates approach behaviours towards novel and stimulating challenges typically encountered by young adults (Arnett et al., 2014; Vecchione et al., 2016).

In the current sample, patients were less open to change and more preoccupied with conservation values compared to controls, although the present study was underpowered in its ability to detect these moderate to large effects after correcting for multiple comparisons. Alternatively, consistent with the hypothesis that valued living is important for SWB in schizophrenia, patients and controls did not significantly differ on the VLQ's valued living index. Moreover, valued living significantly predicted global SWB in both groups. Indeed, valued living is an efficacious treatment target in acceptance-based psychotherapies such as acceptance and commitment therapy (ACT). Given that improving valued living is an empirically validated therapeutic target (Kanter et al., 2006; Lundgren et al., 2008; McCracken et al., 2013; Tyrberg et al., 2017), and given that valued living is likely interrupted early in the course of schizophrenia, it is possible that the non-significant but notably large between group value differences observed herein are indicative of an emotionally adaptive shift in values. However, while the trends between SVS value domains in patients and controls in this study

Table 3

Domain-specific functioning and mental health in people with a schizophrenia spectrum disorder and controls.

	People with SSD <i>M (SD)</i>	Control participants <i>M (SD)</i>	<i>t(df), p</i>	99.75% BCa <i>CI</i> [lower, upper]	Effect size (<i>d</i>)
Current functioning					
FAST					
Autonomy	3.34 (3.23)	0.3 (0.93)	$t(30.41) = 5.10, p < .001$	[1.31, 5.17]	1.22*
Occupational	7.48 (4.56)	0.96 (1.82)	$t(33.9) = 7.47, p < .001$	[3.98, 9.36]	1.82*
Cognitive	4.28 (3.16)	1.48 (2.45)	$t(48.97) = 3.91, p < .001$	[0.47, 5.21]	0.98*
Financial	1.17 (1.73)	0.35 (0.93)	$t(36.53) = 2.63, p = .01$	[-0.05, 2.16]	0.57 ^a
Leisure	2.55 (2.13)	0.96 (1.3)	$t(47.15) = 3.33, p = .002$	[0.04, 2.87]	0.88*
Interpersonal	5.34 (3.02)	2.65 (2.53)	$t(50) = 3.43, p = .001$	[0.24, 4.68]	0.96*
Total impairment	24.17 (10.3)	6.7 (5.7)	$t(45.23) = 7.76, p < .001$	[10.44, 24.67]	2.04*
SOFAS					
SOFAS	64.38 (10.79)	88.57 (8.4)	$t(50) = -8.83, p < .001$	[-31.99, -13.11]	-2.47*
BACS cognition					
BACS cognition	34.70 (12.38)	47.81 (10.56)	$t(50) = -4.2, p < .001$	[-22.84, -4.99]	-1.13*
Physical health and depression					
SCQ health conditions					
SCQ health conditions	1.90 (1.47)	0.43 (0.79)	$t(44.49) = 4.58, p < .001$	[0.51, 2.38]	1.21*
CDSS depression					
CDSS depression	3.66 (2.99)	1.35 (1.69)	$t(45.72) = 3.5, p = .001$	[0.39, 4.28]	0.92*
Life satisfaction, hope, and SWB					
SHS happiness					
SHS happiness	5.07 (1.07)	4.92 (1.13)	$t(50) = 0.49, p = .66$	[-0.9, 0.98]	0.14
SWLS life satisfaction					
SWLS life satisfaction	4.26 (1.38)	4.37 (1.29)	$t(50) = -0.28, p = .78$	[-1.18, 0.94]	-0.08
SHS-9 hope					
SHS-9 hope	2.27 (0.47)	2.31 (0.42)	$t(50) = -0.37, p = .75$	[-0.4, 0.31]	-0.09
WeBS					
Hedonic SWB					
Hedonic SWB	5.08 (0.86)	5.14 (0.66)	$t(50) = -0.24, p = .82$	[-0.7, 0.58]	-0.08
Eudemonic SWB					
Eudemonic SWB	4.94 (0.74)	4.99 (0.75)	$t(50) = -0.31, p = .76$	[-0.66, 0.53]	-0.07
Physical SWB					
Physical SWB	4.09 (0.83)	4.59 (0.94)	$t(50) = -2.12, p = .04$	[-1.12, 0.21]	-0.57 ^a
Financial SWB					
Financial SWB	4.53 (0.76)	4.32 (1.15)	$t(36.36) = 0.79, p = .44$	[-0.68, 1.11]	0.22
Social SWB					
Social SWB	5.1 (0.94)	4.75 (0.65)	$t(50) = 1.53, p = .13$	[-0.38, 1.09]	0.42
Global SWB					
Global SWB	4.74 (0.58)	4.8 (0.61)	$t(50) = 0.34, p = .74$	[-0.59, 0.48]	-0.1

Note. Bonferroni correction applied to alpha level ($p = .0025$) to adjust for multiple comparisons. 99.75% bias corrected and accelerated confidence intervals (BCa *CI*), based on 1000 bootstrapped samples, correspond to modified alpha level. Higher FAST scores represent lower functioning in each domain. Higher SOFAS and BACS scores represent better functioning in associated domains. SSD=Schizophrenia spectrum disorder; FAST = Functional Assessment Short Test; SOFAS=Social and Occupational Functioning Assessment Scale; BACS=Brief Assessment of Cognition in Schizophrenia; SCQ = Self-Administered Comorbidity Questionnaire; CDSS=Calgary Depression Scale for Schizophrenia; SHS=Subjective Happiness Scale; SWLS=Satisfaction with Life Scale; SHS-9 = Schizophrenia Hope Scale; WeBS=Well-Being Scale; SWB=Subjective Well-Being.

^a Indicates statistical significance at the uncorrected significance threshold ($p < .05$).

* Indicates statistical significance at the corrected significance threshold ($p < .0025$).

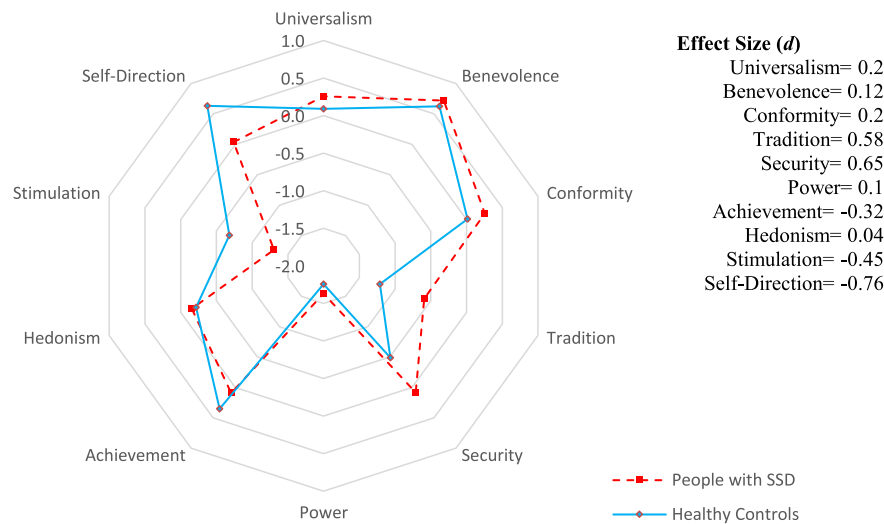


Fig. 1. Radar chart for value dimension means and associated effect size differences from the Schwartz Values Survey for people with a schizophrenia spectrum disorder and community controls.

Table 4
Value domain ratings and valued living scores in people with a schizophrenia spectrum disorder and controls.

	People with SSD <i>M (SD)</i>	Control participants <i>M (SD)</i>	<i>t(df), p</i>	99% BCa <i>CI</i> [lower, upper]	Effect size (<i>d</i>)
SVS					
Openness to change	-0.64 (0.82)	-0.02 (0.95)	<i>t</i> (50) = -2.49, <i>p</i> = .02	[-1.28, 0.06]	-0.71 ^a
Conservation	-0.08 (0.75)	-0.56 (0.62)	<i>t</i> (50) = 2.46, <i>p</i> = .02	[-0.05, 1.00]	0.69 ^a
Self-transcendence	0.49 (0.46)	0.35 (0.57)	<i>t</i> (50) = 0.91, <i>p</i> = .37	[-0.26, 0.52]	0.27
Self-enhancement	-0.77 (0.73)	-0.7 (0.84)	<i>t</i> (50) = -0.31, <i>p</i> = .76	[-0.66, 0.53]	-0.09
VLQ valued living	44.92 (16.04)	42.57 (14.30)	<i>t</i> (50) = 0.55, <i>p</i> = .58	[-9.26, 13.96]	0.15

Note. Bonferroni correction applied to alpha level (*p* = .01) to adjust for multiple comparisons. 99% bias corrected and accelerated confidence intervals (BCa *CI*), based on 1000 bootstrapped samples, correspond to modified alpha level. SSD = Schizophrenia Spectrum Disorder; SVS=Schwartz Values Survey; VLQ = Valued Living Questionnaire.

^a Indicates statistical significance at the uncorrected significance threshold (*p* < .05).

were in line with a priori hypotheses, the validity of this interpretation remains in question. Future studies with larger samples are needed to render more clearly interpretable findings regarding values and SWB in middle-aged people with schizophrenia.

Due to the established link between lower socioeconomic status (SES) and reduced openness to change/increased conservation values (Schwartz, 2007; Schwartz and Boehnke, 2004), as well as the link between lower SES and the development of schizophrenia (Hakulinen et al., 2020), we also explored bivariate associations between openness to change/conservation and several SES-related variables. In this study, lower education was associated with lower openness to change ratings, complicating a clear interpretation of the effect of schizophrenia illness on value formation. However, reduced education in many people with a psychotic disorder is likely to be a consequence (not simply a SES correlate) of the illness due to the developmental period in which prodromal symptoms often appear (McCutcheon et al., 2020). Conversely, average parental education (an indicator for SES of origin) did not differ between groups, and its nonsignificant associations with conservation and openness to change values were similar for patients and controls. Lastly, internalized stigma scores were negatively related to openness to change values in the patient sample, suggesting that post-illness factors at the very least contribute to patient values.

There were important limitations to this investigation. First, due to the COVID-19 pandemic, the current study was underpowered in its ability to detect moderate to large between-group effect sizes after correcting for multiple comparisons. This also precluded sensitivity analyses of the potential impact of categorical group differences on key dependent variables. For example, that the patient sample was mostly of

White/European descent and the control sample largely of Asian descent may have impacted the current results, especially with regards to values. However, conflating ethnicity with culture is generally ill-advised (e.g., Byrd, 2011), and evidence suggests that individual values are more similar across cultures than previously assumed (e.g., Schwartz & Bardi, 2001). Moreover, the proportions of Canadian-born citizens were similar in both groups. Nevertheless, future research examining values in patients, controls, and their siblings may help to separate the influences of shared cultural factors and other life experiences on the formation and maintenance of values. Another limitation was the cross-sectional case-control design employed herein, which precludes broad generalizations regarding SWB in people with schizophrenia. While cross-sectional and longitudinal studies suggest that SWB is certainly achievable in schizophrenia, they further suggest that SWB in this population is more variable over time compared to healthy controls (Lambert et al., 2009; van Dijk et al., 2018). However, the intention of this study was not to estimate prevalence rates of SWB in people with schizophrenia and the general population, but rather to compare the motivational facilitators of SWB in both groups. To this end, the current results provide important insights in need of further research. Relatedly, patients with minimal positive symptoms were recruited for this investigation, and there is evidence to suggest that positive symptom severity exerts unique negative influences on eudemonic SWB (Brown et al., 2016). Therefore, results of the present study may not fully generalize to patients with acute or chronic positive symptoms above the mild severity exclusion threshold.

In summary, the present study replicated past findings of comparable SWB in middle-aged people with schizophrenia and controls, and

demonstrated that valued living appears to be important for SWB in both groups. Although these results are promising from an emotional resiliency perspective, they also implicate a set of cognitive mechanisms in people with schizophrenia that may result in reduced initiative to engage in functionally adaptive behaviours. That is, the notoriously difficult task of helping people with schizophrenia achieve functional recovery may be complicated by levels of happiness, life satisfaction, and valued living that hinder motivation towards functional recovery and other important treatment targets. Based on the negative relationship between internalized stigma and openness to change values in the current sample, one avenue to functional recovery may involve interventions that explicitly aim to clarify patient values and increase self-efficacy, which are important tenets of already existing therapeutic modalities not yet widely applied to this population (e.g., ACT; Hayes et al., 1999). By leveraging patient values, people with schizophrenia may experience greater intrinsic motivation to succeed in personally important domains that can then be translated into concrete social and occupational goals. At a more basic level, a general understanding that patient motivations may differ not because they are simply defective or absent, but for systemically predictable reasons, is likely a useful starting point when attempting to address the functional difficulties common in people with schizophrenia.

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CRedit authorship contribution statement

Daniel Krzyzanowski, Ofer Agid, Vina Goghari, Gary Remington: Conceptualization, Methodology, Writing - review & editing.

Daniel Krzyzanowski: Project administration, Data curation, Visualization, Formal analysis, Investigation, Writing - original draft.

Daniel Krzyzanowski, Gary Remington: Funding acquisition.

Gary Remington, Ofer Agid: Resources.

Vina Goghari, Gary Remington: Supervision.

Declaration of competing interest

None.

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