

Published in final edited form as:

Schizophr Res. 2012 May ; 137(1-3): 132–136. doi:10.1016/j.schres.2012.02.026.

Self-Determination and First-Episode Psychosis: Associations with Symptomatology, Social and Vocational Functioning, and Quality of Life

Nicholas J. K. Breitborde^{1,4}, Petra Kleinlein^{2,3}, and Vinod H. Srihari^{2,3}

¹Department of Psychiatry, University of Arizona, Tucson, Arizona, USA

²Department of Psychiatry, Yale University, New Haven, Connecticut, USA

³Connecticut Department of Mental Health and Addiction Services, Connecticut, USA

Abstract

Self-determination theory (SDT) postulates that satisfaction of three basic psychological needs (i.e., autonomy, competence, and well-being) promotes motivation, well-being, growth across domains of functioning. Thus, per SDT, we examined satisfaction of basic psychological needs among individuals with first-episode psychosis. First, we quantified the level of need satisfaction among a sample of individuals with first-episode psychosis and compared their level of need satisfaction to that of individuals without psychosis. Second, we examined the association between need satisfaction and several domains of well-being among individuals with first-episode psychosis (i.e., symptomatology, social/vocational functioning, and quality of life). Our results indicated that individuals with first-episode psychosis experience less satisfaction of basic psychological needs as compared to their same-aged counterparts. There was a modest association between need satisfaction and well-being among individuals with first-episode psychosis, with the need of relatedness being the need most frequently associated with indices of well-being. Although modest in scope, the results of the current study raise the possibility that further investigation of SDT among individuals with first-episode psychosis may reveal important strategies through which early intervention services can better promote well-being and recovery.

1. Introduction

Self-determination theory (SDT) postulates that aspects of one's social environment play an instrumental role in facilitating or hindering the expression of human potential (Ryan and Deci, 2000). Central to SDT is the hypothesis that environments which allow for the satisfaction of three basic psychological needs for autonomy (i.e., perceiving oneself as the

© 2012 Elsevier B.V. All rights reserved.

⁴To whom correspondence should be sent: Department of Psychiatry, University of Arizona Medical Center, University Campus, 1501 N. Campbell Ave., PO Box 245002, Tucson, AZ 85724-5002, USA. Electronic correspondence may be sent to breitbor@email.arizona.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Conflict of Interest

All authors declare that they have no conflicts of interest

Contributors

NJKB designed the study, completed the statistical analyses, and wrote the first draft of the manuscript. PK compiled the data for the statistical analyses. All authors contributed to and have approved the final manuscript.

volitional source of one's actions), competence (i.e., perceived effectiveness in interactions with the social environment), and relatedness (i.e., a sense of connection and belongingness with other individuals and one's community) promote motivation, well-being, and growth of individuals across domains of functioning (Ryan, 1995; Ryan and Deci, 2004). Empirical investigations of SDT have demonstrated the validity of this theory across a wide array of environmental (e.g., Meyer et al., 2007; Reis et al., 2000; Sheldon and Filak, 2008; Thøgersen-Ntoumani et al., 2010) and cultural contexts (e.g., Chirkov et al., 2003; Chirkov et al., 2005; Deci et al., 2001; Sheldon et al., 2004).

Within the psychiatric literature, there is growing interest in self-determination theory. To date, this theory has been explored in the context of several psychiatric disorders, including posttraumatic stress disorder (Kashdan et al., 2006), social anxiety (Kashdan et al., 2008), and anorexia nervosa (Strauss and Ryan, 1987). With regard to psychotic disorders specifically, several recent studies have drawn on SDT in addressing the motivational deficits that often accompany psychosis (Choi and Medalia, 2010; Medalia and Brekke, 2010; Nakagami et al., 2008). For example, Choi and Medalia (2010) have noted that, per SDT, strategies that address the need for competence among individuals with schizophrenia may increase their desire to participate in cognitive remediation.

SDT may be particularly relevant to the study of first-episode psychosis. For instance, a key treatment concern in first-episode psychosis is the high rates of treatment non-adherence and dropout for both pharmacological and psychosocial interventions (e.g., Coldham et al., 2002; Perkins et al., 2008; Rossberg et al., 2010) during a stage of illness in which individuals may be particularly responsive to such interventions (e.g., Goldstein, 1996; Robinson et al., 1999). Several scholars have suggested that building healthcare environments which satisfy the basic psychological needs of individuals with psychotic disorders may be an effective strategy to increase treatment motivation and participation (Choi and Medalia, 2010; Mancini, 2008). Yet, despite the potential of SDT in informing the development of improved care for first-episode psychosis, no study to date has investigated basic need satisfaction among individuals early in the course of a psychotic illness.

Thus, the goal of this study is to examine the basic psychological needs identified by SDT among individuals with first-episode psychosis. First, we will quantify the level of need satisfaction among a sample of individuals with first-episode psychosis and compare their level of need satisfaction to that of individuals without psychosis. Second, we will examine the association between need satisfaction and several domains of well-being among individuals with first-episode psychosis (i.e., symptomatology, social functioning, and quality of life).

2. Methods

2.1 Participants

Forty-seven individuals with first-episode psychosis were recruited from the Specialized Treatment Early in Psychosis (STEP) Program at Yale University (Srihari et al., 2009). The STEP program is a randomized controlled trial of an intensive treatment package for first-episode psychosis comprised of medication management, case management, group cognitive behavioral therapy, and multifamily group psychoeducation. Individuals randomized not to receive STEP services typically received medication management only. Eligibility criteria for the STEP Program include: (i) diagnosis of a schizophrenia-spectrum disorder or affective disorder with psychotic features as determined using the Structured Clinical Interview for the DSM-IV (First et al., 2002); (ii) duration of psychotic symptoms less than 5 years (*Median* = 15 weeks; *SD* = 58.02 weeks) as determined using the Symptom Onset in Schizophrenia Inventory (Perkins et al., 2000); (iii) less than or equal to eight weeks of

lifetime antipsychotic medication use; (iv) ages 16–45; (v) no evidence of mental retardation; and (vi) willing and able to provide informed consent.

2.2 Procedures

All subjects completed a single assessment battery comprised of measures of self-determination, symptomatology, social and vocational functioning, and quality of life.

2.3 Measures

2.3.1 Self-Determination—Self-determination was assessed using the Basic Psychological Needs Scale-General (BPNS: [Gagné, 2003; Ilardi et al., 1993]). The BPNS is a 21-item self-report scale that assesses satisfaction of the three basic psychological needs identified by SDT in life in general (i.e., autonomy, competence, and relatedness [Ryan and Deci, 2000]). All items are scored on a seven point scale [range: 1–7] with higher scores indicative of greater perceived autonomy, competence, or relatedness. Subscale scores for the three basic psychological needs are calculated by dividing the total score for all items which comprised the subscale by the number of items which comprise the subscale. Consequently, the range of possible scores for each subscale is 1–7.

2.3.2 Symptomatology—Symptomatology was assessed using the Positive and Negative Syndrome Scale (PANSS: [Kay et al., 1987]). The PANSS is widely used 30-item clinician rated scale that assesses three domains of symptomatology relevant to individuals with psychotic disorders: (i) positive symptoms [range: 7–49]; (ii) negative symptoms [range: 7–49]; and (iii) general symptoms (e.g., anxiety and depression [range: 14–112]). All domains are scores such that higher scores are indicative of more severe symptomatology.

2.3.3 Social and Vocational Functioning—Social and vocational functioning was assessed using the Social Functioning Scale (Birchwood et al., 1990). The SFS is 79-item measure that assesses seven domains of functioning: (i) social engagement/withdrawal [range: 0–16]; (ii) interpersonal behavior/communication [range: 0–10]; (iii) prosocial activities [range: 0–66]; (iv) recreation [range: 0–45]; (v) independence competence [range: 0–39]; (vi) independence performance [range: 0–39]; and (vii) vocational functioning [range: 1–10]. Items for each domain are rated such that higher scores are indicative of greater social/vocational functioning.

2.3.4 Quality of Life—Quality of life was assessed using the Heinrich's Quality of Life Scale (QLS: [Heinrichs et al., 1984]). The QLS is a 21-item semi-structured interview that assesses four domains of functioning: (i) intrapsychic foundations [range: 0–42]; (ii) interpersonal relations and social network [range: 0–48]; (iii) instrumental role functioning [range: 0–24]; and (iv) possession of common objects and participation in common activities [range: 0–12]. Quality of life domains are rated such that higher scores are indicative of greater quality of life.

2.4 Statistical Analyses

Pre-analysis screening of the data revealed no outliers or significant departures from a normal distribution. As such, Pearson correlations were used for all analyses. The missing data rate was 13%. Per current recommendations (Collins, 2006; Schafer and Graham, 2002), the missing data were estimated using multiple imputation (Rubin, 1987). Multiple imputation has been shown to produce reliable estimates in situations in which there was significantly greater missing data as compared to the current study (Royston, 2004).

The p_{rep} statistic was used to determine statistical significance for the current study. Unlike traditional null-hypothesis tests, p_{rep} provides an estimate of the percentage of future study replications in which we would expect to find an effect similar to that obtained in the current study. P_{rep} values of 0.90 (i.e., a similar effect would be found in 90% of future replications) have been recommended as a cutoff for statistical significance (Killeen, 2005). The use of p_{rep} in place of traditional p-values is consistent with existing recommendations suggesting that the “significance” of a finding should be determined by its “replicability” (Cohen, 1994). To aid in the interpretation of the results, statistically significant p_{rep} values are supplemented with p-values. Consistent with the theoretical underpinnings of p_{rep} , all presented p-values will be one-sided.

3. Results

3.1 Self-Determination in First-Episode Psychosis

Means and standard deviations of BPNS subscales are listed in Table 1. Participants’ scores on the BPNS Competence subscale were lower than the BPNS Autonomy subscale [$t(46) = 2.37$; $p_{rep} = 0.95$; $p = 0.01$] and the BPNS Relatedness subscale [$t(45) = 3.67$; $p_{rep} = 0.99$; $p = 0.001$]. There was no statistically significant difference between participants’ scores on the BPNS Autonomy and Relatedness Subscales [$t(45) = 1.31$; $p_{rep} = 0.82$; $p = 0.10$]

To evaluate how BPNS scores from our sample of individuals with first-episode psychosis compare to BPNS scores from individuals without psychosis, we completed a literature search to identify all previous studies which used the BPNS. In total, we found 33 manuscripts which used this measure in unmodified form among approximately 10500 individuals with no known psychotic disorder (Brdar and Kashdan, 2010; Eakman, 2011; Faye and Sharpe, 2008; Fiedor and Tucholska, 2010; Gagné, 2003; Hicks and King, 2009; Hicks et al., 2010; Hicks et al., in press; Hofer and Busch, 2011; Kashdan and Breen, 2007; Kashdan et al., 2008; Kashdan et al., 2006; Kashdan et al., 2009; Klar and Kasser, 2009; Kocayörük, 2010; Laghi et al., 2009; Lambert et al., 2010; Meyer et al., 2007; Neff, 2003; Niemiec et al., 2009; Osterman, 2011; Osterman and Dyehouse, in press; Philippe et al., 2011; Puente and Anshel, 2010; Schlegel et al., 2009; Schüler and Kuster, 2011; Sheldon and Hoon, 2007; Thøgersen-Ntoumani and Ntoumanis, 2007; Thøgersen-Ntoumani et al., 2010; Trent and King, 2010; Wei et al., 2005; Weinstein et al., 2009; Weinstein and Ryan, 2010). Data from eight studies were excluded from the current project: seven studies did not report means and standard deviations for the BPNS subscales (Lambert et al., 2010; Neff, 2003; Osterman, 2011; Osterman and Dyehouse, in press; Philippe et al., 2011; Weinstein et al., 2009; Weinstein and Ryan, 2010) and one study reported BPNS scores that fell outside of the possible range of scores for this measure (Fiedor and Tucholska, 2010). This reduced the total sample size to 9145.

From the comparison studies, we calculated means and standard deviations for each BPNS subscale weighted by the number of subject in each study (Autonomy: $M = 5.00$; $SD = 0.89$; $N = 7581$; Competence: $M = 5.07$; $SD = 0.94$; $N = 7883$; Relatedness: $M = 5.33$; $SD = 0.91$; $N = 7904$). For each of the BPNS subscales, individuals with first-episode psychosis had lower scores compared to individuals without psychosis [Autonomy: $t(7626) = 3.53$; $p_{rep} = 0.96$; $p = 0.006$; Competence: $t(7927) = 5.18$; $p_{rep} = 0.99$ $p < 0.001$; Relatedness: $t(7949) = 3.53$; $p_{rep} = 0.99$; $p < 0.001$; See Table 1].

Of note, there were several differences between the current study participants and the participants from the comparison studies. The weighted mean age of subjects in the comparison studies ($M = 20.45$; $SD = 2.98$) was less than that of the individuals with first-episode psychosis who participated in the current study [$M = 21.74$; $SD = 4.29$; $t(8202) = 2.95$; $p_{rep} = 0.98$; $p = 0.002$]. As age has been found to be positively associated with need

satisfaction (Hicks et al., in press), the lower need satisfaction among the older first-episode psychosis sample as compared to the younger comparison sample is particularly striking. Additionally, the weighted mean percentage of male subjects (39%) in the comparison studies was less than that of the current sample [89%; $\chi^2(1) = 50.12$; $p_{rep} = 0.99$; $p < 0.001$]. Available evidence suggests that there is no relationship between gender and need satisfaction (Kashdan et al., 2009). Data on years of education was only assessed in two of the 33 comparison studies [$M = 10.49$; $SD = 1.04$; (Laghi et al., 2009; Wei et al., 2005)]. As such, statistical comparison to the sample of individuals with first-episode psychosis ($M = 11.93$ years; $SD = 2.66$) would not be informative.

3.2 Self-Determination and Symptomatology

Means and standard deviations for PANSS scores and correlations with BPNS subscales are presented in Table 2. PANSS general symptoms scores were negatively correlated with both the BPNS autonomy ($r = -0.27$; $p_{rep} = 0.90$; $p = 0.03$) and relatedness scales ($r = -0.31$; $p_{rep} = 0.93$; $p = 0.02$), respectively, indicating that individuals with greater (i.e., worse) general symptoms reported lower levels of perceived autonomy and relatedness. There were no additional statistically significant associations between PANSS subscales and BPNS subscales.

3.3 Self-Determination and Social and Vocational Functioning

Means and standard deviations for SFS scores and correlations with BPNS subscales are presented in Table 3. The BPNS relatedness subscale was positively correlated with the SFS interpersonal communication/behavior ($r = 0.26$; $p_{rep} = 0.90$; $p = 0.04$), prosocial activities ($r = 0.26$; $p_{rep} = 0.90$; $p = 0.04$), and independence-performance subscales ($r = 0.33$; $p_{rep} = 0.94$; $p = 0.01$), respectively, indicating that individuals with better social functioning in these domains reported higher levels of perceived relatedness. The BPNS autonomy and competence subscales were not associated with any SFS subscale.

3.4 Self-Determination and Quality of Life

Means and standard deviations for QLS scores and correlations with BPNS subscales are presented in Table 4. The BPNS competence subscale was positively correlated with the QLS interpersonal relationships subscale ($r = 0.31$; $p_{rep} = 0.94$; $p = 0.02$), and the BPNS relatedness subscales was positively correlated with both the QLS intrapsychic foundations ($r = 0.41$; $p_{rep} = 0.98$; $p = 0.002$) and interpersonal relationships ($r = 0.41$; $p_{rep} = 0.98$; $p = 0.002$) subscales, respectively. Thus, individuals with higher levels of perceived competence reported possessing better interpersonal relationships, and individuals with high levels of perceived relatedness reported possessing better interpersonal relationships and better intrapsychic foundations. The BPNS autonomy subscale was not associated with any domain of quality of life.

4. Discussion

The results of our study suggest that individuals with first episode psychosis experience less satisfaction of basic psychological needs as compared to their individuals without psychosis. This finding is consistent with previous evidence suggesting that deficits in autonomy, competence, and relatedness may already be present early in the course of a psychotic illness (e.g., Birchwood et al., 1997; Hafner et al., 1992; Harrop and Trower, 2001).

Among the current sample, there was a modest association between need satisfaction and domains of well-being among individuals with first-episode psychosis. Specifically, greater need satisfaction was associated with some, but not all, measures of symptomatology (i.e., fewer general symptoms), social functioning (i.e., greater interpersonal communication/

behavior, participation in prosocial activities, and independent performance of tasks of social functioning), and quality of life (i.e., better intrapsychic foundations and interpersonal relationships). Of note, relatedness was the basic psychological need most commonly associated with indices of well-being in the current sample. This finding comports with studies which have shown relatedness to be positively associated with well-being among individuals with psychosis. For example, several scholars have presented evidence suggesting that the facilitation of relatedness with the clinician in the context of psychotherapy for psychotic disorder may be one of the key mechanisms which promotes therapeutic change and well-being (Lysaker and Daroyanni, 2006; Stierlin, 1963; Walsh, 1995; Will, 1959).

The limited association between indices of well-being and the basic psychological needs of autonomy and competence was surprising given the relative emphasis on these two psychological needs as key elements associated with well-being among individuals with psychosis in the current literature (Heinrichs et al., 2008; Liberman et al., 1986; Sass, 2011). Several factors may account for this finding. First, among individuals with psychotic disorders, the outcomes associated with exposure to environments that promote greater perceived autonomy and competence may vary based on the domain of functioning in which the autonomy and competence is expressed. For example, although greater autonomy with regard to choice of living situation is associated with greater well-being among individuals with schizophrenia (Hansson et al., 2002), exposure to familial environments in which psychiatric symptoms are viewed as under the volitional control of the individual with psychosis is predictive of higher rates of relapse among individuals with schizophrenia (Barrowclough et al., 1994; Breitborde et al., 2009; López et al., 1999; Yang et al., 2004). Additionally, the limited relationship between the basic psychological needs of autonomy and competence and well-being may result from a measurement limitation. Specifically, as individuals with psychosis may perceive themselves as simultaneously possessing high and low levels of autonomy and competence in different domains of functioning (Sass, 2011), measures of autonomy and competence across domains of functioning (e.g., BPNS) may provide convoluted assessments of these constructs. In such situations, domain-specific assessments of autonomy and competence may be more appropriate. A similar argument with regard to utility of domain-specific measures has been raised with regard to theoretical constructs similar to autonomy and competence [e.g., self-efficacy (Bandura, 2006)].

Of note, this study did suffer from a number of limitations, including a small sample size comprised primarily by males. However, the key limitation was our reliance on a cross-sectional design which prevented the investigation of the direction of the relationship between satisfaction of basic psychological needs and indices of well-being. Consequently, it is unclear whether, for example, better interpersonal relationships provide greater satisfaction of the need for relatedness, or greater relatedness leads to better interpersonal relationships. Both relationships are plausible per SDT as this theory suggests that (i) resource rich environments lead to greater need satisfaction and (ii) greater need satisfaction leads individuals to increased participation in activities which promote well-being (Ryan and Deci, 2000).

In his seminal “Conceptions of Modern Psychiatry,” Harry Stack Sullivan (1940) provided the apt reminder that individuals with a mental illness are “much more simply human than otherwise.” With this in mind, it is not surprising that the psychological needs identified by self-determination theory—needs whose satisfaction is purported to be associated with human development and well-being in general (Ryan and Deci, 2000)—appear to be associated with indices of well-being among individuals with first-episode psychosis. Although this association is modest in scope, the results of the current study raise the possibility that further investigation of SDT among individuals with first-episode psychosis

may reveal important strategies through which early intervention services can optimize well-being and recovery.

Acknowledgments

We would like to thank Dr. Barbara Walsh and Dr. Traci Cipriano for their assistance with data collection.

Role of Funding Source

This work was supported by the State of Connecticut, Department of Mental Health and Addition Services, NIH grant MH088971, and a grant from the Patrick and Catherine Weldon Donaghue Medical Research Foundation to VHS as well as funds from the University of Arizona and grant from the Institute for Mental Health Research to NJKB

References

- Bandura, A. Guide for constructing self-efficacy scales. In: Pajares, F.; Urdan, T., editors. *Self-Efficacy Beliefs of Adolescents*. Greenwich, CT: Information Age Publishing; 2006. p. 307-337.
- Barrowclough C, Johnston M, Tarrier N. Attributions, expressed emotion, and patient relapse: An attributional model of relatives' response to schizophrenic illness. *Behav. Ther.* 1994; 25(1):67–88.
- Birchwood M, McGorry P, Jackson H. Early intervention in schizophrenia. *Brit. J. Psychiatry.* 1997; 170(1):2–5. [PubMed: 9068766]
- Birchwood M, Smith J, Cochrane R, Wetton S, Copestake S. The Social Functioning Scale. The development and validation of a new scale of social adjustment for use in family intervention programmes with schizophrenic patients. *Brit. J. Psychiatry.* 1990; 157(6):853–859. [PubMed: 2289094]
- Brdar I, Kashdan TB. Character strengths and well-being in Croatia: An empirical investigation of structure and correlates. *J. Res. Pers.* 2010; 44:151–154.
- Breitborde NJK, Lopez SR, Nuechterlein KH. Expressed emotion, human agency, and schizophrenia: toward a new model for the EE-relapse association. *Cult. Med. Psychiatry.* 2009; 33(1):41–60. [PubMed: 19115098]
- Chirkov VI, Ryan RM, Kim Y, Kaplan U. Differentiating autonomy from individualism and independence: A self-determination theory perspective on internationalization of cultural orientations and well-being. *J. Pers. Soc. Psychol.* 2003; 84(1):97–110. [PubMed: 12518973]
- Chirkov VI, Ryan RM, Willness C. Cultural context and psychological needs in Canada and Brazil. *J. Cross Cult. Psychol.* 2005; 36(4):423–443.
- Choi J, Medalia A. Intrinsic motivation and learning in a schizophrenia spectrum sample. *Schizophren. Res.* 2010; 118:12–19.
- Cohen J. The earth is round ($p < 0.05$). *Am. Psychol.* 1994; 49:997–1003.
- Coldham EL, Addington J, Addington D. Medication adherence of individuals with a first episode of psychosis. *Acta Psychiatr. Scand.* 2002; 106(4):286–290. [PubMed: 12225495]
- Collins LM. Analysis of longitudinal data: the integration of theoretical model, temporal design, and statistical model. *Annu. Rev. Psychol.* 2006; 57:505–528. [PubMed: 16318605]
- Deci EL, Ryan RM, Gagné M, Leone DR, Usunov J, Kornazheva BP. Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country: A cross-cultural study of self-determination. *Pers. Soc. Psychol. Bull.* 2001; 27(8):930–942.
- Eakman AM. Convergent validity of the engagement in meaningful activities survey in a college sample. *OTJR: Occup. Particip. Health.* 2011; 31(1):23–32.
- Faye C, Sharpe D. Academic motivation in university: The role of basic psychological needs and identity formation. *Can. J. Behav. Sci.* 2008; 40(4):189–199.
- Fiedor, M.; Tucholska, K. Behavior supporting coaches and psychological functioning of students at Academy of Physical Education in Krakow. In: Zadarko, E.; Zbigniew, B., editors. *Academic Physical Education: Health, Lifestyle, and Motor Abilities*. Krosno, Poland: State Higher Vocational School in Krosno; 2010. p. 95-109.

- First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition (SCID-I/P). New York: Biometrics Research, New York State Psychiatric Institute; 2002.
- Gagné M. The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motiv. Emotion*. 2003; 27(3):199–223.
- Goldstein MJ. Psycho-education and family treatment related to the phase of a psychotic disorder. *Int. Clin. Psychopharm*. 1996; 11(suppl. 2):77–83.
- Hafner H, Riccher-Rossler A, Maurer K, Fatkenheuer B, Löffler W. First onset and early symptomatology of schizophrenia: A chapter of epidemiological and neurobiological research into age and sex differences. *Eur. Arch. Psych. Clin. Neurosci*. 1992; 242(2–3):109–118.
- Hansson L, Middelboe T, Sorgaard KW, Bengtsson-Tops A, Bjarnason O, Merinder L, Nilsson L, Sandlund M, Korkeila J, Vinding HR. Living situation, subjective quality of life and social network among individuals with schizophrenia living in community settings. *Acta Psychiatr. Scand*. 2002; 106(5):343–350. [PubMed: 12366468]
- Harrop C, Trower P. Why does schizophrenia develop at late adolescence. *Clin. Psychol. Rev*. 2001; 21(2):241–266. [PubMed: 11293367]
- Heinrichs DW, Hanlon TE, Carpenter WTJ. The quality of life scale: An instrument for rating the schizophrenic deficit syndrome. *Schizophren. Bull*. 1984; 10(3):388–398.
- Heinrichs RW, Goldberg JO, Miles AA, Vaz SM. Predictors of medication competence in schizophrenia patients. *Psychiatry Res*. 2008; 157(1–3):47–52. [PubMed: 17897721]
- Hicks JA, King LA. Positive mood and social relatedness as information about meaning in life. *J. Pos. Psychol*. 2009; 4(6):471–482.
- Hicks JA, Schlegel RJ, King LA. Social threats, happiness, and the dynamics of meaning in life judgments. *Pers. Soc. Psychol. Bull*. 2010; 36(10):1305–1317. [PubMed: 20729336]
- Hicks JA, Trent J, Davis WE, King LA. Positive affect, meaning in life, and future time perspective: An application of socioemotional selectivity theory. *Psychol. Aging*. in press.
- Hofer J, Busch H. Satisfying one's needs for competence and relatedness: Consequent domain-specific well-being depends on strength of implicit motives. *Pers. Soc. Psychol. Bull*. 2011; 37(9):1147–1158. [PubMed: 21566077]
- Ilardi BC, Leone D, Kasser R, Ryan RM. Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *J. Appl. Soc. Psychol*. 1993; 23:1789–1805.
- Kashdan TB, Breen WE. Materialism and diminished well-being: Experiential avoidance as a mediating mechanisms. *J. Soc. Clin. Psychol*. 2007; 26(5):521–539.
- Kashdan TB, Elhai JD, Breen WE. Social anxiety and disinhibition: An analysis of curiosity and social rank appraisals, approach-avoidance conflicts, and disruptive risk-taking behavior. *J. Anxiety Disord*. 2008; 22(6):925–939. [PubMed: 17981434]
- Kashdan TB, Julian T, Merritt K, Uswatte G. Social anxiety and posttraumatic stress in combat veterans: Relations to well being and character strengths. *Behav. Res. Ther*. 2006; 44(4):561–583. [PubMed: 15972206]
- Kashdan TB, Mishra A, Breen WE, Froh JJ. Gender differences in gratitude: examining appraisals, narratives, the willingness to express emotions, and changes in psychological needs. *J. Pers*. 2009; 77(3):691–730. [PubMed: 20078735]
- Kay SR, Fiszbein A, Opler LA. The positive and negative syndrome scale for schizophrenia. *Schizophren. Bull*. 1987; 13(2):261–276.
- Killeen PR. An alternative to null-hypothesis significance tests. *Psychol. Sci*. 2005; 16(5):345–353. [PubMed: 15869691]
- Klar M, Kasser T. Some benefits of being an activist: Measuring activism and its role in psychological well-being. *Polit. Psychol*. 2009; 30(5):755–777.
- Kocayörük E. Pathways to emotional well-being and adjustment in adolescence: The role of parent attachment and competence. *Int. Online. J. Educ. Sci*. 2010; 2(3):719–737.
- Laghi F, D'Alessio M, Pallini S, Baiocco R. Attachment representations and time perspective in adolescence. *Soc. Indic. Res*. 2009; 90(2):181–194.

- Lambert NM, Stillman TF, Baumeister RF, Fincham FD, Hicks JA, Graham SM. Family as a salient source of meaning in young adulthood. *J. Pos. Psychol.* 2010; 5(5):367–376.
- Lieberman RP, Mueser KT, Wallace CJ, Jacobs HE, Eckman T, Massel HK. Training skills in the psychiatrically disabled: Learning coping and competence. *Schizophren. Bull.* 1986; 12(4):631–647.
- López SR, Nelson KA, Snyder KS, Mintz J. Attributions and affective reactions of family members and course of schizophrenia. *J. Abnorm. Psychol.* 1999; 108(2):307–314. [PubMed: 10369041]
- Lysaker PH, Daroyanni P. Facilitating the emergence of interpersonal relatedness in individual psychotherapy of schizophrenia: A case study. *Bull. Menninger Clin.* 2006; 70(1):53–67. [PubMed: 16545032]
- Mancini AD. Self-determination theory: A framework for the recovery paradigm. *Adv. Psychiatr. Treat.* 2008; 14(5):358–365.
- Medalia A, Brekke J. In search of a theoretical structure for understanding motivation in schizophrenia. *Schizophren. Bull.* 2010; 36(5):912–918.
- Meyer B, Enström MK, Harstveit M, Bowles DP, Beevers CG. Happiness and despair on the catwalk: Need satisfaction, well-being, and personality adjustment among fashion models. *J. Pos. Psychol.* 2007; 2(1):2–17.
- Nakagami E, Xie B, Hoe M, Brekke JS. Intrinsic motivation, neurocognition and psychosocial functioning in schizophrenia: Testing mediator and moderator effects. *Schizophren. Res.* 2008; 105:95–104.
- Neff KD. The development and validation of a scale to measure self-compassion. *Self Identity.* 2003; 2:223–250.
- Niemiec CP, Ryan RM, Deci EL. The path taken: Consequences of attaining intrinsic and extrinsic aspirations in post-college life. *J. Res. Pers.* 2009; 43(3):291–306. [PubMed: 20161160]
- Osterman R. Feasibility of using motivational interviewing to decrease alcohol consumption during pregnancy. *J. Addict. Nurs.* 2011; 22:93–102.
- Osterman RL, Dyehouse J. Effects of a motivational interviewing intervention to decrease prenatal alcohol use. *Western J. Nurs. Res.* :1–21. in press.
- Perkins DO, Gu H, Weiden PJ, McEvoy JP, Hamer RM, Lieberman JA. Predictors of treatment discontinuation and medication nonadherence in patients recovering from a first episode of schizophrenia, schizophreniform disorder, or schizoaffective disorder: a randomized, double-blind, flexible-dose, multicenter study. *J. Clin. Psychiatry.* 2008; 69(1):106–113. [PubMed: 18312044]
- Perkins DO, Leserman J, Jarskog LF, Graham K, Kazmer J, Lieberman JA. Characterising and dating the onset of symptoms in psychotic illness: The Symptom Onset in Schizophrenia (SOS) Inventory. *Schizophren. Res.* 2000; 44(1):1–10.
- Philippe FL, Koestner R, Beaulieu-Pelletier G, Lecours S. The role of need satisfaction as a distinct and basic psychological component of autobiographical memories: a look at well-being. *J. Pers.* 2011; 79(5):905–938. [PubMed: 21204842]
- Puente R, Anshel MH. Exercisers' perceptions of their fitness instructor's interacting style, perceived competence, and autonomy as a function of self-determined regulation to exercise, enjoyment, affect, and exercise frequency. *Scand. J. Psychol.* 2010; 51(1):38–45. [PubMed: 19392944]
- Reis HT, Sheldon KM, Gable SL, Roscoe J, Ryan RM. Daily well-being: The role of autonomy, competence, and relatedness. *Pers. Soc. Psychol. Bull.* 2000; 26(4):419–435.
- Robinson DG, Woerner MG, Alvir JMJ, Geisler S, Koreen A, Sheitman B, Chakos M, Mayerhoff D, Bilder R, Goldman R, Lieberman JA. Predictors of treatment response from a first episode of schizophrenia or schizoaffective disorder. *Am. J. Psychiatry.* 1999; 156(4):544–549. [PubMed: 10200732]
- Rossberg JI, Johannessen JO, Klungsoyr O, Opjordsmoen S, Evensen J, Fjell A, Haahr U, Joa I, Langeveld J, Larsen TK, Melle I, Rund BR, Simonsen E, ten Velden W, Vaglum P, Friis S, McGlashan T. Are multi family groups appropriate for patients with first episode psychosis? A 5-year naturalistic follow-up study. *Acta Psychiatr. Scand.* 2010; 122(5):384–394. [PubMed: 20491714]
- Royston P. Multiple imputation of missing values. *STATA J.* 2004; 4(3):227–241.
- Rubin, DB. Multiple imputation for non-response in surveys. New York: John Wiley & Sons; 1987.

- Ryan RM. Psychological needs and the facilitation of integrative processes. *J. Pers.* 1995; 63(3):397–427. [PubMed: 7562360]
- Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* 2000; 55(1):68–78. [PubMed: 11392867]
- Ryan, RM.; Deci, EL. Overview of self-determination theory: An organismic dialectical perspective. In: Deci, EL.; Ryan, RM., editors. *Handbook of Self-Determination Research*. Rochester, NY: University of Rochester Press; 2004. p. 3-33.
- Sass, LA. Autonomy and schizophrenia: Reflections on an ideal. In: Piers, C., editor. *Personality and Psychopathology: Critical Dialogues with David Shapiro*. New York: Springer; 2011. p. 99-126.
- Schafer JL, Graham JW. Missing data: our view of the state of the art. *Psychol. Methods.* 2002; 7(2): 147–177. [PubMed: 12090408]
- Schlegel RJ, Hicks JA, Arndt J, King LA. Thine own self: True self-concept accessibility and meaning in life. *J. Pers. Soc. Psychol.* 2009; 96(2):473–490. [PubMed: 19159144]
- Schüler J, Kuster M. Binge eating as a consequence of unfulfilled basic needs: The moderating role of implicit achievement motivation. *Motiv. Emotion.* 2011; 35(1):89–97.
- Sheldon KM, Elliot AJ, Ryan RM, Chirkov VI, Kim Y, Wu C, Demir M, Sun Z. Self-concordance and subjective well-being in four cultures. *J. Cross Cult. Psychol.* 2004; 35(2):240–275.
- Sheldon KM, Filak V. Manipulating autonomy, competence, and relatedness in a game-learning context: New evidence that all three needs matter. *Brit. J. Soc. Psychol.* 2008; 47(2):267–283. [PubMed: 17761025]
- Sheldon KM, Hoon TH. The multiple determination of well-being: Independent effects of positive traits, needs, goals, selves, social supports, and cultural contexts. *J. Happiness Stud.* 2007; 8:565–592.
- Srihari VH, Breitborde NJ, Pollard J, Tek C, Hyman L, Frisman LK, McGlashan TH, Jacobs S, Woods SW. Public-academic partnerships: Early intervention for psychotic disorders in a community mental health center. *Psychiatr. Serv.* 2009; 60(11):1426–1428. [PubMed: 19880454]
- Stierlin H. Aspects of relatedness in the psychotherapy of schizophrenia. *Psychoanal. Rev.* 1963; 51(3):19–28.
- Strauss J, Ryan RM. Autonomy disturbances in subtypes of anorexia nervosa. *J. Abnorm. Psychol.* 1987; 96(3):254–258. [PubMed: 3680765]
- Sullivan HS. Conceptions of modern psychiatry: The first William Alanson White memorial lectures. *Psychiatry.* 1940; 3(1):1–13.
- Thøgersen-Ntoumani C, Ntoumanis N. A self-determination theory approach to the study of body image concerns, self-presentation, and self-perceptions in a sample of aerobic instructors. *J. Health Psychol.* 2007; 12(2):301–315. [PubMed: 17284494]
- Thøgersen-Ntoumani C, Ntoumanis N, Nikitaras N. Unhealthy weight control behaviours in adolescent girls: A process model based on self-determination theory. *Psychol. Health.* 2010; 25(5):535–550. [PubMed: 20204932]
- Trent J, King LA. Predictors of rapid versus thoughtful judgments of meaning in life. *J. Pos. Psychol.* 2010; 5(6):439–451.
- Walsh J. Clinical relatedness with persons having schizophrenia: A symbolic interactionist perspective. *Clin. Soc. Work J.* 1995; 23(1):71–85.
- Wei M, Shaffer PA, Young SK, Zakalik RA. Adult attachment, shame, depression, and loneliness: The mediation role of basic psychological needs. *J. Counsel. Psychol.* 2005; 52(4):591–601.
- Weinstein N, Przybylski AK, Ryan RM. Can nature make us more caring? Effects of immersion in nature on intrinsic aspirations and generosity. *Pers. Soc. Psychol. Bull.* 2009; 35(10):1315–1329. [PubMed: 19657048]
- Weinstein N, Ryan RM. When helping helps: autonomous motivation for prosocial behavior and its influence on well-being for the helper and recipient. *J. Pers. Soc. Psychol.* 2010; 98(2):222–244. [PubMed: 20085397]
- Will OA Jr. Human relatedness and the schizophrenic reaction. *Psychiatry.* 1959; 22(3):205–223. [PubMed: 13844774]

Yang LH, Phillips MR, Licht DM, Hooley JM. Causal attributions about schizophrenia in families in China: expressed emotion and patient relapse. *J Abnorm Psychol.* 2004; 113(4):592–602. [PubMed: 15535791]

Table 1

Subject Demographics and Means and Standard Deviations for BPNS Scores

	First-Episode Psychosis Sample	Individuals Without Psychosis
BPNS-Autonomy	M = 4.67; SD = 0.87	M = 5.00; SD = 0.89 N = 7581
BPNS-Competence	M = 4.35; SD = 1.02 [‡]	M = 5.07; SD = 0.94 N = 7883
BPNS-Relatedness	M = 4.86; SD = 0.95	M = 5.33; SD = 0.91 N = 7904

[‡]N = 46

Table 2
Means and Standard Deviations for PANSS Scores and Correlations with BPNS Subscales

PANSS Subscale	M	SD	BPNS Autonomy	BPNS Competence	BPNS Relatedness
Positive Symptoms	18.15	6.60	0.11	0.05	-0.20
Negative Symptoms	15.59	5.65	0.02	-0.07	-0.10
General Symptoms	32.51	6.56	-0.27*	-0.12	-0.31*

* *Prep* 0.90

Table 3
Means and Standard Deviations for SFS Scores and Correlations with BPNS Subscales

SFS Subscale	M	SD	BPNS Autonomy	BPNS Competence	BPNS Relatedness
Social Engagement/Withdrawal	10.39	2.98	-0.01	0.12	0.07
Interpersonal Behavior/Communication	6.00	2.38	0.13	0.22	0.26*
Prosocial Activities	18.08	10.57	0.26	0.15	0.26*
Recreation	16.74	6.54	0.01	0.21	0.13
Independence-Competence	36.03	4.14	-0.22	-0.10	-0.12
Independence-Performance	24.24	5.81	0.24	0.23	0.33*
Vocational-Educational Functioning	7.32	2.81	0.16	-0.06	-0.05

* *Prep* 0.90

Table 4

Means and Standard Deviations for QLS Scores and Correlations with BPNS Subscales

QLS Subscale	M	SD	BPNS Autonomy	BPNS Competence	BPNS Relatedness
Intrapsychic Foundations	23.09	1.10	0.16	0.16	0.41*
Interpersonal Relations	21.80	1.29	0.24	0.31*	0.41*
Instrumental Role Functioning	29.06	1.22	0.02	0.09	0.22
Common Objects and Activities	6.19	0.33	0.02	0.04	0.11

* *prep* 0.90