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## Suicidal ideation in first-episode psychosis: Considerations for depression, positive symptoms, clinical insight, and cognition

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### Abstract

**Background:** Suicide is a leading cause of death for individuals with psychosis. Although factors influencing suicide risk have been studied in schizophrenia, far less is known about factors that protect against or trigger increased risk during early-stage and first episode of psychosis. This study examined whether depression, psychotic symptoms, clinical insight, and cognition were associated with suicide ideation among individuals with first-episode psychosis.

**Methods:** Data were obtained from the Recovery After an Initial Schizophrenia Episode (RAISE) project. Participants (n=404) included adults between ages 15 and 40 in a first episode of psychosis. Measurement included the Positive and Negative Syndrome Scale, Brief Assessment of Cognition in Schizophrenia, and Calgary Depression Scale for Schizophrenia. A logistic regression model evaluated clinical and cognitive variables as predictors of suicidal ideation.

**Results:** Greater positive symptoms (OR=1.085, p<0.01) and depression (OR=1.258, p<.001) were associated with increased likelihood of experiencing suicidal ideation during the RAISE project. Meanwhile, stronger working memory (OR=0.922, p<.05) and impaired clinical insight (OR=0.734, p<.05) were associated with a decreased likelihood of experiencing suicidal ideation.

**Conclusion:** The likelihood of experiencing suicidal ideation was significantly increased when positive and depressive symptoms were present, and significantly decreased when clinical insight was poorer and working memory stronger. These findings have important implications for the role

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**Contributors**

L. Bornheimer, J. Wojtalik, D. Cobia, and M. Smith conceptualized and designed the study. L. Bornheimer and J. Li conducted the literature reviews. L. Bornheimer performed statistical analyses. L. Bornheimer, J. Wojtalik, J. Li, D. Cobia, and M. Smith interpreted study findings, generated, and edited the manuscript.

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**Conflict of Interest**

The authors declare no conflicts of interest.

of cognition and insight in risk for suicide ideation in early-stage psychosis, which may aid in improving the prediction of suicide behaviors and inform clinical decision-making over the course of the illness.

## Keywords

suicide ideation; psychosis; first-episode psychosis; cognition; depression; insight

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## 1. Introduction

Suicide is among the leading causes of death for individuals with schizophrenia spectrum and other psychotic disorders (Bornheimer 2019; Bromet et al., 2017; Connell et al., 2016; Kjelby et al., 2015). Data show 40-50% of individuals diagnosed with schizophrenia experience suicidal thoughts (Simms et al., 2007), 20-50% make suicide an attempt (Pompili et al., 2007), and an estimated 4-13% die by suicide (Simms et al., 2007; De Hert, McKenzie, & Peuskens, 2001). Moreover, first-episode psychosis (FEP) is a particularly high-risk period (Austad et al., 2015; Barrett et al., 2010; Chang, Chen & Hui, 2014) in which rates of suicide ideation range from 26.2% to 56.5% (Barrett et al., 2010; Chang, Chen, & Hui, 2014; Tarrrier et al., 2007) and risk for suicide death is elevated by 60%, as compared to later stages of illness (Nordentoft et al., 2004).

While much research has focused on distress related to emerging unfamiliar symptoms (Ventriglio et al., 2016) and depression-related symptomatology (e.g., hopelessness) as predictors of suicide ideation and/or behavior (Bornheimer 2016; Montross, Zisook & Kasckow, 2005; Tarrrier et al., 2014), there is growing evidence that positive symptoms (e.g., hallucinations, delusions) can also function as risk factors (Bornheimer 2016; Montross, Zisook, & Kasckow, 2015; Tarrrier et al., 2014; Bornheimer & Jaccard, 2017). To date, there are conflicting and limited understandings of the relationships between negative symptoms within psychosis and suicide ideation and behavior (Carlborg et al., 2010; Kasckow et al., 2011; Ventriglio et al., 2016). Some research indicates negative symptoms relate to an increase in suicide ideation and/or behavior among individuals with psychosis (Drake et al., 1985; Gill et al., 2015; McGirr et al., 2006; Ventriglio et al., 2016), even when depression is controlled for (Gill et al., 2015; Ventriglio et al., 2016). Other research suggests that negative symptoms (diminished drive, blunted affect, social/emotional withdrawal) buffer the occurrence of suicide ideation and attempt among individuals with psychotic disorders, thus, negative symptoms are posited to reduce risk for suicide (Fenton et al., 1997). An explanation of this relationship surrounds the theory that people with negative symptoms, particularly reduced emotional expression/blunted affect, are less able to experience distress and negative emotions associated with psychotic disorder illness, resulting in a decreased likelihood of developing a sense of hopelessness and/or suicide ideation (Chang et al., 2014; Ventriglio et al., 2016).

Furthermore, there is an emerging literature that cognitive ability may be a risk factor for suicidal ideation among individuals with psychosis (Adan et al., 2017; Kim, Jayathilake, & Meltzer, 2003; O'Connor, 2011; Jollant et al., 2011). For example, research suggests that individuals with schizophrenia spectrum disorders with suicidal ideation displayed better

cognitive performance compared to those with no history of suicidal ideation. Some literature also suggests that specific aspects of cognition, such as strong verbal learning (Villa et al., 2018) and global executive functioning (Villa et al., 2018; Nangle et al., 2006), correlate with greater suicidal ideation as compared to individuals with greater cognitive impairment. In addition, greater working memory performance has shown some relationship with greater suicidal ideation among individuals with schizophrenia (Long et al., 2018). Overall, this literature together supports a unique theory that poorer cognitive functioning may serve as a putative protective factor against suicidal ideation among individuals with schizophrenia spectrum disorders. One underexplored aspect of this theory is whether the relationship exists among individuals in the context of experiencing a first episode of psychosis (FEP).

An important factor to consider in relation to suicidal ideation is the role of clinical insight (defined as the awareness of symptoms, diagnosis, or need for treatment; David, 1990; Reddy, 2015). The topic of insight within psychosis and schizophrenia spectrum disorders is of great importance given the established relationship between insight and positive clinical outcomes (McEvoy, 2004; Lincoln, Lüllman, & Rief, 2007; Lopez et al., 2019). Current literature also suggests clinical insight relates to aspects of depression, hopelessness, and suicidality within this population (Mintz, Dobson, & Romney, 2003), thus resulting in the 'Insight Paradox' (Lysaker et al., 2007). For example, Villa and colleagues (2018) observed that greater clinical insight was associated with a significantly greater risk for engaging in suicidal behavior among individuals with schizophrenia or schizoaffective disorder. Furthermore, Challis and colleagues' (2013) meta-analysis on factors associated with suicide attempt and deliberate self-injury among individuals with FEP observed an increase in the risk of engaging in deliberate self-harm among participants who displayed greater insight.

Given the high risk of suicide in schizophrenia (Heilä et al., 2005) and its elevated risk among individuals in FEP (Ayesa-Arriola et al., 2015; Melle et al., 2006; Lopez-Morinigo et al., 2019), there remains critical interest and value in examining the role of depression, positive and negative symptoms, cognition, and clinical insight in relation to suicidal ideation among the schizophrenia spectrum population. While greater characterization of these features and their relationships have been demonstrated among individuals with schizophrenia-spectrum disorders (Villa et al., 2018; Barrett et al., 2011; Delaney et al., 2012; Stip et al., 2017), relatively less is known about them in earlier phases of illness with few studies focusing specifically on individuals in FEP. Accordingly, this study aims to examine the relationships between positive and negative symptoms, symptoms of depression, clinical insight, cognitive functioning, and suicidal ideation among a first-episode sample of participants with psychosis. We hypothesize that: 1) greater positive symptoms, depression, and stronger cognitive functioning will relate to increased suicidal ideation; and, 2) greater negative symptoms and the presence of poorer clinical insight will relate to decreased suicidal ideation.

## 2. Methods

Data were obtained from the Recovery After an Initial Schizophrenia Episode (RAISE) project of National Institute of Mental Health's Early Treatment Program (ETP). ETP aimed

to change the trajectory and prognosis of individuals in a first episode of psychosis (FEP) and compared two early treatment programs to improve functional outcomes and quality of life between 2010 and 2012 (Kane et al., 2015). Community mental health clinics (n=34) across 21 states were randomized to offer one of the two programs: 1) early treatment intervention (n=223) or, 2) standard community care (n=181). The early treatment program, NAVIGATE, included medication management, psychoeducation, resilience-focused 1:1 therapy, and supported employment and education (Kane et al., 2015).

## 2.1 Sample

Participants (n=404) between the ages of 15 and 40 with schizophrenia, schizoaffective disorder, schizophreniform disorder, brief psychotic disorder, delusional disorder, or psychotic disorder not otherwise specified based upon the DSM-IV were included in the study. All participants had experienced a first episode of psychosis (excluded if experienced more than 1 discrete psychotic episode), spoke English, and had been on antipsychotic medications for 6 or less months across the lifespan. Standard care involved clinical care for psychosis as determined by providers and clinic capacities (Kane et al., 2015). Participants were recruited from thirty-four clinical sites in the United States who responded to the national advertisement of the project after completing a detailed questionnaire, site visits, and evaluation to support the study treatment. Sites were randomized in a cluster randomized design to the study condition (early treatment intervention or standard community care). Greater detail can be found in Mueser et al. (2015) and Kane et al. (2015) of the project including the NAVIGATE early treatment program.

## 2.2 Measurement

Suicidal ideation was measured by a single item from the Calgary Depression Scale for Schizophrenia (CDSS; Addington, Addington, & Schissel, 1990; Addington, Addington, & Maticka-Tyndale, 1993) and represented the experience of suicide ideation after baseline (Bornheimer, 2019). The item was coded as absent (0), mild (1), moderate (2), or severe (3), with a positive rating of reported suicidal ideation indicated by a score of mild (1) or moderate (2; Addington et al., 1990; Witt et al., 2014). The suicide item was subsequently recoded into a dichotomous yes or no variable representing the experience of suicidal ideation at each of the 4 post-baseline time points. Lastly, the dichotomous item at each time point after baseline was collapsed into a single dichotomous yes or no variable to represent incidence of suicidal ideation after baseline assessment.

Depression was measured at the RAISE baseline using the Calgary Depression Scale for Schizophrenia (CDSS; Addington, Addington, & Schissel, 1990). The CDSS is a widely used well-validated scale to assess severity of depressive symptoms in individuals diagnosed with schizophrenia and was administered by a trained interviewer (Addington, Addington, & Maticka-Tyndale, 1994). Symptoms of depression were measured in the past two weeks using 8 of the 9 CDSS items, including: depression, hopelessness, self-depreciation, guilty ideas of reference, pathological guilt, morning depression, early wakening, and observed depression. The suicide item was not included in the calculation of depression given its involvement as the dependent variable. Ratings were coded as absent (0), mild (1), moderate (2), or severe (3), and items summed to obtain a total score (0-24) with higher scores

indicating greater presence and severity of symptoms of depression. Reliability analyses indicated minimal change from this removal (original 9-item scale Cronbach's alpha was .81 at baseline and revised 8-item scale alpha was .80 at baseline).

Positive and negative symptoms were measured at baseline with the Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opfer, 1987). The positive (delusions, hallucinations, disorganization, excitement, grandiosity, suspiciousness/persecution, hostility) and negative (blunted affect, emotional withdrawal, poor rapport, passive/apathetic social withdrawal, difficulty in abstract thinking, lack of spontaneity and flow of conversation, stereotyped thinking) symptom subscales were of focus in the current study and the scale measured symptoms within 7 days of assessment. Rating anchors range from 1 *absent* to 7 *extreme* and subscale scores range from 1 to 49 with higher scores indicating greater presence and severity of symptoms. Cronbach's alpha was .76 for negative and .73 for positive symptoms at baseline.

Clinical insight was measured at baseline by a single item from the PANSS (Kay, Fiszbein, & Opfer, 1987) which assessed for a lack of judgment and insight within 7 days of assessment, including impaired awareness or understanding of one's own psychiatric condition and life situation. This item's rating is based on thought content of the participant throughout the interview and raters were instructed to evaluate based upon the following: *impaired awareness or understanding of one's own psychiatric condition and life situation, evidenced by failure to recognize past or present psychiatric illness or symptoms, denial or need for psychiatric hospitalization or treatment, decisions characterized by poor anticipation of consequences, and unrealistic short-term and long-term planning*. The item rating anchor ranged from 1 *absent* to 7 *extreme* with higher scores indicating a greater impairment in clinical insight.

Cognitive functioning was measured at baseline using the Brief Assessment of Cognition in Schizophrenia (BACS; Keefe et al., 2004; Keefe et al., 2008). The BACS assessed for aspects of cognition found to be most impaired and strongly correlated with outcomes among individuals with schizophrenia, and includes: verbal memory, working memory, motor speed, verbal fluency, attention and speed of information processing, and executive functioning.

1. *Verbal memory*: participants completed a list learning task in which they were presented with 15 words and subsequently asked to recall as many as possible. Scores range from 0-75 with higher scores indicating stronger verbal memory.
2. *Working memory*: participants completed a digit sequencing task. Scores range from 0-8 with higher scores indicating stronger working memory.
3. *Motor speed*: participants completed a token motor task in which they were presented with 100 plastic tokens and asked to place them two at a time into a container as fast as possible and within 60 seconds. Scores range from 0-100 with higher scores indicating greater motor speed.
4. *Verbal fluency*: participants completed both semantic and letter fluency tasks in which they produced as many words as possible within animal categories within

60 seconds (semantic fluency) and produced as many words as possible that begin with a given letter within 60 seconds (letter fluency). Higher scores indicate greater verbal fluency.

5. *Attention and speed of information processing*: participants completed a symbol coding task in which they wrote numerals 1-9 as matches to symbols on a response sheet as fast as possible for 90 seconds. Scores range from 0-110 with higher scores indicating greater attention and speed of information processing.
6. *Executive functioning*: participants completed a Tower of London task in which they were shown two pictures simultaneously, both of which showed 3 different colored balls arranged on 3 pegs. The balls were uniquely arranged in each picture and participants were asked to give the total number of times the balls in one picture need to be moved in order to make the arrangement of balls identical to that of the other simultaneously presented picture. Scores range from 0-22 with higher scores indicating greater executive functioning.

### 2.3 Quantitative Modeling and Analysis

Data were analyzed using SPSS 25. Univariate and bivariate explorations of both demographic and clinical characteristics were completed to describe the sample. We performed a binary logistic regression to examine whether depressive symptoms, positive and negative symptoms, clinical insight, cognitive functioning (i.e., independent variables) significantly related to the presence of suicidal ideation (i.e., dependent variable) over time among individuals in a first episode of psychosis. In addition, we included the following covariates in the model given established relationships between demographic characteristics and suicide outcomes in the literature (Monstross et al., 2005; Tarrier et al., 2013): participant age, gender, race, ethnicity, and age of first psychotic symptom onset.

## 3. Results

Characteristics of participants are presented in Table 1, along with bivariate findings of characteristics by suicide ideation experience. Participants were on average 23.6 years of age ( $SD=5.06$ ) and most often identified as male ( $n= 293, 72.5\%$ ), White ( $n= 218, 54\%$ ), and non-Hispanic/Latino ( $n= 331, 81.92\%$ ). The majority of participants endorsed being unmarried ( $n= 358, 88.6\%$ ), unemployed ( $n= 346, 85.6\%$ ), and living with family ( $n= 287, 71\%$ ). Educational status did not differ across three categories: some high school or less ( $n= 145, 36\%$ ), completed high school ( $n= 133, 33\%$ ), and some college or higher ( $n= 125, 31\%$ ). The majority of participants were diagnosed with schizophrenia ( $n= 214, 53\%$ ) and reported they experienced untreated psychosis for  $m=6.36$  months ( $SD= 8.62$ ). A total of 106 participants (26.2%) reported the experience of suicidal ideation during the study time period. As presented in Table 1, a significant difference was found in medication status, months of untreated psychosis, symptoms of depression, positive symptoms, clinical insight, and diagnosis between individuals who did and did not experience suicidal ideation during the study.

The binary logistic regression model demonstrated good fit based upon a non-significant Hosmer and Lemeshow Test ( $\chi^2(8) = 5.394, p = .715$ ) and findings are present in Table 2.



Depression, positive symptoms, clinical insight, and working memory at baseline were associated with increased odds of suicide ideation after baseline (all  $p < 0.05$ ). Specifically, the odds of experiencing suicidal ideation increased for every one-unit increase in depression (OR=1.258, SE =0.036; CI: 1.172-1.350) and for every one-unit increase in positive symptoms (OR=1.085, SE =0.029; CI: 1.025-1.148). Meanwhile, the odds of experiencing suicidal ideation decreased for every one-unit increase in a lack of clinical insight (OR= 0.734, SE = 0.143; CI: 0.555-0.972) and for every one-unit increase in working memory (OR=0.922, SE =0.040; CI: 0.854-0.997).

#### 4. Discussion

The risk of suicide is markedly elevated among individuals experiencing FEP (Austad et al., 2015; Barrett et al., 2010; Chang, Chen, & Hui, 2014), particularly when compared to individuals with in longer-phases of schizophrenia spectrum disorder illness (Villa et al., 2018; Stip et al., 2017; Delaney, McGrane, & Cummings, 2012; Barrett et al., 2011). Consistent with prior literature of adults with schizophrenia (Bornheimer, 2016; Montross, Zisook, & Kasckow, 2005; Tarrier et al., 2014; Bornheimer & Jaccard, 2017; Siris, 2011), our results suggest that individuals with FEP experiencing greater depression and positive symptoms at baseline had greater odds of experiencing suicidal ideation post-baseline. Furthermore, poorer clinical insight and greater working memory ability at baseline were associated with decreased odds of suicidal ideation post-baseline.

Along these lines, greater clinical insight is often considered a key characteristic of suicide risk across the trajectory of psychosis phases (Villa et al., 2018; Mintz, Dobson, & Romney, 2003; Challis et al., 2013), including FEP. For example, in one of few explorations in FEP, Barrett and colleagues (2010) observed that greater clinical insight, along with increased depressive symptoms and negative beliefs about one's condition, significantly related to an increase in risk for experiencing suicidal ideation. Therefore, the 'Insight Paradox' (Lysaker & Buck, 2007) may be applicable in the first episode of psychosis. With the experience of FEP as a traumatic event (Mueser et al., 2010), those who are more aware of the chronicity of this condition may view recovery pessimistically and be at a greater risk to experience suicidal thoughts. Consistent with prior research (Barrett et al., 2015), while it can be inferred from our findings that increasing clinical insight in individuals in FEP will increase their risk of suicidal ideation, the relationship between clinical insight and suicide is complex and dynamic. Due to this complexity, more research is needed to elucidate the longitudinal relationship between clinical insight and suicide-related outcomes (ideation, plan, attempt, and death) within this population. As clinical insight develops among individuals in FEP, it is particularly imperative that suicide risk is simultaneously assessed for and treated. Cognitive-behavioral approaches may be desirable to implement in practice given their demonstrated effectiveness among individuals with schizophrenia spectrum and other psychotic disorders (Bornheimer et al., 2020).

In this study, we observed that stronger working memory performance was a protective factor against suicidal ideation among individuals in FEP. Working memory impairment is a known feature in suicide ideation and behavior (Keilp et al., 2013; Richard-Devantoy et al., 2014), with some evidence showing a negative relationship with cognitive inhibition

(Richard-Devantoy et al., 2013). This is potentially a function of observed structural and functional brain abnormalities among schizophrenia spectrum populations in regions known to support working memory, namely the dorsolateral prefrontal cortex and underlying white matter pathways (see Mann & Rizk, 2020 for a review). Thus, intact or improved working memory in this sample may reflect integrity of relevant brain systems normally weakened in the context of suicidal ideation. Working memory is also theorized to impact aspects of executive control in suicide behavior (Richard-Devantoy et al., 2014) and play a protective factor in the complex higher-order reasoning involved in suicide ideation and attempt.

Verbal memory, motor speed, verbal fluency, attention and speed of information processing, and executive functioning did not relate to suicidal ideation in this study. Nonetheless, our understandings of relationships between cognition broadly and suicidal ideation in FEP are just emerging as compared to the literature evaluating individuals with longer-duration psychotic disorders, namely schizophrenia. For example, it is well-established that greater cognitive abilities are associated with a higher likelihood of experiencing suicidal ideation and making a suicide attempt in schizophrenia spectrum disorders (Villa et al., 2018; Nangle et al., 2006; Long et al., 2018; Delaney et al., 2012). As for suicide death, data show this relationship appears to be moderated by number of attempts, such that individuals who die by suicide have higher cognitive abilities compared to individuals who attempted suicide multiple times and did not die (Delaney et al., 2012). It is possible that our finding of stronger working memory being a protective factor for suicide ideation may also relate to unique experiences within FEP. Further research is needed to examine suicide ideation and behavior, working memory, and cognition overall among individuals in early phase of psychotic disorder illness.

Negative symptoms did not significantly relate to suicidal ideation in the current study. Prior research in these areas are both limited with mixed findings (Carlborg et al., 2010; Kasckow et al., 2011; Ventriglio et al., 2016) and many challenges pointing towards measurement limitations and complexity in clinical assessment. Notably, negative symptoms (diminished emotional expression, avolition, alogia, anhedonia, and asociality) may overlap in clinical presentation with symptoms of depression (Krynicky et al., 2018; Ventriglio et al., 2016), making assessment in practice and research challenging. While there are similarities in presentation, such as anhedonia, avolition, and anergia, there are also differences including diminished emotional expression. These challenges highlight the importance of future investigations being needed to disentangle the presentation of negative symptoms and depression, in addition to the ways in which they may relate to suicide ideation and behavior.

#### 4.1 Limitations

Limitations must be considered in the current study. First, the RAISE project was not designed to address the specific aims of the current study, which resulted in a measurement constraint for clinical insight. This construct was measured using a single item from the Positive and Negative Syndrome Scale (PANSS); ideally utilization of an established multi-item scale of clinical insight to comprehensively capture the construct would have been preferred. Also, suicidal ideation was measured by one of the 9 Calgary Depression Scale



for Schizophrenia (CDSS) items, thus depression was measured by 8 items total. Reliability analyses indicated minimal change with the removal of one item when measuring depression (original 9-item scale Cronbach's alpha was .81 at baseline and revised 8-item scale alpha was .80 at baseline). Second, suicidal ideation was the primary outcome variable, as opposed to both ideation and suicide attempt given the low base rates of attempts among study participants ( $n=33$ , 8.2% of full sample [ $n=404$ ] across the study duration). Future research may consider examining these constructs in relation to increased odds for suicide attempt and death. Lastly, the predictor variables in this study were collected at baseline, while incidence of suicide ideation was evaluated by collapsed suicide incidence data from baseline to the end of the study period. As a result, we did not examine the fluctuations and patterns of suicide ideation in relation to cognitive and psychiatric symptomatology over time. Future research would benefit from systematic evaluation of all predictors and suicidal ideation at multiple time points as these dynamic symptoms progress in FEP and beyond.

## 4.2 Conclusions

Overall, the relationship between cognitive impairments and suicide-related outcomes are complex in schizophrenia spectrum disorders and require further research. What can be inferred from this study, and the larger literature, is that these relationships may change over the course of illness with stronger working memory being a protective factor for suicidal ideation during FEP, but later becoming a risk factor as the illness progresses. This pattern may further be explained by trajectories of decline in the illness (Fucetola et al., 2000), in which cognitive impairment appears to progressively decline from prodromal to more chronic phases of psychotic disorder illness (Corigliano et al., 2014). In the non-psychosis literature, there is evidence to suggest that stronger cognitive abilities among young people are associated with a lower risk of suicide-related outcomes (Burke et al., 2016), which is aligned with our working memory finding and warrants further investigations among individuals with psychosis.

While more research is needed to understand the longitudinal relationships between working memory and suicide-related outcomes in psychotic conditions, the results suggest that cognitive abilities, particularly working memory, may be an important predictor of suicide risk in FEP. This finding has important implications for including tests of working memory in standard clinical assessments when working with FEP individuals in practice.

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**Table 1.**

Characteristics among the full sample and by suicide ideation experience

Characteristic	Full Sample (n=404)		Experienced Suicide Ideation <sup>a</sup> (n=106)		Didn't Experience Suicide Ideation <sup>a</sup> (n=298)		Sig <sup>b</sup>
	n	% or M ± SD	n	% or M ± SD	n	% or M ± SD	
Age	404	23.62 ± 5.06	106	24.34 ± 4.85	298	23.36 ± 5.12	
Gender							
Male	293	72.5	71	67.0	222	74.5	
Female	111	27.5	35	33.0	76	25.5	
Race							
African American	152	37.6	46	43.4	106	35.6	
White	218	54.0	51	48.1	167	56.0	
American Indian or Alaska Native	21	5.2	5	4.7	16	5.4	
Asian	12	3.0	4	3.8	8	2.7	
Hawaiian or Pacific Islander	1	0.2	0	0.0	1	0.3	
Ethnicity							
Hispanic/Latino	73	18.1	14	13.2	59	19.8	
Non-Hispanic/Latino	331	81.9	92	86.8	239	80.2	
Marital Status							
Married	24	5.9	7	6.6	17	5.7	
Single/unmarried	358	88.6	95	89.6	263	88.3	
Divorced, widowed, or separated	22	5.4	4	3.8	18	6.0	
Education							
Some high school or less	145	36.0	39	37.1	106	35.6	
Completed high school	133	33.0	39	37.1	94	31.5	
Some college or higher	125	31.0	27	25.7	98	32.9	
Employment							
Currently working	58	14.4	13	12.3	45	15.1	
Not currently working	346	85.6	93	87.7	253	84.9	
Insurance Type							
Private	82	20.4	18	17.3	64	21.5	
Public	127	31.7	34	32.7	93	31.3	
Uninsured	192	47.9	52	50.0	140	47.1	
Residence							
Independent living	72	17.8	26	24.5	46	15.4	
Lives with family	287	71.0	67	63.2	220	73.8	
Supported or structured housing	14	3.5	3	2.8	11	3.7	
Homeless, shelter, or other	31	7.7	10	9.4	21	7.0	
Medication Status							*
Using antipsychotics	337	83.4	81	76.4	256	85.9	
Not using antipsychotics	67	16.6	25	23.6	42	14.1	
Months of untreated psychosis	355	6.36±8.62	105	8.57±9.56	298	5.58±8.14	**



Characteristic	Full Sample (n=404)		Experienced Suicide Ideation <sup>a</sup> (n=106)		Didn't Experience Suicide Ideation <sup>a</sup> (n=298)		Sig <sup>b</sup>
	n	% or M ± SD	n	% or M ± SD	n	% or M ± SD	
Age of first psychiatric illness	398	16.52 ± 6.32	105	16.59 ± 6.20	293	16.49 ± 6.38	
Age of first psychotic symptoms	392	19.15 ± 6.12	104	18.74 ± 6.11	288	19.30 ± 6.13	
Number of psychiatric hospitalizations	314	1.94 ± 1.98					
Symptoms of Depression	403	12.46 ± 4.04	105	15.41 ± 4.22	298	11.42 ± 3.42	***
Positive Symptoms	403	18.77 ± 5.23	105	20.37 ± 4.86	298	18.20 ± 5.24	***
Negative Symptoms	403	20.19 ± 5.31	105	20.86 ± 5.59	298	19.96 ± 5.20	
Clinical insight	403	3.85 ± 1.08	105	3.60 ± .905	298	3.94 ± 1.12	**
Cognition							
Working memory	402	17.91 ± 4.61	106	17.30 ± 4.84	296	18.13 ± 4.52	
Attention and info processing speed	400	48.67 ± 13.47	105	48.88 ± 14.96	295	48.60 ± 12.94	
Executive functioning	400	15.61 ± 4.51	106	15.56 ± 4.59	294	15.63 ± 4.49	
Verbal memory	402	37.78 ± 11.48	106	38.13 ± 10.97	296	37.66 ± 11.68	
Verbal fluency	402	41.94 ± 11.95	106	41.94 ± 13.37	296	41.94 ± 11.42	
Motor speed	402	58.67 ± 15.36	106	58.51 ± 16.08	296	58.72 ± 15.12	
DSM-IV Diagnosis							***
Schizophrenia	214	53.0	50	47.2	164	55.0	
Schizoaffective bipolar	24	5.9	10	9.4	14	4.7	
Schizoaffective depressive	57	14.1	28	26.4	29	9.7	
Schizophreniform	67	16.6	10	9.4	57	19.1	
Brief psychotic disorder	2	0.5	0	0.0	2	0.7	
Psychotic disorder NOS	40	9.9	8	7.5	32	10.7	

<sup>a</sup> Measured from baseline to end of study; all other variables measured at baseline

<sup>b</sup> Significance between suicide ideation groups examined using independent samples t-tests and chi-square tests

\* p<.05,

\*\* p<.01,

\*\*\* p<.001

**Table 2:**

Logistic regression predicting suicidal ideation

Predictor	<i>B</i>	S.E.	Wald $\chi^2$	<i>p</i>	Odds Ratio
Depression	.229	.036	40.47	.001	1.258
Positive symptoms	.081	.029	7.99	.005	1.085
Negative symptoms	.008	.030	.08	.778	1.008
Impaired clinical insight	-.309	.134	4.66	.031	.734
Working memory	-.081	.040	4.17	.041	.922
Attention and information processing speed	.002	.012	.035	.851	1.002
Executive functioning	.018	.035	.280	.596	1.019
Verbal memory	.010	.015	.476	.490	1.010
Verbal fluency	-.002	.014	.015	.902	.998
Motor speed	-.007	.010	.438	.508	.993
Gender	.206	.299	.476	.490	1.229
Race	-.050	.113	.193	.660	.952
Ethnicity	-.617	.387	2.55	.110	.539
Age at first psychotic symptoms	.026	.022	1.32	.250	1.03
Constant	-3.79	1.29	8.58	.003	.023