



Published in final edited form as:

Psychiatr Rehabil J. 2020 September ; 43(3): 225–233. doi:10.1037/prj0000393.

The Multidimensional Construct of Resilience Across the Psychosis Spectrum: Evidence of Alterations in People with Early and Prolonged Psychosis

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Abstract

Objective—Research has demonstrated that resilience impacts functional outcomes and is often reduced among those with prolonged psychosis. However, little work has examined when during the course of psychosis resilience declines and whether resilience impacts symptoms and functioning similarly in different illness phases. This study examined whether overall resilience 1) differed between those with early compared to relatively prolonged psychosis and 2) differed between the psychosis groups and non-clinical controls and 3) differentially related to symptoms and functioning in the psychosis groups.

Methods—Participants with early ($n = 30$) and prolonged psychosis ($n = 64$) and non-clinical controls ($n = 58$) completed the Resilience Scale. Psychosis participants also completed clinician-rated functioning and symptom measures. Analyses of Variance were used to compare group resilience levels. Pearson's correlations identified relationships between resilience, symptoms, and functioning.

Results—Overall resilience levels did not significantly differ between the psychosis groups, but both psychosis groups had lower resilience than non-clinical controls. Higher overall resilience was significantly associated with lower negative symptoms in the early psychosis group and lower mood symptoms in the prolonged psychosis group; greater resilience was significantly associated with higher functioning in both psychosis groups.

Conclusions and Implications for Practice—Resilience may be reduced throughout the course of psychosis but may differentially impact symptom domains in different illness phases. Targeting resilience with psychosocial interventions may be important throughout the course of psychosis and may lead to improvements in functioning as well as negative symptoms and mood symptoms (in early and prolonged psychosis, respectively).

Keywords

resilience; psychosis; early psychosis; negative symptoms

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Introduction

Resilience is a multidimensional construct that is often defined as “the capacity of a dynamic system to withstand or recover from significant challenges that threaten its stability, viability, or development” (Masten, 2011). It has been theorized to be a protective factor that promotes positive outcomes and adaptation when facing adverse circumstances (Kim-Cohen, 2007). Further, resilience may help to protect against the development of psychopathology or worsening of symptoms in the context of adversities as well as help to promote recovery and symptom improvement among those with severe psychiatric symptomology (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000; Torgalsbøen, 2011).

Although resilience has only recently gained attention in psychosis, extant studies have demonstrated that resilience plays a critical role in recovery and functioning in people with psychosis. For example, in a study examining twelve elements related to the Substance Abuse and Mental Health Services Administration (SAMHSA) definition of recovery (SAMHSA, 2006), Chiu, Ho, Lo, and Yiu (2010), found that resilience was one of the strongest correlates of recovery among those with psychosis. Greater levels of resilience have also been linked to increased overall functioning as well as quality of life in the domains of work, leisure time, finances, friends, and mental health in those with psychosis (Galderisi et al., 2014; Wartelsteiner et al., 2016). Similarly, although less research has examined the relationship between resilience and distinct symptom domains in individuals with psychosis, some have found that greater resilience is associated with improved negative symptoms and depression as well as overall symptomatology (Hofer et al., 2016; Rossi et al., 2017). Taken together, these findings suggest that resilience may be a key factor in a range of improved outcomes in people with psychotic disorders.

However, several studies have demonstrated that resilience is decreased in those with psychotic disorders compared to non-clinical controls. In separate studies comparing Austrian, Japanese, and American participants with psychosis to non-clinical control participants (Edmonds et al., 2018; Hofer et al., 2016; Lee, Martin, Tu, Palmer, & Jeste, 2018; Wartelsteiner et al., 2016), levels of resilience have been identified as being reduced in those with psychosis, with large effect sizes. Further, Mizuno et al. (2016) found that individuals with schizophrenia have demonstrated comparable levels of resilience levels compared to those with bipolar disorder, but both groups had significantly less resilience than non-clinical control participants. However, it is unclear from these studies if levels of resilience differ across the course of the illness, and particularly whether individuals earlier in the course of the illness also experience reductions in resilience. Indeed, most of these prior studies have focused on individuals with prolonged psychosis. Identifying whether resilience differs between those earlier in the illness course compared to those with more prolonged psychosis could help to identify when during the course of the illness resilience might be most critical to target in an effort to improve functioning and symptoms among persons with psychosis. Further, despite the fact that resilience is a multidimensional construct (Luthar, Cicchetti, & Becker, 2000; Wagnild, 2009b), most studies have focused on overall resilience levels. Identifying whether individual resilience domains are differently impacted in psychosis could help to identify more concrete resilience-related treatment targets by identifying the domains that might be most reduced in those with psychosis.

Existing work suggests that resilience is a modifiable process that may fluctuate during the lifespan in the general population. In a large cross-sectional study of 1,719 participants ranging in age from 19 to 103 years of age, Lundman, Strandberg, Eisemann, Gustafson, and Brulin (2007) categorized participants into 10 year age groups and found that resilience appeared to incrementally increase as the groups increased in age. This finding was largely replicated by Portzky, Wagnild, De Bacquer, and Audenaert (2010) who also demonstrated that resilience increased as age groups increased in 3,265 healthy participants ranging in age from 17 to over 65; however, they also found some evidence that resilience may stop increasing in 65 and older group. Further, among those with severe medical illnesses such as cancer, resilience has also been found to increase with age (Cohen, Baziliansky, & Beny, 2014). Thus, it may be that as an individual accumulates life experiences, they may be better able to identify and use coping strategies more efficiently to manage day-to-day challenges, symptoms, and/or illnesses (M. Cohen et al., 2014). Similarly, the longer one lives with and experiences an illness, the more knowledge and awareness they may develop, which can facilitate improved resilience. Among individuals with severe mental illness, there is some evidence that resilience also might increase with age (Mizuno et al., 2016) and that it can be modified with interventions (Meyer, Gottlieb, Penn, Mueser, & Gingerich, 2015). However, less is known about whether like the general population, younger people with psychosis show lower levels of resilience compared to individuals who are relatively older and have more prolonged psychosis.

To inform these gaps, the current study had two main aims. Our first aim was to identify whether overall resilience and individual resilience domains differ between those earlier in the course of psychosis compared to those with relatively prolonged psychosis and whether the psychosis groups differed from non-clinical controls. To do this, we used the multidimensional Resilience Scale by Wagnild and Young (1993), which contains two subscales: Personal Competence and Acceptance of Self and Life. Given that resilience has been found to increase with age (Lundman et al., 2007; Portzky et al., 2010), we hypothesized that those with early psychosis would have reduced levels of resilience (overall and subscale scores) compared to those with prolonged psychosis. We also hypothesized that both groups of psychosis would have lower resilience scores than non-clinical controls. Further, given that less work has examined associations between symptom domains and resilience, we also sought to explore whether overall and subscale resilience scores were differentially related to symptom as well as functioning domains between those with early compared to prolonged psychosis.

Methods

Procedures

Recruitment for the psychosis sample occurred at a large urban university medical center as well as from community treatment center referrals. Recruitment flyers were posted in the psychiatric outpatient clinic at the University of Illinois at Chicago and interested outpatient candidates contacted the researchers or study coordinator directly to learn more about the study. If the candidate expressed interest in participation, a brief inclusion/exclusion screening questionnaire was administered. Eligible inpatient research candidates were also

referred directly from the medical center's inpatient psychiatric unit by the clinical treatment team. Inclusion criteria for the adult psychosis sample included being an inpatient or outpatient with a schizophrenia or bipolar disorder with psychosis diagnosis. Exclusion criteria included current substance dependence, seizure disorders, current pregnancy, and neurological conditions.

Recruitment for the adult non-clinical control (NCC) sample occurred through posting flyers throughout the surrounding university medical center community. Interested participants called to obtain additional information about the study and completed a brief inclusion/exclusion screening questionnaire. Exclusion criteria included meeting current or past criteria for any major mental disorder, current substance dependence, seizure disorders, current pregnancy, and/or neurological conditions.

Candidates for both groups who met inclusion/exclusion screening criteria were scheduled for a research appointment. At the appointment, the researchers met with the subject in a private area to review the protocol and obtain written consent prior to the initiation of research study procedures. All study procedures were completed at a single appointment. All interviewers (M.D. or Ph.D.) were trained as part of a research team that used a standardized training protocol that involved viewing a set of recoded training interviews, observing live interviews, and conducting interviews while being observed; during each training phase, ratings were also completed and compared to standardized scores and/or trained interviewer's scores. Prior to diagnostic group assignment, consensus diagnoses were determined using the Structured Clinical Diagnostic Interview—fourth edition (SCID-IV; First, Spitzer, Gibbon, & Williams, 2002) and Diagnostic and Statistical Manual of Mental Disorders—fourth edition, text revision (DSM-IV-TR; American Psychiatric Association 2000).

The University of Illinois at Chicago's Internal Review Board approved this study, which was conducted in accordance with the latest version of the Declaration of Helsinki (General Assembly of the World Medical Association, 2014).

Participants

The psychosis group consisted of 94 people with a diagnosis of either schizophrenia ($n = 58$) or bipolar disorder with current psychosis ($n = 37$; 20 bipolar manic, 17 bipolar depressed). Following the work of others (Fervaha, Agid, Takeuchi, Foussias, & Remington, 2016; Fervaha, Foussias, Agid, & Remington, 2013), the early psychosis group included those under 36 years of age ($n = 30$), and the relatively prolonged psychosis group were those at least 36 years old ($n = 64$). Although early psychosis can also be defined by illness length (c.f., Breitborde, Srihari, & Woods, 2009; White, Luther, Bonfils, & Salyers, 2015), we chose to identify groups based on age given that age has shown to impact resilience levels. The NCC group consisted of 58 participants.

Measures

Resilience Scale—Resilience was assessed by the 25-item Resilience Scale (Wagnild & Young, 1993). Items are self-reported on a scale from 1 (strongly disagree) to 7 (strongly

agree). We used the total score and the factor-analytically-derived Personal Competence (i.e., “I am proud that I have accomplished things. I am able to depend on myself more than anyone else.”) and Acceptance of Self and Life (i.e., “I am friends with myself; I seldom wonder what the point of it all is.”) subscales (Wagnild & Young, 1993). The total score ranges from 25 to 175, with scores 125 or below suggesting low resilience, scores from 126 to 145 indicating moderately low to moderate resilience, and scores 146 or greater suggesting high resilience (Wagnild, 2009a). This measure has been previously used in psychosis samples (Hofer et al., 2016; Mizuno et al., 2016) and demonstrated good internal consistency and convergent validity with other measures of subjective elements related to recovery (e.g., self-esteem, hopefulness) (Hofer et al., 2016; Wartelsteiner et al., 2016). In the current study, internal consistency for the psychosis and control samples was acceptable for the total score (α 's range from .93-.95), Personal Competence (α 's range from .92 to .95), and Acceptance Self and Life subscales (α 's range from .77 to .80).

Positive and Negative Syndrome Scale—The Positive and Negative Syndrome Scale (PANSS; Kay, Fiszbein, & Opfer, 1987) was used to assess psychosis symptomatology. Each of the 30 PANSS symptom items is interviewer-rated on a scale from 1 (symptom absent) to 7 (extreme symptom severity). The factor-analytically derived negative (blunted affect, emotional withdrawal, passive/apathetic social withdrawal, poor rapport, active social avoidance, lack of spontaneity and flow of conversation, and motor retardation items), positive (hallucinatory behavior, delusions, unusual thought content, grandiosity, suspicious/persecuted, lack of judgment and insight items), cognitive (difficulty in abstract thinking, conceptual disorganization, poor attention, preoccupation, disturbance of volition, disorientation, mannerisms and posturing, and stereotyped thinking items), mood (depression, anxiety, somatic concern, feeling of guilt, and tension items), and hostility (hostility, excitement, poor impulse control, and uncooperativeness items) symptom subscales (Thokagevistik et al., 2016) were used. In the current study, the internal consistency of the PANSS was excellent (α 's ranging from .93 to .95).

Heinrichs-Carpenter Quality of Life Scale—Following the work of others (Foussias et al., 2011; Lysaker & Salyers, 2007; Swartz et al., 2007), functioning was assessed by the 21-item Heinrichs-Carpenter Quality of Life Scale (QLS; Heinrichs, Hanlon, & Carpenter, 1984). Items assess for domains: 1) interpersonal relations (family, friends, acquaintances, social activity, social network, social initiative, withdrawal, sociosexual items), 2) instrumental role functioning (occupational role, level of accomplishment, degree of underemployment, and work satisfaction), 3) intrapsychic foundations (sense of purpose, motivation, curiosity, anhedonia, aimless inactivity, empathy, and emotional interaction), and 4) commonplace objectives and activities. QLS items are interviewer-rated on a variable 0 to 6 point scale, with higher scores indicating greater functioning. In the current study, coefficient alpha for inter-rater reliability was good (0.86).

Data Analysis

Analyses were conducted using SPSS version 25.0. We first compared demographics between the early psychosis, prolonged psychosis, and NCC groups to identify any group differences that should be controlled in additional analyses. Specifically, one-way analysis of

variance (ANOVA) analyses were used to assess overall group demographic differences in sex, race, education, and age; significant ANOVAs were followed up with *t*-tests for continuous variables and chi-square tests for categorical variables. Age of psychotic illness onset, psychotic illness duration, symptoms, and functioning levels were compared between the two psychosis groups using *t*-tests; inpatient versus outpatient status was compared between the psychosis groups using chi-square tests. Resilience levels across the three groups were compared using ANOVAs; significant ANOVAs were followed up with Bonferroni-corrected post-hoc comparisons. As a more stringent test, these were followed by one-way analysis of covariance tests (ANCOVAs) where we controlled for any identified group demographic differences in sex, race, education, age of illness onset, and inpatient versus outpatient status (expected differences in age and psychotic illness duration were not controlled for since they were conflated by group membership). We calculated Cohen's *d* as a measure of effect size and followed Cohen (1992) in categorizing effect sizes of 0.2 as small, 0.5 as medium, and 0.8 as large.

Pearson's bivariate correlations were conducted to determine associations between resilience scores and symptoms (overall, negative, positive, cognitive, mood, and hostility symptoms) and functioning (overall, interpersonal relations, instrumental role functioning, intrapsychic foundations) in both the early and prolonged psychosis groups; the magnitude of these correlations was statistically compared using Fisher's *r*-to-*z* transformation. We interpreted the magnitude of the correlations based on Cohen's (1992) recommendation for correlations where 0.10 is small, 0.30 is medium, and 0.50 is large.

Results

Demographic Group Comparisons

As shown in Table 1, the three groups did not statistically differ in terms of sex ($p = .08$) but significantly differed in terms of race ($p = .002$), years of education ($p < .001$), and as hypothesized, age ($p < .001$). Specifically, groups differed in terms of the proportion of African Americans and Asian participants; the prolonged psychosis group had more African American and fewer Asian participants than the other two groups. The NCC group had significantly more years of education than the early ($p < .001$) and prolonged psychosis ($p < .001$) groups; the psychosis groups did not significantly differ in terms of education ($p = .12$). In terms of age, as expected, the early psychosis group was significantly younger than the prolonged ($p < .001$) and NCC group ($p < .001$); the prolonged group was also significantly older than the NCC group ($p < .001$). As expected, the early psychosis group had a shorter psychotic illness duration than the prolonged psychosis group ($p < .001$). The early psychosis group was comprised of more inpatients than the prolonged psychosis group ($p < .001$). The psychosis groups did not significantly differ in terms of age of psychosis illness onset ($p = .08$), levels of symptoms (overall, negative, positive, cognitive, mood, and hostility symptoms, all p 's $> .06$), or functioning (overall, interpersonal relations, instrumental role functioning, intrapsychic foundations, all p 's $> .36$).

Resilience Level Group Comparisons

When looking at the mean Resilience total scores, the NCC group had high levels of resilience overall, while both psychosis groups had moderately low to moderate levels of resilience. ANOVAs identified effects for group on all resilience scores: Resilience total score ($p < .001$), Personal Competence subscale ($p < .001$), and Acceptance of Self and Life subscale ($p = .002$) (See Table 1). Follow-up Bonferroni-corrected post-hoc comparisons indicated that the NCC group had significantly higher Resilience total and subscale scores than both the early (total, $p = .004$, $d = .71$; personal, $p = .004$, $d = .68$; acceptance, $p = .03$, $d = .62$) and prolonged (total, $p < .001$, $d = .77$; personal, $p < .001$, $d = .80$; acceptance, $p = .003$, $d = .63$) psychosis groups. The early psychosis and prolonged psychosis groups did not significantly differ in terms of Resilience total ($p > .99$, $d = -.004$), Personal Competence subscale ($p > .99$, $d = -.01$), or Acceptance of Self and Life subscale scores ($p > .99$, $d = .02$). ANCOVAs controlling for identified demographic group differences in race, education, and inpatient vs. outpatient status (for psychosis groups) left the results nearly unchanged. Further, to ensure that diagnoses or our categorization method was not impacting our resilience comparison results in our psychosis groups, we conducted some follow-up analyses; resilience scores (overall, subscale scores) did not differ between those with schizophrenia and bipolar disorder with psychosis in the overall psychosis, early psychosis, or prolonged psychosis groups (all p 's $> .19$). In addition, the resilience scores also did not differ between early and prolonged psychosis when we restricted the early psychosis group to those with an illness duration of 5 years and under (all p 's $> .72$).

Associations with Resilience Scores and Symptoms and Functioning in Psychosis Groups

Correlations are reported in Table 2. In the early psychosis group, higher scores on both the Resilience total and Personal Competence subscale were significantly associated with lower negative symptoms and higher functioning in all domains (overall, interpersonal relations, instrumental role functioning, intrapsychic foundations); all relationships were moderate to large in magnitude. In the prolonged psychosis group, higher Resilience total and Personal Competence subscale scores were significantly and moderately associated with reduced mood symptoms and higher overall functioning and intrapsychic foundations functioning. Among the prolonged psychosis group, greater Personal Competence scores were also associated with increased instrumental role functioning, and greater Acceptance of Self and Life scores were significantly associated with greater intrapsychic foundations functioning (both small to medium effect sizes). No other significant relationships were observed between resilience scores and symptoms or functioning in either psychosis groups, and notably, the Acceptance of Self and Life subscale was not significantly associated with any symptoms. When comparing the magnitude of the correlations between the psychosis groups, the early and prolonged psychosis groups demonstrated significantly different correlations between both the Resilience total and Personal Competence subscale and the PANSS hostility subscale, with the correlations being small, positive, and non-significant in the early and small, negative, and non-significant in the prolonged psychosis group (total, $Z = 1.98$, $p = .047$; personal, $Z = 2.03$, $p = .04$). An additional trending difference also emerged: Personal Competence was more strongly related to negative symptoms in the early than in the prolonged psychosis groups ($Z = 1.92$, $p = .055$).

Discussion

Prior work has demonstrated that resilience impacts functional outcomes and is often reduced among those with prolonged psychosis (Edmonds et al., 2018; Galderisi et al., 2014). This study sought to build on this prior work by examining resilience among those with early psychosis and explore whether resilience is associated with specific symptom domains. Further, we also sought to examine whether resilience is increased in those with prolonged psychosis compared to those with relatively early psychosis as well as compare resilience levels between both psychosis groups and non-clinical controls. Given that most prior work has focused on overall resilience levels, we also sought to identify whether the individual resilience domains of Personal Competence and Acceptance of Self and Life are similarly reduced in both groups of psychosis compared to non-clinical controls.

In contrast to our hypotheses, overall resilience levels did not differ between those with early compared to relatively prolonged psychosis. However, both psychosis groups had reductions in overall resilience compared to non-clinical controls, with both psychosis groups demonstrating moderately low to moderate levels of resilience. This is consistent with prior work demonstrating that resilience is reduced in those with psychosis and bipolar disorder with psychosis compared to non-clinical controls (Mizuno et al., 2016). Together, these findings may suggest that resilience is less of a dynamic process throughout the course of psychosis and may be more of an enduring feature of current psychotic disorders (i.e., not in remission). Indeed, it may be that reductions in resilience or difficulty overcoming and persisting despite significantly challenging or negative experiences precede the onset of psychosis, and these difficulties remain until a person develops better tools, including identifying personal strengths and resources that realistically support one's ability to adapt or act on challenging experiences as well as experiencing mastery despite challenging experiences. This is consistent with work demonstrating that those at high risk for psychosis have reduced resilience compared to controls (Kim et al., 2013; Marulanda & Addington, 2016), and that those who do go on to develop psychosis have lower resilience compared to those who do not convert to psychosis (Marulanda & Addington, 2016). Taken together with our findings, this suggests that it may be important to target resilience among those already diagnosed with psychosis, and particularly among those at risk for psychosis through psychosocial interventions such as a transdiagnostic prevention program developed to target resilience in at-risk college students (Burke et al., under review) or the Individual Resiliency Training component of the NAVIGATE program for first-episode psychosis (Mueser et al., 2015).

To expand on prior work that has focused mostly on overall resilience levels in psychosis, we also compared levels of individual resilience domains across the three groups. The two psychosis groups demonstrated reductions in both resilience domains of Personal Competence and Acceptance of Self and Life compared to controls, with medium/ large effect sizes. However, the psychosis groups did not significantly differ on levels of these resilience domains, and the magnitude of the decrease for both resilience domains was comparable in each psychosis group. Although unexpected, these findings suggest that these domains of resilience may be similarly reduced throughout the course of psychosis and that both might be important to target in interventions during different illness phases. The

observed decreases in the Personal Competence resilience domain also align with findings demonstrating that defeatist beliefs about one's ability to successfully perform tasks and self-efficacy are decreased in both those with early and prolonged psychosis compared to controls (Bentall et al., 2010; Grant & Beck, 2009; Ventura et al., 2014). Further, some studies have found that some forms of self-esteem are decreased in early and prolonged psychosis groups (Ciufolini et al., 2015; Freeman et al., 1998), which is consistent with our finding that levels of the Acceptance of Self and Life Resilience subscale did not significantly differ between psychosis groups. Thus, in line with CBT approaches (Grant, Huh, Perivoliotis, Stolar, & Beck, 2012; Hall & Tarrier, 2003; Lecomte et al., 1999), improving these resilience domains may involve targeting defeatist beliefs reduction and self-esteem and positive self-schema enhancement. Further, in line with these approaches as well as third-wave CBT approaches (Hayes & Hofmann, 2017) and Compassion Focused therapies (Gilbert, 2010; Heriot-Maitland, McCarthy-Jones, Longden, & Gilbert, 2019; Kennedy & Ellerby, 2016) to improve these resilience domains, it may be helpful to promote and build one's sense of self-reliance and mastery over stressful experiences, identify meaningful life goals that help to promote a greater sense of purpose and accomplishment, and promote self-compassion and identification of strengths.

We also conducted exploratory analyses to examine whether there were differential relationships between resilience and functioning and symptoms in the early and prolonged psychosis groups. Building on and consistent with prior work in more prolonged psychosis, we found that greater overall resilience was significantly correlated with higher overall functioning in both psychosis groups (Galderisi et al., 2014; Poloni et al., 2018). Further, the greater Personal Competence resilience domain was associated with greater overall functioning as well as the functioning domains related to work/school functioning and sense of purpose, motivation, and emotional engagement (i.e., the QLS instrumental and intrapsychic foundations subscales, respectively) in both psychosis groups. Notably, the resilience subscale of Acceptance of Self and Life appeared to be minimally related to functioning in either psychosis group, suggesting that it may be more important to target the Personal Competence resilience domain to improve functional outcomes. Further, none of the correlation magnitudes between functioning (overall or domain scores) significantly differed between the psychosis groups. Thus, this may suggest that not only does resilience (overall and the domain of Personal Competence) impact functioning but also that resilience impacts functioning to a similar extent across the course of psychosis.

Our results also expand on prior work by examining the relationships between resilience and individual symptom domains in the psychosis groups. In the early psychosis group, greater overall resilience and the subscale of Personal Competence were significantly associated with lower negative symptoms. On the other hand, in the prolonged psychosis group, these resilience scores were only significantly correlated with greater mood symptoms. Thus, it may be that resilience has more of an impact on negative symptoms earlier in the course of psychosis and mood symptoms later in the course of psychosis. However, while the magnitude of these associations did not statistically differ between groups, the strength of the association between negative symptoms and Personal Competence resilience subscale was trending towards being significantly stronger in the early compared to prolonged psychosis group. Overall, these findings align with prior work demonstrating that resilience

is more consistently associated with negative than mood symptoms in those at high risk for psychosis (Marulanda & Addington, 2016). However, given that we also found that hostility symptoms demonstrated significantly different relationships between resilience in the two groups (but the individual group correlations were not significant), additional work with larger samples is needed to more decisively identify whether there are differential symptom relationships with resilience across the course of psychosis. We also found that positive symptoms were not significantly correlated with any resilience score in either psychosis group; this may suggest that resilience has a limited impact on positive symptoms. Together, these symptom findings align with a prior study highlighting the influence of both negative and mood symptoms (and not positive symptoms) on well-being in a psychosis sample (Strauss, Sandt, Catalano, & Allen, 2012). Thus, it may be particularly important for interventions targeting resilience to focus not on positive symptoms but on negative symptoms or mood symptoms (depending on the participant's illness phase). Future longitudinal studies are needed to parse out the direction of the relationship between resilience and symptoms (i.e., does greater resilience lead to changes in symptoms or vice versa).

There are also limitations that should be considered when interpreting our findings. First, our sample size was relatively small, which may have limited our power to detect resilience differences or relationships differences between resilience and symptom and functioning scores across psychosis groups. However, our resilience comparison results in the psychosis group were robust to demographic differences and also remained when different groupings were used. Further, although the PANSS is widely used, our use of this instrument as the only measure of symptomology, particularly for mood symptoms is a limitation; future studies using similar psychosis-spectrum samples could benefit by using more comprehensive (e.g., Calgary Depression Scale for Schizophrenia; Addington, Addington, & Schissel, 1990) or domain-specific (e.g., Young Mania Rating Scale; Young, Biggs, Ziegler, & Meyer, 1978) mood measures. Similarly, newer negative symptom measures, such as the CAINS, may provide a more comprehensive measure of negative symptoms than the PANSS (Luther, Fischer, Firmin, & Salyers, 2018). Relatedly, although there is no gold standard for resilience measures in psychosis research and the Resilience Scale is commonly used with people with psychosis, future work could also examine whether resilience as measured by the Conner-Davidson Resilience Scale (Connor & Davidson, 2003) is similarly impacted across the psychosis spectrum. Also, the use of the QLS for both inpatients and outpatients may have impacted the findings; future studies could consider using alternative functioning measures (i.e., Personal and Social Performance (PSP) scale (Morosini, Magliano, Brambilla, Ugolini, & Pioli, 2000)). Finally, the cross-sectional nature of these analyses is a limitation, and longitudinal studies are needed to more conclusively identify whether resilience changes over the course of psychosis and how any changes might impact the trajectory of psychosis. Similarly, longitudinal work, especially in those with early psychosis, could also more precisely inform how treatment may best improve resilience and how promoting resilience may improve outcomes.

Conclusions

In sum, these results support the growing literature suggesting that resilience may be an important treatment target among those with psychosis. Our results suggest that resilience levels are similarly reduced among those with early and relatively prolonged psychosis, and both psychosis groups demonstrated reductions in resilience compared to non-clinical controls. Further, we also found that in both psychosis groups, resilience (overall and personal competence domain) was significantly related to overall functioning. There was also some evidence that resilience was differently associated with symptom domains in the psychosis groups, with resilience (overall and personal competence domain) demonstrating significant relationships only with negative symptoms in the early psychosis group and only with mood symptoms in the prolonged psychosis group. Taken together, these results suggest that targeting resilience with interventions such as the Individual Resiliency Training (Mueser et al., 2015), may be important throughout the course of psychosis and that targeting resilience may help to lead to improvements in functioning as well as in negative symptoms and mood symptoms (in early and prolonged psychosis, respectively) among those with psychosis.

Acknowledgement

The authors would like to thank all the individuals who participated in this study, as this work would not have been possible without them.

Funding: This work was supported in part by PHS grant (NIH) R01MH094358 (R.P.S.).

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Impact and Implications

This study suggests that resilience may be reduced throughout the course of psychosis and therefore may be an underlying component of the illness. Further, resilience may impact functioning as well as impact separate types of symptoms (e.g., negative, mood symptoms) during different illness stages. Supporting resilience in interventions may help to improve the course of psychosis, especially by improving functioning and negative or mood symptoms.

Table 1
Means, standard deviations, and group comparisons for demographic, resilience, symptoms, and functioning

	Early psychosis (<i>n</i> = 30)	Prolonged psychosis (<i>n</i> = 64)	Non-clinical Controls (<i>n</i> = 58)	Comparison Statistic
	M (SD)	M (SD)		
Demographic variables				
Age	25.47 (4.47)	49.16 (8.13)	40.57 (12.93)	$F(2,149) = 59.97^{***}$
Sex (<i>n</i> , % Male)	19, 63%	31, 48%	22, 38%	$\chi^2(2) = 5.17$
Race (<i>n</i> , %)				$\chi^2(6) = 21.44^{**}$
African American	16, 53%	52, 81%	31, 53%	
Hispanic	6, 20%	6, 9%	5, 9%	
Asian	2, 7%	0, 0%	10, 17%	
Caucasian	6, 20%	6, 9%	12, 21%	
Education	13.35 (2.43)	12.39 (2.87)	15.41 (2.40)	$F(2,149) = 20.80^{***}$
Age of Psychosis Illness Onset ^a	19.90 (4.49)	22.35 (8.83)	–	$t(87.95) = -1.75$
Illness Duration ^a (years)	5.57 (5.93)	27.05 (12.01)	–	$t(88) = -11.36^{***}$
Inpatient (<i>n</i> , %)	17, 57%	9, 14%	–	$\chi^2(1) = 18.53^{***}$
Measures				
RS – Total	133.33 (30.17)	133.44 (26.39)	151.74 (20.69)	$F(2,149) = 9.49^{***}$
RS – Personal Competence	91.63 (23.79)	91.88 (18.25)	105.03 (14.41)	$F(2,149) = 9.51^{***}$
RS – Acceptance and Self and Life	41.70 (8.87)	41.56 (9.23)	46.71 (7.11)	$F(2,149) = 6.60^{**}$
PANSS – Negative ^b	18.90 (9.75)	15.69 (6.51)	–	$t(41.53) = 1.64$
PANSS – Positive ^b	23.20 (6.41)	20.42 (6.88)	–	$t(92) = 1.86$
PANSS – Cognitive ^b	22.30 (8.57)	19.97 (6.81)	–	$t(92) = 1.42$
PANSS – Mood ^b	14.20 (3.43)	14.34 (2.70)	–	$t(92) = -.22$
PANSS – Hostility ^b	8.33 (3.28)	7.80 (2.66)	–	$t(92) = .84$
PANSS – Total ^c	86.93 (25.12)	78.22 (19.39)	–	$t(92) = 1.84$

	Early psychosis (<i>n</i> = 30)	Prolonged psychosis (<i>n</i> = 64)	Non-clinical Controls (<i>n</i> = 58)	Comparison Statistic
	M (SD)	M (SD)		
PANSS – Negative ^d	19.53 (9.40)	16.72 (6.84)	–	<i>t</i> (92) = 1.64
PANSS – Positive ^d	24.50 (6.45)	22.33 (6.92)	–	<i>t</i> (92) = 1.45
PANSS – General ^d	42.90 (11.83)	39.17 (8.81)	–	<i>t</i> (92) = 1.71
QLS – Interpersonal Relations ^e	25.03 (13.22)	27.33 (10.06)	–	<i>t</i> (43.29) = –.83
QLS – Instrumental Role ^e	11.41 (7.06)	10.69 (6.26)	–	<i>t</i> (91) = .50
QLS – Intrapyschic Foundations ^e	25.86 (11.44)	26.48 (8.40)	–	<i>t</i> (91) = –.30
QLS – Overall Functioning ^e	61.28 (28.34)	63.72 (21.39)	–	<i>t</i> (43.05) = –.41

Note: PANSS = Positive and Negative Syndrome Scale; QLS = Quality of Life Scale; RS = Resilience Scale.

^aMissing data for 4 participants in the prolonged psychosis group.

^bThese subscales are based on Thokagevisik et al. (2016).

^cThis was computed by summing all 30 PANSS items.

^dThese subscales are based on Kay, Fiszbein, & Opler (1987) and were added to help orient the reader; however, they were not used in additional analyses given that factor analytic studies have found five-factor models better characterize PANSS data (Lehoux et al., 2009; Wallwork et al., 2012).

^eMissing data for one participant in the early psychosis group.

**
p < .01.

p < .001.

Table 2

Correlations between resilience, symptoms, and functioning in the psychosis groups

	Resilience – Total			Resilience – Personal Competence subscale			Resilience – Acceptance of Self and Life subscale		
	Early	Prolonged	Statistical Difference (Z)	Early	Prolonged	Statistical Difference (Z)	Early	Prolonged	Statistical Difference (Z)
PANSS - Negative Symptoms ^a	-.41*	-.06	-1.62	-.48**	-.08	-1.92*	-.12	-.02	-.44
PANSS - Positive Symptoms ^a	-.13	.15	-1.22	-.14	.12	-1.13	-.08	.20	-1.22
PANSS – Cognitive ^a	-.26	.01	-1.19	-.29	-.01	-1.25	-.09	.04	-.56
PANSS – Mood ^a	-.06	-.30*	1.08	-.09	-.33**	1.09	.06	-.21	1.18
PANSS – Hostility ^a	.22	-.23	1.98*	.23	-.23	2.03*	.12	-.21	1.44
PANSS – Total	-.26	-.04	-.98	-.31	-.06	-1.13	-.07	.02	-.39
QLS – Interpersonal Relations ^b	.40*	.21	.90	.43*	.23	.96	.20	.15	.22
QLS – Instrumental Role ^b	.43*	.22	1.01	.47**	.25*	1.09	.21	.14	.31
QLS – Intrapsychic Foundations ^b	.41*	.38**	.15	.42*	.40**	.10	.24	.30*	-.28
QLS – Overall Functioning ^b	.48**	.28*	1.00	.51**	.29*	1.13	.26	.22	.18

Note: PANSS = Positive and Negative Syndrome Scale; QLS = Quality of Life Scale;

^aThese subscales are based on Thokagevisk et al. (2016).

^bMissing data for one participant in the early psychosis group.

* $p < .05$

** $p < .01$.