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# Comparing experiential acceptance and cognitive reappraisal as predictors of functional outcome in individuals with serious mental illness



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## ABSTRACT

**Background:** Two psychological regulation strategies to cope with psychotic symptoms proposed by the cognitive behavioral tradition were examined in this study: cognitive reappraisal and experiential acceptance. Although cognitive behavior therapy for psychosis has increasing empirical support, little is known about the role of these two strategies using methods of known ecological validity.

**Methods:** Intensive longitudinal data was gathered from 25 individuals diagnosed with a psychiatric disorder with psychotic features. During the course of six days we measured contextual factors, psychotic and stressful events, psychological regulation strategies and functional outcome.

**Results:** Positive psychotic symptoms and stressful events had negative associations with quality of life and affect, whereas experiential acceptance had positive associations with them. Cognitive reappraisal had inconsistent associations with quality of life and no association with affect. Social interactions and engagement in activities had a positive association with quality of life. Results were supported by additional and exploratory analyses.

**Conclusions:** Across measures of functional outcome, experiential acceptance appears to be an effective coping strategy for individuals facing psychotic and stressful experiences, whereas cognitive reappraisal does not. In order to inform treatment development efforts, results suggest the need to further investigate the role of these psychological regulation strategies using ecologically valid methods.

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## Introduction

In the last three decades, cognitive behavior therapy (CBT) has made great strivings at showing its efficacy in the treatment of individuals with psychotic symptoms such as those from schizophrenic, schizoaffective, bipolar, and re-occurring major depressive disorders. Although the efficacy of CBT for psychosis has been questioned (Lynch, Laws, & McKenna, 2010), meta-analyses of these interventions show that they have a reliable effect size on a range of psychiatric symptoms (Wykes, Steel, Everitt, & Tarrier, 2008), they can substantially reduce levels of re-hospitalization (Bach & Hayes, 2002), and can be effective even among low functioning patients with schizophrenia (Grant & Huh, 2012).

Among CBT interventions for psychosis, two sharply contrasting strategies have been proposed for how to handle psychotic experiences. On the one hand, there are classic cognitive models for which psychotic experiences should be challenged and replaced with more realistic cognitions (i.e., Cognitive Therapy). On the other, new models encourage noticing and accepting psychotic experiences as a natural process of one's mind, and to refocus on behavior (i.e., Acceptance and Commitment Therapy). However, to date, there has been little research contrasting these two strategies in a real-world setting.

Although there is strong evidence that CBT for psychosis is efficacious, little is known about the key ingredients of these interventions (Morrison et al., 2012; Wykes et al., 2008) and more generally about the daily psychological coping strategies used by this population in order to cope with stressful cognitive and sensory experiences. In a seminal paper, Lazarus and Alfert (1964) argued that cognitive reappraisals are crucial to individual's perception of threat, and research has shown that in their absence individuals tend to experience more negative affect and reduced

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well-being (Gross & John, 2003; John & Gross, 2004). Cognitive reappraisals have been described as “a form of cognitive change that involves construing a potentially emotion-eliciting situation in a way that changes its emotional impact” (Gross & John, 2003, p. 349). More specifically, it has been argued that the thinking patterns of individuals with psychosis can contribute to the exacerbation or reduction of psychotic symptoms (Beck, 1952, 1979; Drury, Birchwood, Cochrane, & MacMillan, 1996). For example, Drury and colleagues emphasized the need to challenge negative evaluative beliefs (Drury et al., 1996), whereas Kuipers and colleagues referred to the importance of modifying dysfunctional schemas (Kuipers et al., 1997) in the psychological treatment of these disorders.

The relationship between cognitive reappraisal and a wide range of indicators of psychopathology and well-being has received broadly positive support in the emotion and clinical psychology literature (Gross & John, 2003); however, cognitive reappraisal as a treatment target has received more limited support (Aldao & Nolen-Hoeksema, 2012; Haefel, 2010; Longmore & Worrell, 2007). In the area of psychosis, only one open trial has yet examined cognitive reappraisals as a mediator of outcome (Morrison et al., 2012) and further research is still needed to determine whether cognitive regulation is an effective strategy in coping with psychotic experiences (Morrison et al., 2012; Wykes et al., 2008).

Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2011) is among the newer forms of CBT that take a different view of the role of cognitions and their influence on psychiatric symptoms and functional outcome more broadly. ACT emphasizes behavioral and contextual regulation such as experiential acceptance, which is “the adoption of an intentionally open, receptive, flexible, and nonjudgmental posture with respect to moment-to-moment experience” that involves a “voluntary and values-based choice to enable or sustain contact with private experiences or the events that will likely occasion them” (Hayes et al., 2011, p. 77). Experiential acceptance refers to the non-reactive and mindful awareness of our ongoing stream of consciousness, and it is the opposite of experiential avoidance, which has been defined as individual's unwillingness to remain in contact with particular private experiences (e.g., bodily sensations, emotions, thoughts, memories, behavioral predispositions) and individuals' efforts to alter the form, frequency, or situational sensitivity of these experiences (Hayes et al., 2011).

The use of experiential acceptance strategies might be particularly relevant to psychotic populations, because it may reduce attention to and thus greater entanglement with the particularly intense and pervasive sensorial and cognitive experiences that characterize psychotic disorders. There have so far been three randomized trials of ACT for psychosis, each showing good outcomes (Bach & Hayes, 2002; Gaudiano & Herbert, 2006a; White, 2011). A recent reanalysis of the combined Bach and Hayes (2002) and Gaudiano and Herbert (2006a) datasets found that approximately 3 h of ACT during hospitalization reduced rehospitalization rates for one year post release. A formal measure of experiential acceptance was not taken because none had yet been developed, however the re-hospitalization outcome was mediated by the increased ability to notice positive psychotic symptoms without believing them (Bach, Gaudiano, Hayes, & Herbert, 2013; Gaudiano, 2010; Gaudiano & Herbert, 2006b).

Given the emerging research on experiential and emotional avoidance as a core process in many forms of psychopathology (Barlow et al., 2010; Hayes, Wilson, Gifford, & Follette, 1996) and the need to examine cognitive reappraisal further in psychotic populations, the present study examined whether experiential acceptance as a form of behavioral regulation would have a stronger association with functioning in individuals with psychotic

symptoms as compared to cognitive reappraisal as a form of emotional and cognitive regulation. Because individuals with psychotic symptoms have significant cognitive deficits and recall bias (Elvevåg & Goldberg, 2000) it seems especially important to use methods with this population that have high ecological validity (Ben-Zeev, 2012).

The experience sampling method (ESM; Hektner, Schmidt, & Csíkszentmihályi, 2007) reduces the gap between the experiencing of psychological or contextual events and the time of reporting them, and has the potential to examine the dynamic relationship between moment to moment processes and context in a less biased fashion. In the area of psychosis, researchers started to use ESM more than two decades ago (Delespaul & deVries, 1987). Programmable watches and pagers were initially used to gather psychotic symptoms and contextual data, and over time, electronic devices were adopted to electronically prompt participants and gather time stamped data (e.g., Kimhy et al., 2006). Most ESM research in that area has focused on contextual factors associated with psychotic symptoms and mood (e.g., Delespaul, deVries, & Van Os, 2002; Myin-Germeys, Nicolson, & Delespaul, 2001; Oorschot, Kwapi, Delespaul, & Myin-Germeys, 2009). In a more recent study, experiential avoidance had an association with poor self-esteem and increased paranoid thinking in a non-clinical sample of individuals (Udachina et al., 2009). However, to our knowledge the present study is the first that used an intensive longitudinal design (ESM) to explore in a clinical sample of individuals with severe psychopathology the interplay between psychotic experiences, the psychological coping strategies discussed above, and functional outcome.

## Method

### Participants

Participants were recruited from a program of assertive community treatment (PACT) at a state funded adult mental health institution of the United States that serves a large proportion of the population of northern Nevada. Individuals were eligible for the current study if they met diagnostic criteria for schizophrenia, schizoaffective, bipolar and recurrent depressive disorder with psychotic features in addition to functional limitations in three or more of the following areas: vocational, housing, social, financial, family, psychiatric, medical, community or educational. Those with a diagnosis of mental retardation, inability to conduct assessments due to acute medical condition or symptoms of florid psychosis that might need imminent intensive psychiatric treatment or hospitalization were not approached. A DSM-IV diagnosis of serious mental illness was determined by chart review of records of licensed psychiatrists and/or psychologists prior to inclusion in the study and verified with patient's individual psychiatrist. Participants were receiving outpatient services through the PACT program, but none of them was receiving psychotherapy during study completion.

Thirty nine individuals were invited to participate in the study. Their race and ethnicity was reported as Caucasian (80%), Asian (8%), African American (4%), and Latino (8%). Those who refused to participate ( $n = 8$ ) did not differ from those enrolled with regards to age ( $t_{9,172} = .339, p = .742$ ), sex ( $\chi^2(1) = .444, p = .212$ ), or Global Assessment of Functioning score ( $t_{9,645} = -.277, p = .787$ ), however, they differed in psychiatric diagnosis: the majority of individuals in the group of subjects who refused to participate had a diagnosis of schizophrenia ( $t_{21,882} = 2.722, p = .012$ ). One participant was unable to follow study procedures and to respond to daily surveys, so data for this participant was not collected. Finally, five participants did not comply with the study procedure, which was defined as

responding less than the equivalent of one day of experience sampling assessments. Chart review of medical records indicated that none of the participants had received either acceptance-based or cognitive-based cognitive behavioral therapy for psychosis at the institution. The final sample included 25 participants (descriptive information can be found in Table 1). The study was approved by the Institutional Review Board of the University of Nevada, Reno.

Measurement

Experience sampling measurements

A flowchart of the ESM procedure can be found in Fig. 1, and a summary of the ESM items utilized and their response range can be seen in Table 2. ESM assessment covered these domains: Current context, number of interactions, psychotic experiences or stressful events, psychological coping, and functional outcome. Items for current context and for psychotic experiences were adapted from previous research examining contextual factors (Delespaul et al., 2002) and psychotic experiences (Granholm, Loh, & Swendsen, 2008; Kimhy et al., 2006). An item measuring the occurrence of internal or external stressful events was added in order to assess individual's coping strategies in response to them.

Participant's psychological coping strategies were assessed only if they had experienced a recent psychotic or stressful event. The cognitive reappraisal item was modeled from item 6 of the Emotion Regulation Questionnaire (Gross & John, 2003). Similar adaptations of these items have been used by other researchers (e.g., Kashdan, Barrios, Forsyth, & Steger, 2006). This item had factor loadings that ranged from .32 to .71 in a cognitive reappraisal factor (Gross & John, 2003). The experiential acceptance item was adapted from item 2 of the acceptance subscale of the Voices Acceptance and Action Scale (Farhall, Ratcliff, Shawyer, & Thomas, 2010), which had a factor loading of .54 on acceptance. The order of presentation of these two items was randomized.

Participant's functional outcome was assessed by current affect and quality of life questions. Affect quality was assessed using a box check in which they had to select the most representative affective state. Although using dichotomous ESM questions to measure affect deviates from previous ESM research (e.g., Myin-Germeys, Delespaul, & Van Os, 2005), our pilot data suggested that this strategy reduced assessment burden and appropriately captured the same emotional states. We assessed participants' moment to moment quality of life (QOLe) using 6 items adapted from the Short Quality of Life Scale-18 (S-QoL-18; Boyer et al., 2010). These items measured individuals' anhedonia, self-esteem, perceived social support, autonomy and physical well-being. An overall sum score of

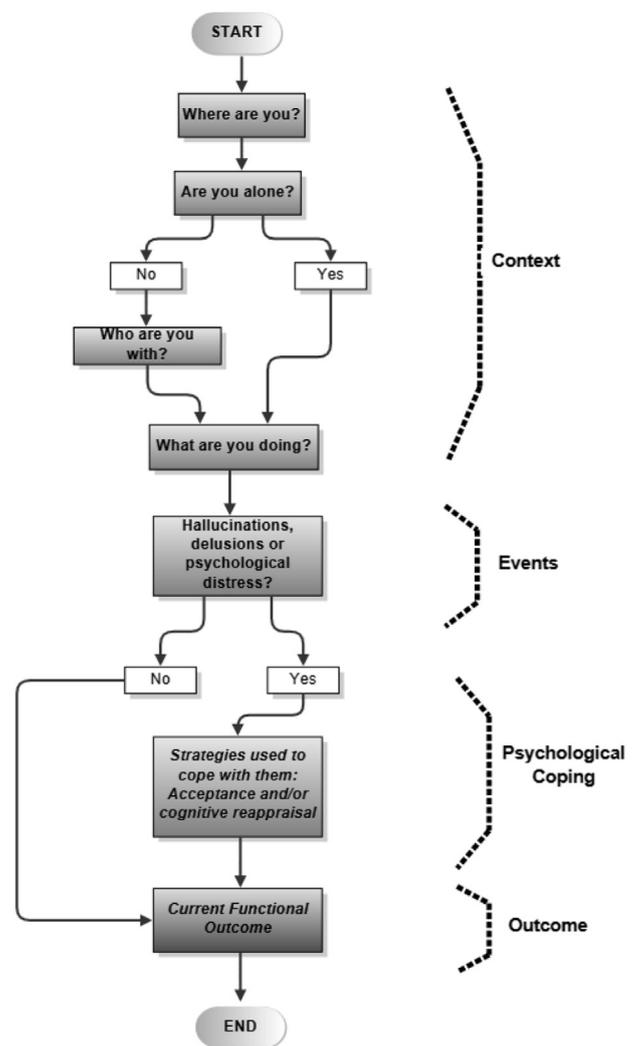


Fig. 1. Flowchart of ESM procedure.

quality of life was aggregated from these items, with higher scores indicating higher quality of life. This scale ranged from 0 to 36 and had a Cronbach's alpha of .81 in our sample.

Global self-report measures

In contrast to QOLe, the S-QoL-18 (Boyer et al., 2010), and the Global Assessment of Functioning (GAF) assessed global functional outcome and not moment to moment experience. The S-QoL-18 has good psychometric properties, with Cronbach's alpha ranging from .72 to .84 (Boyer et al., 2010). Higher scores on this scale indicate higher global levels of quality of life. Participant's GAFs were obtained from archival data and updated at the time of the study with case managers who had daily contact with patients. The Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011) measured experiential avoidance which is considered at the other side of the spectrum of experiential acceptance. The AAQ-II consists of 7 items rated on a 7-point Likert scale ranging from 1 ("never true") to 7 ("always true"). In our sample, this measure had a Cronbach's alpha of .86. Higher scores on this scale indicate higher experiential avoidance. The cognitive reappraisal subscale of the Emotion Regulation Questionnaire (ERQ-R; Gross & John, 2003) assesses individual's ability to modify and change emotions by changing one's thoughts in order to cope with stress or difficult emotions. This subscale has 6 items scored on a 7-point Likert scale ranging from 1

Table 1 Demographic information in our final sample (N = 25).

Variable	Statistic
Age	M = 45 (SD = 12.76)
Gender	60% Male
Race	80% White
Education	65.2% Some college but not degree
Marital status	69.6% Single or never married
Employment	100% Unemployed
Living situation	34.8% Lived alone/21.7% group home/ 13% alone with provider support
Diagnosis	Schizophrenia (n = 7) Schizoaffective (n = 14) Bipolar (n = 1) Any psychotic features (n = 3)
GAF	M = 51.13 (SD = 11.29)
S-QOL-18	M = 62.87 (SD = 15.7262)

Note. GAF: Global assessment of functioning; S-QOL-18: Short Quality of Life Scale-18; M = mean; SD = Standard Deviation.

**Table 2**  
Sample of relevant experience sampling questions.

Thematic Category	Question	Response options
Contextual factors	What are you doing at this moment? (Box check)	Doing nothing Eating, dressing, hygiene Shopping, chores, cooking Work/school Leisure Healthcare Other
	Since the last questionnaire, about how many times have you talked to another person?	Zero interactions One interaction Two or three interactions Four or more interactions
Psychotic or other events	Since the last survey, did any of the following things happen to you? (Check all that apply)	I heard things that others could not hear (Auditory hallucinations) I saw things that others could not see (Visual hallucinations) I felt that someone was spying or plotting against me (Paranoia) I felt that people could read my thoughts (Mindreading) I felt possessed or controlled by someone or something (Thought insertion) I felt that someone could communicate with me thru the TV/radio (Thought broadcasting) I felt I had special powers to do something nobody else could do (Grandiosity) I felt stressed (Stressful event) None of the above
Psychological coping	What did you do?	(7-point scale)
Cognitive reappraisal	I made myself think about it in a way to make me stay calm	0 (not at all)–6 (completely)
Experiential acceptance	I simply noticed my feelings and continued with what I was doing	0 (not at all)–6 (completely)
Positive and Negative affect	Which emotion do you feel most strongly right now (Box Check)	Down Guilty Relaxed Anxious Happy Cheerful Lonely Satisfied None of the above
Quality of life	How are you doing right now?	(7-point scale)
Anhedonia	I enjoy what I'm doing	0 (not at all)–6 (completely)
Self-esteem	I feel competent	0 (not at all)–6 (completely)
Perceived social support	I feel connected to others	0 (not at all)–6 (completely)
Autonomy	I feel free to act	0 (not at all)–6 (completely)
Physical well-being	I have energy	0 (not at all)–6 (completely)
Self-esteem	I am comfortable with myself	0 (not at all)–6 (completely)

("strongly disagree") to 7 ("strongly agree"). In our sample, this measure had a Cronbach's alpha of .78. Higher scores on the reappraisal scale indicate higher levels of cognitive reappraisal. A global *Likeability/usability Scale* was provided to participants at the end of study participation (Kimhy et al., 2006). This scale measured feasibility and likeability issues such as difficulties to understand questions, interference with daily life, or stress due to study procedure. This scale had 9 items scored on a 5-point Likert scale ranging from 1 ("not at all") to 5 ("very much"). Finally, demographic data was also obtained from medical records.

### Procedure

After written informed consent, participants were administered the global self-report measures with the aid of a clinician, which is common practice in research in this population. Since this was an observational study, each one of the psychological regulation strategies was explained to them without prompting their specific use. Then they were trained in the use of the experience sampling device and provided with a booklet with written instructions and pictures about how to problem solve common technical issues with the personal digital assistant (PDA). They were instructed to charge the PDA every night and to reset it on a daily basis and told that they would be contacted every day in order to monitor technical problems with the PDA. The PDAs were handheld Dell computers

(model Axim X51) and had a protective case and a necklace (see Fig. 2). Each device had Windows Mobile 5.0 installed and the experience sampling program MyExperience (Froehlich, Chen, Consolvo, Harrison, & Landay, 2007). No identifying information was kept on any of these devices, and the wireless capability of each device was disabled.

The ESM design was a random-signal-contingent-survey by blocks in which individuals were prompted three times per day, between 9:00 and 13:00, 13:00 and 17:00; and 17:00 and 21:00. Within each 4-hour block there were three separate survey prompts for nine total surveys per day, over a total of six days. If after the first signal the survey was not completed, two consecutive signals were followed within 5-minute intervals. If participant had not responded after a total of 15 min, the survey was cancelled. Thirty minutes was the minimum amount of time between surveys. In order to allow participants to skip surveys in situations in which they were unable to respond (e.g., during a doctor's visit), a button was programmed to allow for that function. The maximum possible number of surveys per participant during the week was 54. Participants were compensated with a \$10 Wal-Mart Gift card for participating in the study. To incentivize survey completion, participants were informed ahead of time that they would receive an additional \$5 Wal-Mart gift card if they completed more than 80% of the experience sampling surveys.

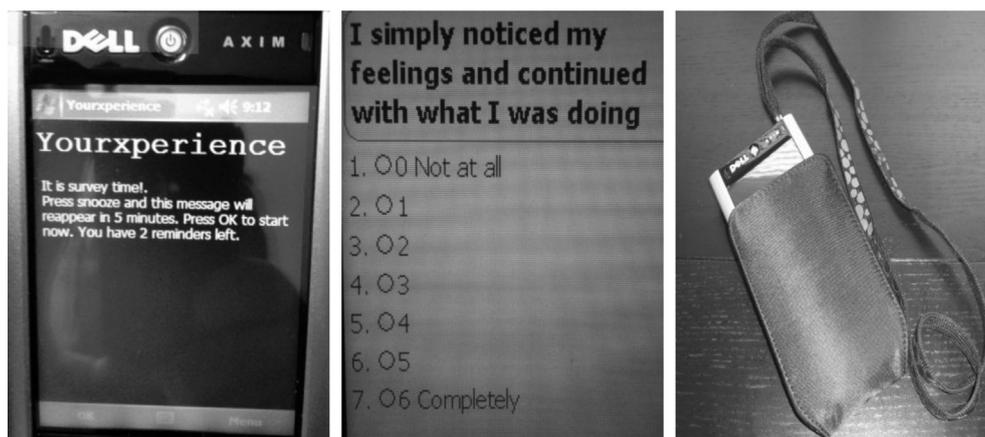


Fig. 2. Photographs of prompting survey message, item example and PDA case and necklace.

Overview of data analysis

Given the intensive longitudinal data that was highly imbalanced in timing and number, multilevel linear (for quality of life) and logistic (for positive and negative affect) regressions were used to examine our research hypotheses (Gelman & Hill, 2007). Contextual covariates and indicators for psychotic and stressful events were included in an initial model, and a second model examined the additive effects of psychological coping strategies. Because coping strategies were only asked when participants experienced some sort of psychotic or stressful event (39.1% of total occasions), we averaged participant's coping strategies as measured by our experience sampling items throughout the week, which allowed us to take full advantage of all of our experience sampling observations in our statistical models. Since this analytic strategy maximizes the use of all available data points in our outcome measures but undermines the role of specific moment to moment measures, we run additional exploratory analyses with the reduced subset of observations in which psychotic or stressful events occurred. The following are examples of the basic model and of the model with coping strategies, using the composite or mixed models form of multilevel regression equations:

$$Quality\ of\ life_{ij} = b_0 + b_1Psychotic + b_2Stressful + b_{3-5}Context + \mu_{0j} + r_{ij} \tag{1}$$

$$Quality\ of\ life_{ij} = b_0 + b_1Psychotic + b_2Stressful + b_{3-5}Context + b_6Acceptance_{Ave} + b_7Reappraisal_{Ave} + \mu_{0j} + r_{ij} \tag{2}$$

where *i* indexes individuals and *j* indexes observations. Note that all covariates are time-varying and subscripts are not included for ease of presentation. To explore the association between these models and positive and negative affect, we built similar multilevel probabilistic logistic models:

$$Pr(Affect_{it}) = \text{logit}^{-1}(b_0 + b_1Psychotic + b_2Stressful + b_{3-5}Context + \mu_{0j} + r_{ij}) \tag{3}$$

$$Pr(Affect_{it}) = \text{logit}^{-1}(b_0 + b_1Psychotic + b_2Stressful + b_{3-5}Context + b_6Acceptance_{Ave} + b_7Reappraisal_{Ave} + \mu_{0j} + r_{ij}) \tag{4}$$

*P* values and confidence intervals were fixed at the 95% level; however, due to relatively small sample size of this sample, estimates with *p* values smaller than .10 were interpreted as marginally statistically significant. To improve interpretation, covariates were centered on their mean. Models were compared using likelihood ratio chi-square tests, also called deviance tests (Singer & Willett, 2003).

Exploratory analyses were conducted in order to assess the strength of the observed associations by using global self-report measures of experiential avoidance (AAQ-II) and cognitive reappraisal (ERQ-R) and by narrowing down our analysis to observations in which psychotic or stressful events occurred (*n* = 268). Additional exploratory analyses were conducted using lagged regressions in order to explore temporal associations between quality of life and each one of our main covariates. These lags were defined as the immediate measurement period with the condition that they belonged to the same day. In these models, quality of life at time *t* was predicted from cognitive reappraisal and experiential acceptance at time *t* – 1 and vice versa. Due to small sample size of these lagged analyses, we were not able to enter quality of life at *t* – 1 as a covariate. This analytic strategy was also used to explore temporal associations between experiential acceptance and cognitive reappraisal. All analyses were conducted using the linear mixed effects lme4 package (Bates, Maechler, & Bolker, 2011) in R-2.14.1 (R Core Team, 2012). Confidence intervals and *p* values were extracted from each model with the package languageR (Baayen, 2011).

Results

We gathered 742 experience samples from a maximum of 1350 possibly cued surveys (or 55%). Participants responded to an average of 30.8 surveys (*SD* = 11.8) during the course of the assessment period. Seventy percent were single or never married; none were employed, and the majority lived alone (35%, *n* = 8) or in a group home (22%, *n* = 5). Across experience samples, participants reported some type of psychotic experience on 22% of occasions, and some sort of stressful event on 17% of them. The most frequent form of hallucination was auditory (10%), (versus visual, 8%), and the most frequent forms of delusion were mind-reading, thought

broadcasting and paranoid ideation (3% each). Frequencies and descriptive statistics for the main processes, outcomes and contextual factors are presented in Table 3. Participants score on the 9 items of the global likeability/usability scale, which ranged from 9 to 45, had a mean of 37.43 ( $SD = 5.53$ ).

The results of multilevel models for quality of life (based on Equations (1) and (2) above) are shown in Table 4. The experience of psychotic symptoms or stressful events had significant negative associations with QOLe – a decrease of approximately .3  $SD$  for each. Moreover, being un-engaged in any activity (i.e., “doing nothing”) was similarly related to a decrease in QOLe of a similar magnitude, whereas social interactions generally and being at home of family/friends were significantly related to QOLe with magnitudes of .27 and .14  $SD$ , respectively. The second model added individuals’ use of reappraisal and experiential acceptance as psychological regulation strategies. In this second model, experiential acceptance was significantly associated with QOLe ( $B = 2.7$ ). A 1  $SD$  change in (average) experiential acceptance ( $SD = 1.9$ ) was associated with a predicted difference in QOLe of 4.9, which is approximately .71  $SD$  change in QOLe. Cognitive reappraisal, on the other hand, was not significantly associated with QOLe. Based on the methods described by Snijders and Bosker (1999), the second model reported in Table 4 explained 42% of the variance of QOLe.

Next, we addressed the association between these two forms of psychological regulation and positive and negative affect. In the first model of Tables 5 and 6 we found that the occurrence of psychotic and stressful events decreased the odds of experiencing positive affect by 45% and 62%, respectively (i.e.,  $OR$  of .55 and .38). Conversely the occurrence of psychotic and stressful events increased the odds of experiencing negative affect by 133% and

**Table 3**  
Psychotic experiences, psychological coping and quality of life as measured by the ESM.

Variable	n	Percentage
<b>Contextual factors</b>		
Doing nothing	148	19.94%
Home of relative/friend	106	14.28%
Zero interactions	202	27.22%
One interaction	220	29.64%
Two or three interactions	232	31.26%
Four or more interactions	92	12.39%
<b>Psychotic experiences</b>		
Auditory hallucinations	79	10.64%
Visual hallucinations	60	8.08%
Paranoid delusions	21	2.83%
Mind-reading	21	2.83%
Thought insertion	17	2.29%
Thought broadcasting	21	2.83%
Grandiose delusions	19	2.56%
Total hallucinations	93	12.53%
Total delusions	81	10.91%
<b>Stressful event</b>		
Experiential acceptance	$M = 4.32$	$SD = 1.86$
Cognitive reappraisal	$M = 3.60$	$SD = 2.26$
Quality of life	$M = 28.50$	$SD = 6.85$
<b>Positive affect</b>		
Relaxed	515	69.40%
Happy	173	23.31%
Cheerful	81	10.91%
Satisfied	111	14.95%
<b>Negative affect</b>		
Down	22	2.96%
Guilty	15	2.02%
Anxious	72	9.70%
Lonely	38	5.12%
Other affect	84	11.32%

Note. Percentages are based on total number of signals,  $N = 742$ . Variables quality of life, experiential acceptance and cognitive reappraisal were continuous so means ( $M$ ) and standard deviations ( $SD$ ) were reported.

**Table 4**  
Multilevel linear regression of QOLe.

Covariates	b	SE	t	95% CI	p
<b>Model 1 (deviance = 4455, n = 746)</b>					
<b>Events</b>					
Any psychotic symptom	-1.789	.563	-3.178	[-2.830, -.603]	.001**
Any stressful event	-2.010	.516	-3.894	[-3.143, -1.09]	.000***
<b>Contextual factors</b>					
Doing nothing	-2.149	.506	-4.241	[-3.080, -1.058]	.000***
Home of relative/friend	.957	.700	2.011	[.047, 2.791]	.044*
Number of interactions	1.909	.196	4.868	[.565, 1.340]	.000***
<b>Model 2 (deviance = 4242, n = 719, p = .000)</b>					
<b>Events</b>					
Any psychotic symptom	-1.765	.545	-3.238	[-2.811, -.665]	.001**
Any stressful event	-1.962	.500	-3.919	[-2.996, -1.05]	.000***
<b>Contextual factors</b>					
Doing nothing	-2.126	.496	-4.283	[-3.052, -1.10]	.000***
Home of relative/friend	1.546	.678	2.280	[.396, 3.051]	.022*
Number of interactions	.779	.194	4.006	[.355, 1.123]	.000***
<b>Psychological regulation</b>					
Avg. experiential acceptance	2.619	.834	3.138	[1.466, 3.844]	.001**
Avg. cognitive reappraisal	.198	.668	.297	[-.747, 1.149]	.766

Note.  $N = 25$ ;  $b$  = unstandardized slopes;  $SE$  = standard error;  $CI$  = confidence interval; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , † $p < .10$ .

186%, respectively (i.e.,  $OR$  of 2.33 and 2.86). In the second model of Tables 5 and 6, none of the contextual variables had a reliable association with negative affect; however, doing nothing had a marginally significant negative association with positive affect whereas number of interactions had a marginally significant positive association with positive affect. The occurrence of psychotic and stressful events remained a statistically significant predictor of positive and negative affect. Psychological regulation in the form of experiential acceptance decreased the likelihood of experiencing negative affect by .24  $OR$ s, whereas it increased the likelihood of experiencing positive affect by 2.80. Cognitive reappraisal however, did not have a statistically significant association with negative or positive affect.

In order to explore whether these models produced similar results when taking into account individual’s global tendency to use cognitive reappraisal and experiential avoidance, we run parallel multilevel regressions of quality of life and negative and positive affect using the AAQ-II and the ERQ-R while adjusting for the same covariates. Results indicated that experiential avoidance as

**Table 5**  
Multilevel logistic regression of positive affect.

Covariates	b	SE	z	p	OR
<b>Model 1 (deviance = 686.2, n = 746)</b>					
<b>Events</b>					
Any psychotic symptom	-.595	.289	-2.056	.039*	.551
Any stressful event	-.950	.280	-3.393	.000***	.386
<b>Contextual factors</b>					
Doing nothing	-.408	.281	-1.454	.146	.664
Home of relative/friend	.031	.396	.078	.937	1.031
Number of interactions	.256	.112	2.278	.022*	1.292
<b>Model 2 (deviance = 639.3, n = 719, p = .000)</b>					
<b>Events</b>					
Any psychotic symptom	-.617	.287	-2.147	.031*	.539
Any stressful event	-.921	.279	-3.299	.000***	.398
<b>Contextual factors</b>					
Doing nothing	-.486	.284	-1.715	.086†	.614
Home of relative/friend	.086	.389	.222	.823	1.090
Number of interactions	.217	.115	1.882	.059†	1.243
<b>Psychological regulation</b>					
Avg. experiential acceptance	1.030	.312	3.299	.000***	2.801
Avg. cognitive reappraisal	.031	.253	.126	.899	1.032

Note.  $N = 25$ ;  $b$  = unstandardized slopes;  $SE$  = standard error; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , † $p < .10$ .

**Table 6**  
Multilevel logistic regression of negative Affect.

Covariates	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>OR</i>
Model 1 (deviance = 560.4, <i>n</i> = 746)					
Events					
Any psychotic symptom	.847	.296	2.862	.004**	2.334
Any stressful event	1.054	.297	3.541	.000***	2.869
Contextual factors					
Doing nothing	.171	.311	.552	.581	1.187
Home of relative/friend	.197	.453	.435	.663	1.218
Number of interactions	-.116	.127	-.916	.359	.889
Model 2 (deviance = 509.2, <i>n</i> = 719, <i>p</i> = .000)					
Events					
Any psychotic symptom	.907	.295	3.070	.002**	2.478
Any stressful event	1.044	.295	3.541	.000***	2.842
Contextual factors					
Doing nothing	.287	.314	.913	.361	1.332
Home of relative/friend	.147	.444	.331	.740	1.158
Number of interactions	-.072	.132	-.545	.585	.930
Psychological regulation					
Avg. experiential acceptance	-1.409	.342	-4.120	.000***	.244
Avg. cognitive reappraisal	.287	.300	.955	.339	1.333

Note. *N* = 25; *b* = unstandardized slopes; *SE* = standard error; \**p* < .05, \*\**p* < .01, \*\*\**p* < .001, †*p* < .10.

measured by the AAQ-II had a statistically negative association with QOLe ( $B = -.40$ ,  $SE = .07$ , 95% CI  $[-.52, -.28]$ ,  $p = .000$ ), whereas cognitive reappraisal as measured by the ERQ-R had a non-statistically significant association with QOLe ( $B = .02$ ,  $SE = .08$ , 95% CI  $[-.10, .15]$ ,  $p = .797$ ). The AAQ-II was also statistically significantly associated with the likelihood of experiencing negative affect ( $B = .16$ ,  $SE = .03$ ,  $z = 4.86$ , 95% OR = 1.17,  $p = .000$ ) and negatively associated with positive affect ( $B = -.14$ ,  $SE = .03$ ,  $z = -4.28$ , 95% OR = 1.02,  $p = .000$ ), but the cognitive reappraisal subscale of the ERQ did not seem to have the same strength of association with either negative affect ( $b = .03$ ,  $SE = .03$ ,  $z = .84$ , 95% OR = 1.03,  $p = .399$ ) or with positive affect ( $b = -.01$ ,  $SE = .03$ ,  $z = -.22$ , 95% OR = 1.03,  $p = .824$ ).

The association between psychological coping and QOLe was also analyzed for the subgroup of observations in which participants experienced a psychotic or stressful event ( $n = 268$ ). In this subset of data, acceptance and reappraisal were not averaged, and coefficients examine the association of outcomes and covariates measured at the same time point. Both psychological acceptance ( $b = .80$ ,  $SE = .21$ , 95% CI  $[.53, 1.37]$ ,  $p = .000$ ) and cognitive reappraisals ( $b = .41$ ,  $SE = .20$ , 95% CI  $[.04, 1.37]$ ,  $p = .037$ ) had statistically significant – and positive – associations with QOLe, in the first case with a coefficient with a narrow confidence interval, and in the second, with a coefficient of half the size, and a wider confidence interval. In order to disambiguate these associations, we created models in which psychological coping preceded changes in QOLe and vice versa. Lagged scores of experiential acceptance, cognitive reappraisal and QOLe were created and then entered as covariates. If preceding levels of QOLe predicted psychological coping, this would suggest that these processes are a byproduct of QOLe and not vice versa. Conversely, changes in preceding levels of experiential acceptance or cognitive reappraisal would suggest that QOLe is a byproduct of those coping strategies. Results showed that on the one hand, experiential acceptance at time  $t - 1$ , predicted scores of QOLe at time  $t$  at a marginally statistically significant level ( $b = .49$ ,  $SE = .25$ , 95% CI  $[.10, 1.17]$ ,  $p = .053$ ), however, QOLe at time  $t - 1$  did also marginally predict scores of experiential acceptance at time  $t$  ( $b = .03$ ,  $SE = .01$ , 95% CI  $[.00, .08]$ ,  $p = .082$ ). On the other hand, cognitive reappraisal at time  $t - 1$  did not predict QOLe at time  $t$  ( $b = -.01$ ,  $SE = .24$ , 95% CI  $[-.46, .47]$ ,  $p = .983$ ), but QOLe at time  $t - 1$  statistically significantly predicted scores of cognitive reappraisal at time  $t$  ( $b = .05$ ,  $SE = .02$ , 95% CI  $[.006, .084]$ ,  $p = .02$ ).

Finally, we used the same lagged regression approach to explore predictive and temporal associations between both experiential acceptance and cognitive reappraisal. Results showed that cognitive reappraisal at time  $t - 1$ , did not predict scores of experiential acceptance at time  $t$  ( $b = -.02$ ,  $SE = .07$ , 95% CI  $[-.16, .13]$ ,  $p = .838$ ), and that experiential acceptance scores at time  $t - 1$  did not predict scores of cognitive reappraisal at time  $t$  ( $b = -.06$ ,  $SE = .08$ , 95% CI  $[-.21, .12]$ ,  $p = .429$ ).

## Discussion

Consistent with our hypothesis, the study showed that among individuals with psychotic symptoms, behavioral regulation in the form of experiential acceptance had a stronger association with quality of life as compared to cognitive and emotional regulation, in the form of cognitive reappraisal. More fine grained analyses showed that cognitive reappraisal had a significant but weaker association with quality of life, but no association with positive and negative affect, whereas experiential acceptance had a reliable association with both of them. This study also showed that “doing something”, number of social interactions, and being at home of relative or friend were contextual factors that had a reliable association with quality of life but not with positive or negative affect. Our final model explained 42% of the variance of quality of life.

Additional exploratory analyses strengthened these results by indicating that global self-report measures of experiential acceptance and cognitive reappraisal had a similar pattern of associations. Furthermore, lagged-temporal analyses supported the pattern of associations between the two psychological coping strategies we compared, suggesting that experiential acceptance and quality of life might be mutually influencing each other, but that cognitive reappraisal might be a byproduct of quality of life and not vice versa. This study also explored temporal associations between cognitive reappraisal and experiential acceptance and suggested that experiential acceptance and cognitive reappraisal are two distinct processes. These lagged regressions need to be interpreted with caution, not only due to small sample size, but also to the fact that observations were not equally spaced across the assessment period and that neither experiential acceptance nor cognitive reappraisal were experimentally manipulated.

Experiential acceptance is considered one of the core psychological processes of mindfulness and acceptance based therapies (Hayes et al., 2011) and of the unified protocol for anxiety and depression (Barlow et al., 2010). Thus this study provided empirical support for the role of such core process in this particular population as assessed by a more ecologically valid method of assessment. This acceptance approach is consistent with a larger body of literature that suggests that hearing voices is a ubiquitous phenomenon in both clinical and non-clinical populations (Honig et al., 1998) and that individuals who experience these symptoms with a more accepting stance tend not to develop a clinical disorder (Escher, Romme, Buiks, Delespaul, & Van Os, 2002a; Escher, Romme, Buiks, Delespaul, & van Os, 2002b; Romme & Escher, 2011). Cognitive reappraisals have been argued to be a core coping strategy related to general well-being and psychopathology (John & Gross, 2004), particularly among individuals with psychosis (Kuipers et al., 1997; Morrison et al., 2012; Oorschot et al., 2009). However, in this study cognitive reappraisal had a weak association with quality of life, and no association with positive or negative affect. Furthermore, quality of life seemed to predict individuals' tendency to reappraise their experiences, and not vice versa. This study is not the first to question the role of cognitive reappraisals among individuals who experience challenging cognitive experiences, such as paranoia (Westermann, Kesting, & Lincoln, 2012). As discussed by John and Gross (2004), most of the research on

cognitive reappraisals has focused on a few types of emotions, and it is therefore possible that this cognitive and emotional regulation strategy is not equally effective within this population. In addition, individual's ability to successfully use cognitive reappraisal skills might be highly dependent on individuals' participation in a therapeutic relationship. While this is probably true for many coping strategies, including experiential acceptance, the therapeutic relationship has been argued to be a critical component of CBT for psychosis (Mueser et al., 2002).

This study has implications for psychiatric and psychosocial treatments. The presence or absence of psychotic experiences is routinely assessed in inpatient and outpatient psychiatry settings. However, individuals' coping mechanisms in response to them are barely examined in routine clinical practice, and most treatments for this population are psychopharmacological. The data in this study suggests that measurements of experiential acceptance could potentially inform clinical practice. Finally, because of the consistent associations we found between level of engagement in activities, social interactions and quality of life, the study supports the notion that a generally active and social lifestyle should also be encouraged and implemented among individuals with psychosis.

This study had a number of limitations that warrant a replication of these findings. First, future research would benefit from using larger and more representative experience samples of individuals with psychosis. Although multilevel linear modeling helped correct this bias, this did not completely solve the disproportionate number of surveys provided across individuals. Second, despite that ESM provides increasing levels of ecological validity as compared to traditional retrospective methods, our study design still involved some degree of recall bias (e.g., "Since the last survey, did any of the following things happen to you?"), and ultimately rendered observational and not experimental conclusions.

Third, in order to measure experiential acceptance and cognitive reappraisals, we also adopted a single item approach with the goal of reducing assessment burden and improve data quality. ESM is a flexible and adaptable methodological approach that encourages researchers to tailor measurement to the characteristics of the population being targeted (Hektner et al., 2007), which in this case involved the risk of assessment burden. However, future studies could benefit from exploring psychological regulation using a multi-item approach.

Forth, cognitive reappraisal and experiential acceptance strategies are often provided to patients in the context of CBT treatment packages that require regular monitoring and practice. However, in this observational study we assumed that some degree of each psychological regulation strategy existed in each individual's repertoire. Previous research has documented the spontaneous use of both psychological regulation strategies by non-clinical populations without the need of instruction or involvement in therapy (e.g., Hayes et al., 1996; John & Gross, 2004). Thus in this study we did not intend to increase patient's cognitive reappraisal and experiential acceptance skills but to simply capture these processes in their natural context.

Fifth, since the number of items on each branch was not balanced, and reporting psychotic or stressful symptoms increased the length of the ESM survey, the ESM branching structure might have encouraged individuals not to report psychotic symptoms over time. We chose to use this branching structure to minimize assessment burden, however, visual inspection of reported symptoms over time did not reveal any trend across subjects. Future studies might benefit from having a more balanced branching structure to avoid any possible bias. Finally, since the aim of the current study was to explore the role of specific psychological regulation strategies, we did not conduct a formal comparison of

the incremental validity of ESM versus traditional global self-report measures in this population; however, future studies might consider such question.

To our knowledge, this study provides the first head to head comparison of the role of experiential acceptance and cognitive reappraisal as psychological regulatory strategies in the presence of psychotic experiences while using ecologically valid methods of measurement. More specifically, the findings provide support to targeting experiential acceptance as a core mechanism of change in CBT interventions for psychosis, and showed that this process had consistent and reliable associations with a variety of functional outcomes. Further research is needed in order to confirm these results and to inform future treatment development efforts in this population.

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