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First Episode Indices Associated with Lifetime Chronicity of Depression among Formerly
Depressed Participants: An Exploratory Study

Abstract

Background: Researchers have found that an earlier age of disorder onset and the severity of the first depressive episode are associated with recurrence in depression. Additionally, neuroticism has been shown to be an important factor in the recurrence of the disorder.

Aims: This exploratory study aimed to replicate and extend previous research by examining the relationships between features of the first experienced depressive episode (age of onset, severity), the five factors of personality, and lifetime chronicity of depression.

Method: A sample of 43 previously depressed participants completed self-report measures of personality, current depression, hopelessness, and perfectionism. Previous depressive episodes were assessed using a semi-structured interview (LIFE – SCID), and features of these previous episodes experienced by participants were systematically recorded.

Results: Pearson correlations showed that depression chronicity, measured in the number of weeks depressed in a lifetime, was significantly correlated with age of onset and number of symptoms experienced in the first episode. Personality measures were not significantly associated with depression chronicity.

Conclusion: Earlier and more severe first episodes of depression may play an important role in the recurrence of the disorder. Future research should focus on replication and determining the causal role of these features.

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Keywords: first episode; depression; personality; chronicity; age of onset; recurrence; relapse

Depression is a highly recurrent and chronic condition (Bockting et al., 2015). Individuals who are diagnosed with one episode of depression often go on to experience 4 to 5 episodes (Perris, 1992). Despite this, studies that examine factors that maintain the cycle of depression are limited (Burcusa & Iacono, 2007). Further, recurrent depression (i.e., having experienced at least two depressive episodes; American Psychiatric Association [APA], 2013), has seldom been examined in the context of the five-factor model, which is one of the most validated models in psychology (Costa & McCrae, 2013). Applying a multifactorial framework to understand vulnerability in recurrent depression is important, as this may inform prevention efforts.

There may be a large degree of overlap between factors that predispose individuals to develop the first episode of depression and those that are maintaining the disorder across the lifespan (Beshai & Dobson, 2013). A number of studies have shown that first episode indices (age of first onset, severity, duration, etc.) may predict the course of depression in a lifetime. For example, it has been found that individuals who reported a greater number of depressive episodes also reported an earlier age of first onset and greater distress in childhood (Ma & Teasdale, 2004; Teasdale et al., 2000; Yang et al., 2014). Further, research has found that early onset age, number of episodes, and total duration of depression episodes are factors that may result in greater severity and impairment (Pettit et al., 2009), and that a severe first episode is more likely to develop recurrent forms of depression (O'Leary et al., 2000).

In addition to childhood history, genetics, and cognitive vulnerabilities (Dobson & Dozois, 2011), personality traits have often been implicated as a risk factor for depression (Burcusa & Iacono, 2007). More specifically, the facet of neuroticism, the tendency to experience general distress, from Costa and McCrae's (1992) five-factor model (Goldberg, 1999), has been found to be associated with depression onset. Higher levels of neuroticism have

been shown to lead to heightened distress and maladaptive coping mechanisms (Gunthert et al., 1999; van Os et al., 2001), suggesting that neuroticism may be a predisposing factor to depression (Farmer et al., 2002; Lahey, 2009). Indeed, longitudinal research has found that changes in neuroticism scores significantly predicted changes in depression scores (Chow & Roberts, 2014). Furthermore, individuals who were previously diagnosed with recurrent depression reported significantly higher scores on neuroticism than those diagnosed with one previous depressive episode (Duggan et al., 1995; Ormel et al., 2001). Neuroticism scores of individuals undergoing a course of antidepressant medication and cognitive therapy were shown to decrease when compared to the scores of those taking a placebo (Tang et al., 2009). Thus, there is sufficient evidence to suggest that heightened neuroticism may not only be a vulnerability factor in depression onset, but that it may be associated with recurrent forms of the disorder.

In addition to neuroticism, other personality factors arising from the five-factor model have also been associated with depression and related constructs. For example, conscientiousness, which is the tendency to be organized and efficient in task performance, has been associated with negative self-image (Anderson & Mclean, 1997; Compas et al., 2004). Though there are multiple studies that have found an association between low conscientiousness and depression, research findings implicating conscientiousness as a factor for recurrence in depression are few, and recent attempts to find this association have not succeeded (Chow & Roberts, 2014).

Low extraversion, or the tendency to seek interpersonal interactions and to experience positive emotions (Costa & McCrae, 1992), has also been associated with depression, although evidence of this relationship is scarce (e.g., del Barrio et al., 1997). There are a number of studies

that suggest that high extraversion is related to a higher quality of interpersonal relationships and adaptive coping styles (Asendorpf & Wilpers, 1998; Kardum & Krapić, 2001). Since interpersonal relationship and other social factors may act as buffers against depression, heightened extraversion may be viewed as a protective factor against the disorder (Farmer et al., 2002). Finally, there is limited evidence implicating agreeableness and openness in depression onset and recurrence.

A number of cognitive factors have also been closely linked to depression. For example, hopelessness, and societal ideation in particular, has been associated with severe forms of depression (Cuijpers et al., 2013). Abramson and colleagues (1989) suggested that hopelessness, defined as negative expectations about future outcomes coupled with helplessness to change the likelihood of a negative occurrence, is a sufficient cause for depression onset. Since the inception of the hopelessness theory, there has been empirical support for the role of hopelessness in depression (Hyde et al., 2008). Further, Hewitt and colleagues (1996) proposed that perfectionism plays an etiological role in depression. Perfectionism is multifactorial, but research has found a close link with self-oriented perfectionism, or a critical stance toward the self and self-imposed, unrealistic personal standards, and depression onset (Hewitt & Flett, 1991). However, despite early empirical support for both hopelessness and perfectionism in the onset of depression, these factors have rarely been examined in the context of recurrent depression.

The central aims of the current exploratory study were to examine the relationships of the chronicity of depression (defined as number of weeks depressed in a lifetime) with a) first episode indices, such as age of onset and first episode severity, and b) scores on factors from the five-factor model among a group of formerly depressed participants. In a set of ancillary correlational analyses, we also examined the relationships of the big five personality factors with

current depressive symptoms and depression related constructs (e.g., current levels of hopelessness and perfectionism) among this sample of participants. As mentioned above, only a select few (e.g., Ma & Teasdale, 2004) studies have found the lifetime trajectory of depression to differ depending on first episode indices (age of onset and severity of first episode). As such, we aimed to replicate and extend these previous studies, as accurately predicting the trajectory of depression can have important intervention implications. Further we aimed to replicate these studies as successful replication in psychology has recently been shown to be a larger problem than originally anticipated (Open Science Collaboration, 2015). In accordance with previous research on age of onset and chronicity of depression (e.g., Ma & Teasdale, 2004; Teasdale et al., 2000), we hypothesized that total number of weeks depressed in a lifetime would be negatively and significantly correlated with age of onset of first episode even after controlling for age, and positively correlated with the number of symptoms experienced during the first episode. Further, in accordance with research on neuroticism and recurrent depression (e.g., Gunthert et al., 1999), we hypothesized that total number of weeks depressed would be significantly and positively associated with scores on the five-factor personality trait of neuroticism.

Method

Participants

Individuals were recruited from the community in the city of Exeter, England. Recruitment advertisements were distributed via social media, University of Exeter email, and through posters and flyers throughout social venues across Exeter. To be included in the study, participants were to have suffered from at least one previous depressive episode, and be between the ages of 18 and 65. Participants who reported experiencing mania or psychosis symptoms were excluded.

Twenty-five participants were excluded for the following reasons: 36% ($n = 9$) endorsed psychosis or mania symptoms; 32% ($n = 8$) did not complete the questionnaires; 12% ($n = 3$) did not meet diagnostic criteria for a previous major depressive episode; and 20% ($n = 5$) completed the battery and were eligible to proceed, but were unavailable or did not wish to proceed with the second part of the study (LIFE – SCID).

A total of 43 participants ($N = 33$ women, $N = 10$ men) were included in the analyses. Ages of participants ranged from 19 to 63 years ($M = 38.16$, $SD = 13.11$). Of the total sample, 37% ($n = 16$) were married, 33% ($n = 14$) were single, 12% ($n = 5$) were separated or divorced, and 19% ($n = 8$) were cohabiting. The majority of the sample identified as white ($n = 39$), and indicated that their first language and language spoken at home was English ($n = 38$). Additionally, 81% ($n = 35$) indicated that they had received some form of treatment for depression, and 82% ($n = 29$) of those indicated that they had found it beneficial. Scores on other demographic variables are summarized in Table 1.

Measures

The Structured Clinical Interview for DSM-IV Axis I disorders (SCID; First et al., 2002) is a well-validated and widely used diagnostic tool. Moderate agreement of $k = .61$ has been reported between researchers using the SCID and expert diagnosticians. Basco et al. (2000) found that the SCID had a sensitivity and specificity of 84% and 91%, respectively. In the present study, the Longitudinal Interval Follow-Up Evaluation (LIFE) SCID (Mood Module) was used, in which the interviewer uses a series of prompts to determine symptoms, time course, relapse, and recovery of a depressive episode (Keller et al., 1987). In addition, two questions from the SCID screening module were used as a screen for psychosis. These questions ask the participant to indicate whether they have had signs of delusions or hallucinations in the past 12

months. In this study, if they answered “yes” to both items, they were debriefed early and their data were not included in the study. In the present study, interviews were not recorded, and therefore inter-rater reliability could not be assessed.

The Patient Health Questionnaire 8 (PHQ-8; Kroenke & Spitzer, 2002) is an eight-item self-report scale that incorporates DSM-IV diagnostic criteria, excluding suicidal or self-injurious thoughts, to assess the severity of depressive symptoms. Each item is responded to on a 4-point Likert scale: “not at all”, “several days”, “more than half of the days”, and “nearly every day”, labelled 0 to 3, respectively. The total score varies from 0 to 24, where higher scores indicate greater symptom severity. The PHQ-8 has been shown to be a reliable measure of current depression, and has an 88% sensitivity and 88% specificity for major depression (Kroenke et al., 2009). It has also been shown to be similar to the PHQ-9 in diagnosing depression based on DSM-IV criteria (Kroenke & Spitzer, 2002). In the current sample, the PHQ-8 possessed a Cronbach alpha of .86.

The Composite International Diagnostic Interview (CIDI; World Health Organization [WHO], 1994) is a structured clinical interview for the assessment of mental disorders in accordance with DSM-IV diagnostic criteria. High concordance validity between CIDI and the SCID have been reported (Kessler et al., 2006; Wittchen, 1994). In the current study, the mania module from the CIDI was used to screen for symptoms of mania in the form of two questions.

The International Personality Items Pool (IPIP; Goldberg, 1999) is a self-report psychometric inventory developed to measure Goldberg’s (1999) Five Factor Model (FFM) personality domains (extraversion, agreeableness, conscientiousness, emotional stability, and intellect/imagination). Each item is rated on a scale from 1 (“very inaccurate”) to 5 (“very accurate”) depending on the degree to which the item is descriptive of the participant. Scores for

each trait range from 0 to 50. The greater the obtained score, the higher the level of the assessed trait. In the current study, a 50-item version of the IPIP was used. This version has shown high internal consistency with a Cronbach's alpha ranging from .75 to .86 depending on the trait (Zheng et al., 2008). The scale also demonstrates high validity as it correlates with well-established measures of the FFM, ranging between $r = .49$ and $-.84$ for different factors (Gow et al., 2005). Cronbach's alphas for the five traits ranged from .72 to .89 within the current sample.

Passer and Smith (2009) suggested that the IPIP domain of emotional stability is the opposite of neuroticism represented in Costa and McCrae's (1992) FFM model. The two constructs are strongly negatively correlated, $r = -.84$ (Gow et al., 2005). Thus, in the present study, emotional stability scores were coded in reverse so that each participant had a neuroticism score. Similarly, Block (2010) found that the IPIP domain of intellect/imagination is synonymous with openness to experience; indeed, Gow et al. (2005) found that the two domains are strongly and positively correlated, $r = .59$. Therefore, in the present study, the intellect/imagination scale and openness are used interchangeably.

The Beck Hopelessness Scale (BHS) is a 20-item self-report inventory designed to quantify hopelessness for the future (Beck et al., 1974). Each item is marked as "true" or "false", and the scores on each item are summed to provide a total score between 0 and 20. The BHS has been found to have good internal consistency for clinical samples ($\alpha = .92$) (Dyce, 1996; Young et al., 1992), and be correlated highly with other measures of hopelessness (Steed, 2001). The scale possessed a Cronbach alpha of .88 within the current sample.

The Frost Multidimensional Perfectionism Scale (FMPS) is a self-report scale of perfectionism that includes 35 items rated on a scale of 1 ("strongly disagree") to 5 ("strongly agree") (Frost et al., 1990), where higher scores are indicative of higher perfectionism. These

items test six subscales of perfectionism: concern over mistakes, personal standards, parental expectations, parental criticism, doubts about actions, and organization; however, due to a weak association, Frost et al. (1990) recommended that organization not be used to calculate the total score. Thus, this study used the 29-item version, excluding the organization subscale. The FMPS has been shown to have high internal consistency, with a Cronbach's alpha between .88 (Parker & Adkins, 1995) and .91, and high convergent validity with other scales of perfectionism (Frost et al., 1990). Within the current sample, Cronbach's alphas for the various subscales ranged between .75 and .91.

Training of Interviewers

Four student researchers conducted the interviews with participants in the present study. All four students were trained by a Doctoral level clinical scientist with extensive experience in using the SCID. This training included in-session practice of the SCID Mood Module, as well as listening to six audio recordings of previously conducted SCID assessments, and re-coding the assessments in accordance with SCID criteria. This re-coding was then checked for accuracy. Researchers were also trained on how to assess and respond to suicidal risk.

Procedure

During initial contact with study researchers (through social media, telephone, or, email), all participants were directed to an online battery of questionnaires using LimeSurvey, an open-access survey software (LimeSurvey Project Team & Schmitz, 2015). After providing their consent, participants were asked a number of demographic and diagnostic questions, such as treatment history for depression. Additionally, participants were presented with screening questions for psychosis and mania. Those who qualified were directed to the PHQ-8, IPIP, FMPS, and BHS. The questionnaires required approximately 15-20 minutes to complete.

After completing the survey, researchers contacted the participants in order to arrange the second part of the study. During this second session, study researchers conducted the LIFE – SCID with eligible participants over telephone or in person. Participants were first asked to identify all possible previous episodes of depression by assessing instances where the two hallmark features of depression have occurred in their life (e.g., low mood or anhedonia for over two weeks). To enhance recall of these events and to establish a timeline, participants were asked additional questions that might trigger recall for the onset or end of an identified depressive period (e.g., “What season was it?”). The month and year when the episodes started and ended were then estimated for each of the periods generated.

Once all possible depressive periods were identified, the SCID Mood Module was applied retrospectively, starting from the first identified period and ascending chronologically to present day, to establish whether diagnostic criteria were met during generated depressive periods. A maximum of six depressive episodes were recorded, as there was concern that recording more episodes would unduly increase the study completion time for participants. In accordance with the DSM-IV, a depressive episode was recorded if participants had met at least five of the criteria (with the exception of suicidality criterion, which was removed from the SCID in the current study) during the time period in question (APA, 2000). In accordance with the SCID-IV, each symptom was coded as absent, borderline, or present, and if symptom criteria were established, each episode had to be associated with significant distress or functional impairment, and not be the result of physical illness, substance use, or bereavement.

Statistical Analyses

After excluding participants who did not complete either part of the study, there were no missing data. Since we only assessed up to six depressive episodes, number of weeks depressed

were calculated in order to increase the range for chronicity. Pearson product-moment correlation coefficients were calculated to examine the relationships between lifetime number of weeks depressed and age of onset, the number of symptoms reported from the first episode, and the FFM personality traits. These correlations were also calculated for the number of recorded episodes. Ancillary analyses examined the correlations between personality, current depression, hopelessness, and perfectionism. As this was an exploratory study, we did not correct alpha level for multiple comparisons.

Results

First Episode Indices, Personality, and Weeks Depressed in a Lifetime

Table 2 lists means and standard deviations of all outcome measures. As planned, Pearson product-moment correlation coefficients were calculated to examine the relationships of age of onset, number of symptoms identified in the first episode, and the big five personality traits with the total number of weeks depressed in a lifetime. These analyses revealed a significant and negative correlation between age of depression onset and total weeks depressed, $r(41) = -.39, p = .01$. To ensure that the significant correlation between age of onset and weeks depressed was not confounded by current age, a partial correlation between age of onset and weeks depressed while controlling for current age was conducted. This analysis revealed a stronger significant and negative relationship between age of onset and weeks depressed, $r(40) = -.47, p = .002$, suggesting that this relationship is not entirely due to the passage of time.

The number of previous depressive episodes was also significantly and negatively correlated with age of onset, $r(41) = -.36, p = .019$. Further, the total number of depressive symptoms experienced in the first episode was significantly and positively correlated with number of weeks depressed, $r(41) = .38, p = .013$. The analyses revealed that none of the

personality traits were significantly correlated with total number of weeks depressed or with the number of previous episodes (see Table 3 for summary).

Personality and Current Depressive Symptoms

A second set of correlation coefficients was calculated to examine the relationships of the big five personality traits and total scores on the PHQ-8. This analyses revealed significant and negative correlations between total scores on the PHQ-8 and extraversion, $r(41) = -.45, p = .002$, and conscientiousness, $r(41) = -.59, p < .001$. There was a significant and positive correlation between total scores on PHQ-8 and scores on neuroticism, $r(41) = .49, p = .001$. Neither relationship between PHQ-8 and agreeableness, and PHQ-8 and openness were significant.

Personality, Hopelessness, and Perfectionism

A third correlational analysis was conducted to examine the relationships of the big five personality factors and BHS total scores. This analysis revealed significant and negative correlations between total BHS scores and extraversion, $r(41) = -.48, p = .001$, and conscientiousness, $r(41) = -.43, p = .004$. There was a significant and positive relationship between BHS scores and neuroticism, $r(41) = .47, p = .001$. There was no significant relationship between BHS and agreeableness or openness. BHS scores were also positively and significantly correlated with PHQ-8 scores, $r(41) = .59, p < .001$.

Finally, correlational analyses were completed to determine the relationships of the big five personality factors and FMPS scores, excluding the organization subscale. This analysis revealed a significant and positive relationship between FMPS scores and neuroticism, $r(41) = .43, p = .004$. There was no significant relationship between FMPS and conscientiousness, extraversion, agreeableness, openness, or PHQ-8 scores.

Discussion

The results of this study suggested that chronicity in depression is related to some indices of the first episode. As predicted, an earlier age of onset and a larger number of symptoms at first episode were associated with chronicity, measured as the total number of weeks depressed in a lifetime, beyond the passing of time. Additionally, though number of weeks depressed was our main outcome measure, we also found that number of episodes was also related to an earlier age of onset. This extended previous research that has found that earlier onset of depression is associated with recurrence of the disorder throughout life (e.g., Ma & Teasdale, 2004; Teasdale et al., 2000). The findings also replicated previous research that has found that increased severity of the first depressive episode is associated with a more chronic course of depression (O'Leary et al., 2000). Despite our prediction, we failed to replicate the finding that neuroticism or any of the personality factors were related with the number of weeks depressed. This may be due to methodological differences, as previous research has linked number of previous episodes, as opposed to weeks depressed, with neuroticism (Duggan et al., 1995; Ormel et al., 2001).

In our ancillary analyses, we found that individuals with higher levels of neuroticism reported higher levels of current depression. As discussed above, the relationship between neuroticism and depression has been demonstrated numerous times in previous research. For instance, Sen et al. (2010) found that neuroticism was associated with an increase in depressive symptoms, and that neuroticism scores incrementally predicted level of depression above history of depression, sex, and difficult family environment in childhood. There is currently no consensus on whether neuroticism is related to initial onset, or whether it is part of a "scar" that is associated with increased risk for recurrence (Burcusa & Iacono, 2007). With this said, it is likely that high levels of neuroticism are central to the experience of depression.

The present study also obtained evidence that formerly depressed participants who

reported lower extraversion and conscientiousness were more likely to report higher levels of current depression. As discussed, findings implicating these traits in the onset or recurrence of depression are scarce. Thus, our findings of this relationship, even among remitted patients, are important since it supplements and replicates previous research in this area (Anderson & Mclean, 1997; Chioqueta & Stiles, 2005; Compas et al., 2004).

In corroboration with previous research, this study found that neuroticism, extraversion, and conscientiousness were related to hopelessness in the expected direction. Chioqueta and Stiles (2005) and Velting (1999) also found moderate correlations between hopelessness and neuroticism, conscientiousness, and extraversion. We also obtained evidence that higher scores of perfectionism were related to higher levels of neuroticism. Indeed, previous studies have also substantiated this relationship (Rice et al., 2007; Dunkley et al., 2012).

The present study provides preliminary evidence that age of onset and other features of the first episode of the disorder are related to lifetime depression chronicity. Additionally, personality factors were shown to be related to current depression even among individuals with a history of the disorder and not currently depressed. This is one of the few studies that have examined features of the first depressive episode, personality, and depression chronicity over time. However, there are a number of factors in our study that limit generalizability. Due to a small sample size, we could not differentiate between those who experienced recurrent depression (i.e. more than two episodes) from those who had experienced only one previous episode. Thus, the present study could not reliably detect differences between the two groups. Further, although the majority of participants in the current study indicated that they had received treatment for depression in their life, type or date of treatment were not systematically assessed. As some forms of treatment may alter personality scores (e.g., Michalak et al., 2008;

van den Hurk et al., 2011; Tang et al., 2009), it is difficult to conclude whether personality scores and their relationship with depression were stable over time. Finally, this study was retrospective in nature; thus, assessment in the current study may have suffered from poor or incomplete participant recall, and causal inferences could not be drawn.

Despite these limitations, the present study presents important evidence supporting the relationship between the first episode of depression and recurrence of the disorder over time. Future research that is longitudinal in nature and employs larger samples is needed to replicate the current findings. Such research may aid in the development of treatments that might be more successful in preventing recurrence of depression (Beshai et al., 2011). Depression is highly prevalent around the world, and the rates of the disorder appear stagnant (Patten et al., 2016). As such, identifying and addressing possible factors in recurrent depression is imperative.

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Table 1. *Demographic Characteristics*

Demographic		Number	Percent
<i>Education</i>	High school	5	11.6
	Non-University degree	7	16.3
	Below Bachelor's degree	5	11.6
	Bachelor's degree	13	30.2
	Master's degree	4	9.3
	Other	9	20.9
<i>Income</i>	Below £10k, unemployed, or student	13	30.2
	£10k - £30k	12	27.9
	£30k - £50k	10	23.3
	£50k - £75k	4	9.3
	£75k or above	4	9.3
<i>Religion</i>	Christian or Catholic	17	39.5
	Atheist	13	30.2
	Agnostic	5	11.6
	Other	8	18.6

Table 2. *Descriptive Statistics for Measures*

	Mean	Std. Deviation
Weeks Depressed	134.86	151.51
Number of Symptoms in Episode 1	6.63	1.33
Age of Onset	24.09	11.89
Number of Episodes	2.65	1.56
PHQ-8	7.74	5.30
BHS	7.58	4.80
Extraversion	27.49	8.19
Agreeableness	41.72	6.86
Conscientiousness	35.91	6.14
Neuroticism	22.95	8.34
Openness	38.09	7.31
FMPS ¹	87.44	23.86

Note:

¹Without organization scale

Table 3. *Pearson Correlations Among Lifetime Weeks Depressed, Features of the First Episode, Personality, Hopelessness, and Perfectionism*

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. Weeks Depressed	-											
2. Number of Symptoms in Episode 1	.38*	-										
3. Age of Onset	-.39*	-.13	-									
4. Number of Episodes ¹	.24	-.09	-.36*	-								
5. PHQ-8	.05	.03	.04	.18	-							
6. BHS	.00	-.02	.07	.24	.59**	-						
7. Extraversion	-.24	-.19	.14	-.17	-.45**	-.48**	-					
8. Agreeableness	.03	.37*	.19	-.17	.12	-.12	.26	-				
9. Conscientiousness	.07	.24	-.13	-.15	-.55**	-.43**	.24	.09	-			
10. Neuroticism	-.17	.02	-.10	-.07	.49**	.47**	-.30*	-.03	-.36*	-		
11. Openness	.08	-.08	.02	.20	-.16	-.18	.28	.11	.28	.21	-	
12. FMPS ²	.19	.23	-.21	.01	.12	.33*	-.24	-.01	.21	-.43**	.29	-

Note:

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

¹ Up to a maximum of 6

² Without organization scale