

The Temporal Relationship between Emotion Controllability Beliefs and Emotional Distress, with a Focus on Depression and Anxiety: A Random Intercept Cross-Lagged Panel Model

Sunkyung Yoon[†]

Department of Psychology, Sungkyunkwan University, Seoul, Korea

Beliefs regarding the controllability of emotions are closely associated with emotional distress, such as depression and anxiety. Most previous studies have focused on the unidirectional prediction of emotional distress based on emotion controllability beliefs. However, it is equally plausible that emotion controllability beliefs and emotional distress influence each other in a bidirectional manner. Using a random intercept cross-lagged panel model (RI-CLPM), this study aimed to elucidate the directionality of the relationship between emotion controllability beliefs and emotional distress, with a focus on depression and anxiety. A total of 393 participants reported their emotion beliefs, and symptoms of depression and anxiety at time 1. They were followed up at 5 weeks (time 2), and 10 weeks (time 3). At the within-person level, higher-than-average levels of a person's depression and anxiety symptoms predicted increases in beliefs that depression and anxiety are uncontrollable. In addition, we found a significant bidirectional relationship between anxiety controllability beliefs and anxiety symptoms. These findings highlight the need to expand our current understanding of emotion controllability beliefs to account for the reciprocal relationships between these beliefs and emotional distress, especially in the context of anxiety.

Keywords: depression, anxiety, mindset, implicit theories, cognition

Introduction

Individuals hold beliefs about whether different aspects of themselves (e.g., intelligence) are malleable and controllable (vs. fixed and uncontrollable) (Dweck et al., 1995). According to Dweck's theory (Dweck et al., 1995; Dweck & Leggett, 1988), these beliefs


are central to outcomes in various domains (e.g., academic success). Emotion researchers began to investigate beliefs about the controllability of emotions only relatively recently (Tamir et al., 2007) and found that these beliefs play a crucial role in emotional outcomes (Burnette et al., 2020; Ford & Gross, 2019). For instance, stronger beliefs that emotions are relatively controllable were associated with lower levels of emotional distress, such as depression and anxiety (see Burnette et al., 2020 for review). With this increasing body of evidence, beliefs about the controllability of emotions have been theorized as one of an individual's fundamental emotion beliefs that influence their emotional experiences and regulation processes (Ford & Gross, 2019).

In keeping with the theory of emotion beliefs (Ford & Gross, 2019), most previous studies have focused on the unidirectional

[†]Correspondence to Sunkyung Yoon, Department of Psychology, Sungkyunkwan University, 25-2 Sungkyunkwan-ro, Jongno-gu, Seoul 03063, Korea; E-mail: syoon0113@skku.edu

Received Dec 4, 2023; Revised Feb 27, 2024; Accepted Feb 28, 2024

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as potential conflicts of interest.

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prediction of emotional distress based on emotion controllability beliefs (Howell, 2017; Somerville et al., 2023). However, it is equally plausible that emotion controllability beliefs and emotional distress influence each other in a bidirectional manner. Dweck et al. (1995) posited a reciprocal relationship between a person's controllability beliefs and the experiences that influence these beliefs. Emotions are an integral part of human experiences and can provide direct evidence that can either support or contradict beliefs (Clore & Gasper, 2000). Indeed, previous work has shown a significant reciprocal relationship between other types of beliefs (e.g., worries, self-criticism) and emotional distress (Eisma et al., 2022; Shahar et al., 2004). It is plausible that emotional distress is a precursor to the belief that emotions are relatively uncontrollable and that this, in turn, leads to increased emotional distress. Indeed, Schroder's (2021) anxiety mindset model suggests that beliefs about the controllability of anxiety and emotional distress can reciprocally affect each other.

A small number of longitudinal studies have investigated whether emotional distress predicts future emotion controllability beliefs, with mixed results (Crawford et al., 2021; Ford et al., 2018; Henshaw et al., 2023; Zhang et al., 2023). Three studies examined the bidirectional relationships between emotion controllability beliefs and depressive symptoms (Crawford et al., 2021; Ford et al., 2018) and/or negative affect (Crawford et al., 2021; Zhang et al., 2023). Crawford et al. (2021) found that greater negative affect predicted stronger beliefs that emotions are uncontrollable 18 months later. However, this finding was not replicated by Zhang et al. (2023). Two studies revealed that higher levels of depression did not predict future emotion controllability beliefs when prior beliefs (Ford et al., 2018) and prior negative affect (Crawford et al., 2021) were controlled. All three studies showed that emotion controllability beliefs significantly predict future emotional distress (Crawford et al., 2021; Ford et al., 2018; Zhang et al., 2023). Henshaw et al. (2023) examined beliefs about anxiety controllability, and found a significant bidirectional relationship between these beliefs and anxiety symptoms. In addition, Schleider and Weiz (2016) demonstrated that psychological difficulties, including emotional distress and other difficulties (e.g., conflicts with peers), significantly predicted later emotion controllability beliefs in youth, but not vice versa.

Given the mixed findings of previous longitudinal studies, this

study aimed to clarify the directionality of the relationship between controllability beliefs and emotional distress. Although the aforementioned previous longitudinal studies provided significant insight into the controllability beliefs-emotional distress relationship, there remains room for further investigation for two reasons. Firstly, these studies did not (or could not) distinguish between between-person trait effects that exist across time (i.e., stable individual differences in controllability beliefs and emotional distress) and within-person state effects that change over time (i.e., fluctuations in these beliefs and emotional distress within an individual over time). A person's implicit theories can be relatively stable but also fluctuate according to context (Dweck et al., 1995). It is important to disentangle between-person and within-person associations, and examine whether changes in a person's controllability beliefs predict increases or decreases in their emotional distress at a within-person level.

Secondly, it is possible that the non-significant bidirectionality between controllability beliefs and emotional distress found in previous works (Crawford et al., 2021; Ford et al., 2018; Zhang et al., 2023) was due to their measurement of general, rather than specific, emotion controllability beliefs. An individual may hold beliefs that a specific emotion (e.g., anxiety) is controllable, while not perceiving other emotions (e.g., depression) as similarly controllable. Indeed, previous studies showed that controllability beliefs are domain-specific. For example, Schroder et al. (2015) conducted exploratory factor analysis (EFA) and found that items on beliefs about the controllability/malleability of anxiety, and those on emotions in general were loaded onto two distinct factors in US samples, indicating the two are distinct domains. A subsequent study (Schroder et al., 2016), using confirmatory factor analysis (CFA), showed that controllability beliefs regarding anxiety and depression are two different domains, although these beliefs were significantly correlated. The findings that depression and anxiety controllability beliefs were distinguishable domains were replicated in another study using both EFA and CFA in Chinese samples (Zhu et al., 2022). Further, controllability beliefs about a specific domain (i.e., anxiety) have shown a closer relationship to distress related to the domain (i.e., anxiety symptoms) than controllability beliefs about emotions in general (Schroder et al., 2019). Thus, to clarify the temporal relationships between emotion controllability

beliefs and emotional distress, it is important to examine domain-specific beliefs in relation to distress associated with each domain. This study focused on beliefs about the controllability of depression and anxiety, and their relations to depressive and anxiety symptoms, respectively.

This study aims to examine the temporal directional relationships between emotion controllability beliefs and emotional distress at both between- and within-person levels, with a focus on two discrete emotions: depression and anxiety. I hypothesized the existence of bidirectional relationships between beliefs about the controllability of depression and anxiety, and symptoms of depression and anxiety, respectively.

Methods

Participants and Procedure

Data for this study was collected via Amazon Mechanical Turk (mTurk) (Buhrmester et al., 2011) as part of a larger study investigating beliefs about emotions. To ensure data quality, we recruited mTurk workers who had completed over 10,000 approved human intelligence tasks (HITs) with a HIT acceptance rate above 98%. Participants were also restricted to adults residing in the U.S. Individuals who completed the study in the first week of January 2023 (time 1 [T1]) were contacted for the two follow-up surveys at 5 weeks (T2) and 10 weeks (T3). Controllability beliefs and emotional distress were measured at all three time points. Participants were compensated \$3.50 for study completion at T1, and \$0.80 at T2, and T3.

At T1, the study was completed by 402 individuals. Of these, nine were excluded due to not reporting an identification number, leaving a final sample of 393. The mean age of participants was 40.2 years ($SD = 10.9$; range = 19-79). There were 168 females (42.7%) and 327 (83.2%) participants identified themselves as white. Among the participants in the T1 sample, 267 (67.9%) and 234 (59.5%) also completed the T2 and T3 surveys, respectively. All participants gave informed consent online. The study procedure was approved by the Institutional Review Board of the author's university (#2022-11-029).

Measures

Emotional distress

The Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2011)

was used to assess depressive symptoms. The PHQ-9 is a nine-item scale that measures the frequency and severity of depressive symptoms. Respondents rated the extent to which each item (e.g., feeling down, depressed, or hopeless) had applied to them over the past 2 weeks on a four-point Likert scale (0 = not at all, 3 = nearly every day). The Cronbach's alpha for this sample on the PHQ-9 was 0.93 at T1, 0.93 at T2, and 0.92 at T3. The seven-item Generalized Anxiety Disorder scale (GAD-7) (Spitzer et al., 2006) was used to assess anxiety symptoms. Participants rated their anxiety symptoms (e.g., feeling nervous, anxious, or on edge) over the past 2 weeks on a four-point Likert scale (0 = not at all, 3 = nearly every day). The Cronbach's alpha for the current sample on the GAD-7 was 0.92 at T1, 0.93 at T2, and 0.92 at T3.

Emotion controllability beliefs

Participants were asked to rate the extent to which they believe that feeling sad/blue is *uncontrollable* on an eight-point Likert scale (0 = not at all, 7 = extremely) and to do the same for their belief about feeling scared/afraid. The mean scores for sad/blue and scared/afraid beliefs were computed as measures of uncontrollability beliefs about depression and anxiety, respectively. For depression beliefs, Cronbach's alpha was 0.71 at T1, 0.84 at T2, and 0.79 at T3. For anxiety beliefs, Cronbach's alpha was 0.74 at T1, 0.90 at T2, and 0.88 at T3.

Statistical Analysis

To elucidate the temporal, and directional relationships between emotion controllability beliefs and emotional distress, a random-intercept cross-lagged panel model (RI-CLPM) was used. Unlike traditional cross-lagged panel models (CLPMs), the RI-CLPM parses out the time-invariant stability at a between-person level, with random intercepts for time-invariant traits, allowing measurement of between-person differences in variables across time points. By including random intercepts, the RI-CLPM can also test the time-varying temporal relationships at a within-person level (e.g., whether deviations from a person's expected distress value at T1 predicts deviations from that person's expected emotion controllability beliefs value at T2). As the main focus of this study was within-person cross-lagged associations, RI-CLPM was the most appropriate statistical model.

Following the procedure developed by Mulder and Hamaker (2021), two RI-CLPMs were conducted using the lavaan package in R software (R Core Team, 2013): one for depression and one for anxiety. In each model, age, gender (0 = female, 1 = male), and ethnicity (0 = white, 1 = other) were entered as time-invariant covariates of the observed variables. A missing completely at random (MCAR) test¹ (Little, 1988) found the data to be MCAR, $\chi^2(212) = 109.08, p > .05$. Thus, a full information maximum likelihood estimation was used, which is appropriate for handling MCAR data (Newsom, 2015). To enhance both the parsimony of the model and the interpretability of the findings, we constrained autoregressive and cross-lagged paths as well as residuals to be equal over time. Lastly, the model's goodness-of-fit was evaluated using the following criteria by Byrne (2016): A comparative fit index (CFI) greater than 0.95, a root mean square error (RMSEA) of approximation less than 0.08, and a standardized root mean square residual (SRMR) less than 0.05.

Results

The descriptive statistics and bivariate correlation coefficients of the variables across time points are presented in Table 1. The

standardized coefficients of the RI-CLPM models and model fit information are presented in Figure 1 for anxiety, and Figure 2 for depression.

The RI-CLPMs results showed a good model fit for both depression and anxiety. In both models, the random intercepts of the controllability beliefs and clinical symptoms were significantly correlated, indicating that those with stronger beliefs in the uncontrollability of depression or anxiety were more likely to report greater symptoms of depression or anxiety, respectively. At a within-person level, autoregressive paths were significant for emotional distress, but not for beliefs about the controllability of either anxiety or depression. For cross-lagged relationships, there were significant bidirectional cross-lagged relationships between anxiety controllability beliefs and anxiety symptoms. A belief that anxiety cannot be controlled above a person's mean predicted an increase in anxiety 5 weeks later. Similarly, symptoms of anxiety greater than a person's mean predicted greater belief in the uncontrollability of anxiety 5 weeks later. For depression, greater depression predicted a stronger belief in the uncontrollability of depression 5 weeks later. In contrast, belief in the uncontrollability of depression did not significantly predict changes in depressive symptoms 5 weeks later.

Table 1. Descriptive Statistics, and Bivariate Correlation Coefficients of the Variables in the Study of the Relationships between Symptoms of Anxiety, and Depression, and Belief in Their Controllability

	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11
1. Dep at T1	7.24 (6.84)											
2. Dep at T2	7.61 (7.08)	.86										
3. Dep at T3	7.41 (6.83)	.82	.88									
4. Anx at T1	6.08 (5.49)	.90	.79	.74								
5. Anx at T2	6.24 (5.69)	.83	.90	.83	.84							
6. Anx at T3	5.91 (5.38)	.75	.79	.89	.77	.84						
7. Dep beliefs at T1	3.93 (1.51)	.39	.33	.36	.37	.36	.35					
8. Dep beliefs at T2	3.46 (1.72)	.48	.51	.54	.41	.49	.54	.48				
9. Dep beliefs at T3	3.34 (1.57)	.45	.47	.51	.40	.43	.54	.51	.63			
10. Anx beliefs at T1	4.17 (1.53)	.27	.24	.25	.27	.25	.26	.69	.48	.43		
11. Anx beliefs at T2	3.60 (1.81)	.37	.37	.45	.34	.40	.47	.42	.78	.46	.40	
12. Anx beliefs at T3	3.44 (1.71)	.35	.38	.40	.32	.36	.43	.50	.54	.77	.47	.53

Anx = Anxiety; Anx beliefs = beliefs that anxiety is uncontrollable; Dep = Depression; Dep beliefs = beliefs that depression is uncontrollable; SD = standard deviation; T1 = time 1; T2 = time 2; T3 = time 3.

All correlation coefficients were significant at $p < .001$.

¹) The MCAR test was conducted using SPSS version 27 (IBM Corp., 2020).

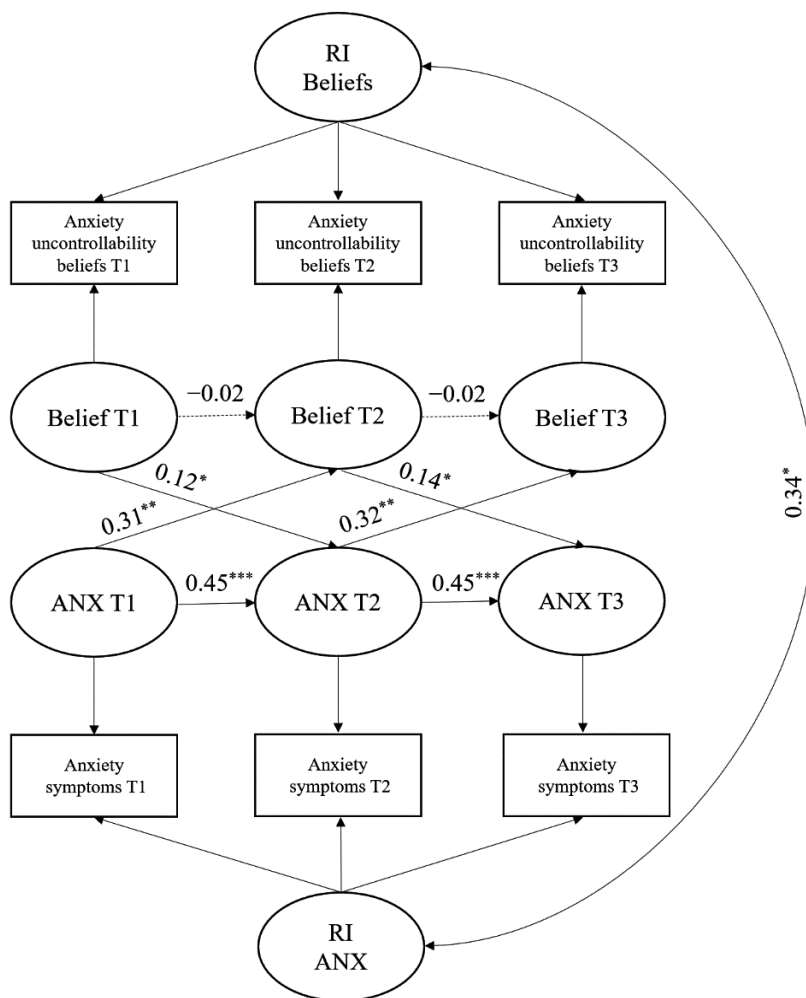


Figure 1. Random intercept cross-lagged panel model of the relationship between anxiety controllability beliefs, and anxiety. Model fit information, $\chi^2(20) = 32.063, p = .043, CFI = 0.986, RMSEA = 0.039$ (90% CI = 0.007, 0.063), SRMR = 0.036. ANX = anxiety symptoms; Beliefs = anxiety uncontrollability beliefs; RI = random intercept; T1 = time 1; T2 = time 2; T3 = time 3; Dashed lines = non-significant paths. * $p < .05$, ** $p < .01$, *** $p < .001$.

Discussion

The current study used an RI-CLPM to clarify the temporal and directional relationships between beliefs about depression and anxiety controllability, and symptoms of depression and anxiety, respectively. The main results were as follows: 1) At a within-person level, greater symptoms of depression or anxiety predicted an increase in the beliefs that depression or anxiety, respectively, cannot be controlled; 2) There was a significant bidirectional relationship between anxiety and beliefs about the controllability of anxiety; 3) Beliefs about the controllability of depression did not pre-

dict changes in depressive symptoms 5 weeks later.

While a theoretical model of emotion beliefs (Ford & Gross, 2019) and most previous studies (Howell, 2017; Somerville et al., 2023) have focused on emotional distress as an outcome of emotion controllability beliefs, this study showed that symptoms of depression and anxiety significantly predicted stronger beliefs in the uncontrollability of these emotions at the within-person level. Further, the current findings of a significant bidirectional relationship between anxiety controllability beliefs and anxiety symptoms empirically support the anxiety mindset model (Schroder, 2021), which posits that anxiety symptoms and anxiety controlla-

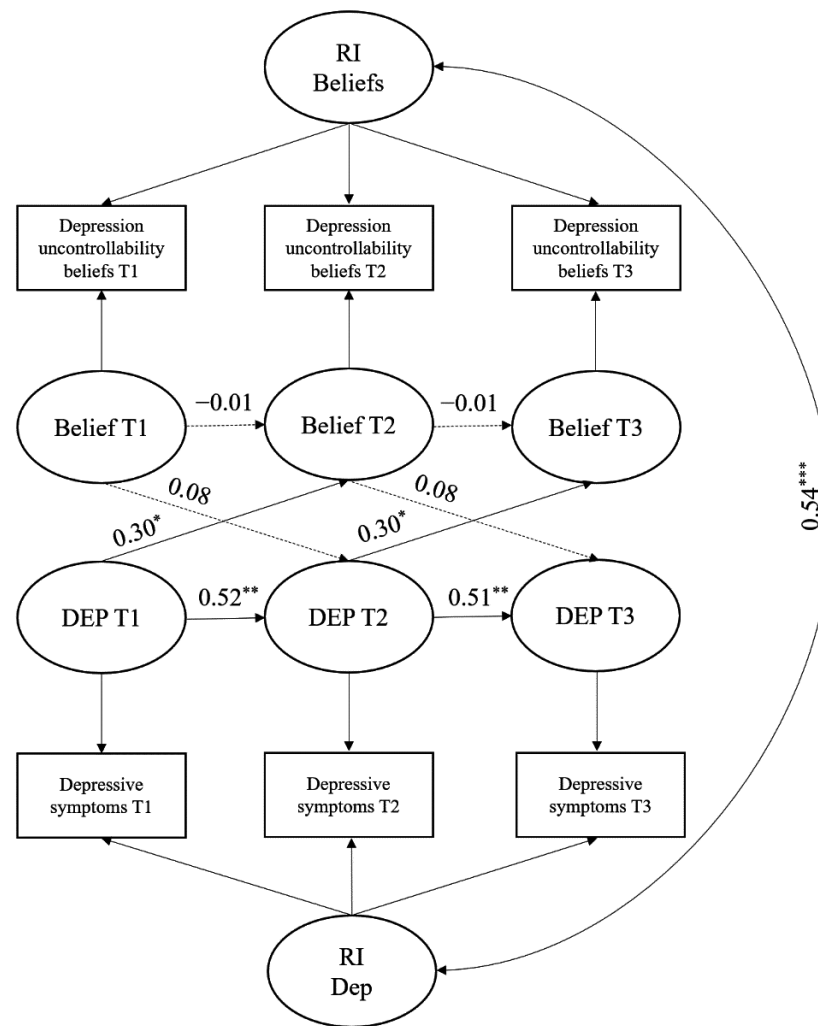


Figure 2. Random intercept cross-lagged panel model of the relationship between depression controllability beliefs, and depression.

Model fit information, $\chi^2(20) = 52.385$, $p < .001$, CFI = 0.970, RMSEA = 0.064 (90% CI = 0.043, 0.086), SRMR = 0.044.

Beliefs = depression uncontrollability beliefs; DEP = depressive symptoms; RI = random intercept; T1 = time 1; T2 = time 2; T3 = time 3; Dashed lines = non-significant paths.

* $p < .05$, ** $p < .01$, *** $p < .001$.

bility beliefs influence each other in a reciprocal manner. To alleviate a person's anxiety, it could be essential to break the cycle wherein emotion controllability beliefs and distress reinforce one another. Results from this study emphasize the importance of addressing controllability beliefs not just as a preventive measure against future emotional distress but also as a necessary target for individuals currently experiencing distress.

The current results raise questions about the mechanism(s) underlying this bidirectional relationship. Boden and Berenbaum (2010) argued that the bidirectional relationship between affect and beliefs is driven by two main motives: sense-making and af-

fect regulation. That is, individuals modify their beliefs to make sense of unexpected affective experiences and regulate their affect in a desired direction. It is possible that individuals may hold stronger beliefs that emotions are *uncontrollable* when experiencing more emotional distress than usual to explain a discrepancy between their existing beliefs and emotional experiences, ultimately in an attempt to downregulate negative emotions resulting from the beliefs-experience discrepancy. Emotion regulation has been theorized as an important mechanism in the controllability beliefs-emotional distress relationship (Ford & Gross, 2019; Schroder, 2021), and previous studies showed that controllability beliefs

predict the use of emotion regulation strategies (Hong & Kangas, 2022). Future research is imperative to test the idea that emotion controllability beliefs and emotional distress are more likely to influence each other when there is a heightened need to explain and regulate their emotions.

Unexpectedly, this study found that depression controllability beliefs did not predict within-person changes in depressive symptoms, although the beliefs and depressive symptoms were significantly correlated at a between-person level. Previous studies found that emotion controllability beliefs predicted later depressive symptoms (Crawford et al., 2021; Ford et al., 2018; Zhang et al., 2023); however, they did not assess controllability beliefs specific to depression nor disentangle between-person and within-person associations. The current findings may indicate that emotion controllability beliefs are associated with emotional distress differently depending on a specific emotion. One possible explanation of why controllability beliefs of depression did not predict within-person changes in future depressive symptoms while anxiety beliefs predicted anxiety symptoms is that perceived control over emotions may be a risk factor more closely associated with anxiety than with depression. While perceived control over external events has been theorized to contribute to both depression (Abramson et al., 1989) and anxiety (Gallagher et al., 2014), perceived control over one's internal states, such as emotions, has been more tightly conceptualized with anxiety than with depression. For instance, individuals naturally experience "anxiety" about their own emotions when they perceive a lack of control over their emotional experiences, leading to greater intolerance of emotions (Schroder, 2021). Relatedly, exposure therapy, a major evidence-based treatment for anxiety disorders, aims to increase individuals' tolerance of uncomfortable states, such as fear, ultimately leading to the realization that feared outcomes or fear itself are not inherently dangerous (Abramowitz, 2013). This may suggest the possibility that controllability beliefs of emotions, specifically anxiety, may play a particularly crucial role in relation to future anxiety symptoms. Future longitudinal research is imperative to test this idea and confirm whether the different patterns of within-person controllability beliefs and distress relationships between depression and anxiety found in this study can be replicated.

The current study had several limitations. First, the intervals

between measurement time points (5 weeks) were relatively short. This may have influenced the results, particularly the unexpected findings that depression beliefs did not predict depression at the within-person level, as well as the non-significant autoregression paths of both depression and anxiety beliefs. Second, the emotion controllability belief scale used in this study was not tested for its psychometric properties. Because this study was part of a larger project on beliefs about emotions, a brief scale on emotion controllability beliefs (consisting of a total of four items) was developed and used to minimize participants' burden. I suggest that future studies consider using measures of controllability beliefs regarding depression and anxiety whose psychometric properties were pre-tested, such as the Mindsets of Depression, Anxiety, and Stress Scale (Zhu et al., 2022), and anxiety and depression mind-set scales developed in Schroder et al. (2016). And lastly, this study's sample was limited to adults in the U.S. Given that a person's emotion beliefs are closely related to the norms of their culture and society (Mesquita et al., 1997), culture could influence the relationships between emotion controllability beliefs and emotional distress. For example, in East Asian culture where controlling emotional experiences and expressions is highly valued relative to Western cultures (Matsumoto, 1993), the perceived lack of control over emotions could be seen as more threatening by East Asians than by Westerners. Accordingly, the bidirectional relationships between emotion controllability beliefs and emotional distress might be stronger in East Asians compared to Westerners. Future research is recommended with more culturally diverse samples and longer intervals between measurement time points, using a measure with established validity and reliability.

Conclusion

Despite these limitations, this longitudinal study is the first to use the RI-CLPM to test both between-person and within-person associations between emotion controllability beliefs and emotional distress with a focus on two discrete emotions of depression and anxiety. Results from this study showed that both depressive and anxiety symptoms predicted changes in later emotion controllability beliefs. Further, anxiety symptoms and anxiety controllability beliefs predicted each other in a bidirectional manner. These

findings highlight the need to expand our current understanding of emotion controllability beliefs and to explore the reciprocal relationships between the beliefs and emotional distress, particularly in the context of anxiety.

Author contributions statement

The author confirms sole responsibility for the conception and design of the study, data collection, formal analysis, as well as writing.

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