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Predicting the future from fear: An RI-CLPM analysis of risk appraisals and long-term psychological well-being

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Abstract

Risk perceptions involving estimates of whether negative events would occur are theorized to be linked to psychological well-being, although there is inconsistent evidence on whether well-being leads to reduced risk perceptions or if risk perceptions lead to reduced well-being. We clarify this using a longitudinal, random-intercepts cross-lagged panel modeling (RI-CLPM) approach. Specifically, we examined the inter-relationship between risk perceptions and psychological well-being across four waves of data (2014–2020) from the Understanding America Study (UAS; $N = 7{,}289$). Neuroticism, age, gender, education, income, and race were adjusted for. Results indicated that between-person differences in risk perception covaried with lower psychological well-being ($r = -0.49$, $p < .001$). Importantly, within-person increases in risk perception were associated with lower psychological well-being at the subsequent wave (βs $= -0.07$ to $-.06$, ps $< .007$), whereas psychological well-being was not linked to future risk perceptions. These findings support a unidirectional association of risk appraisals with lower subsequent psychological well-being.

Tammy W. Y. Teo and Cameron S. E. Tan contributed equally to the manuscript.

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KEYWORDS

longitudinal, neuroticism, random intercepts cross-lagged panel modelling, risk perceptions, well-being

INTRODUCTION

Risk perceptions, defined as subjective estimates of the likelihood of negative outcomes happening to oneself, are closely intertwined with psychological well-being, with numerous studies showing that individuals who perceive greater risks tend to report lower levels of mental health. Yet, the direction of this relationship remains uncertain. Do higher perceived risks contribute to declines in well-being, or does better well-being lead individuals to perceive fewer risks in their everyday lives?

Various theoretical models suggest the prediction that risk appraisals should be intimately tied to one's sense of wellness. For example, classic theoretical models including the Health Belief Model (Rosenstock, 1974) and Protection Motivation Theory (Prentice-Dunn & Rogers, 1986) propose that risk appraisals are central determinants of health-related behavior and are closely linked to individuals' sense of wellness. Building on these frameworks, top-down theories posit that risk perception reflects a global appraisal of a situation as inherently threatening or "bad" (Alhakami & Slovic, 1994; Ganzach et al., 2008). This overarching evaluation may initiate a chronic cognitive preoccupation with potential harm, fostering anxiety and hyper-vigilance—states that gradually erode psychological safety and mental health (Dyer et al., 2022; Globig et al., 2022; Slovic et al., 2002). Within dual-processing frameworks, risk perception arises from both deliberative and intuitive processes. Deliberative processing involves analytic evaluations of probabilities and consequences, whereas intuitive processing relies on rapid, affective impressions or "gut-level" reactions (Sinclair et al., 2010). Importantly, both forms of processing may contribute to diminished well-being when they sustain persistent perceptions of threat. Deliberative evaluations may promote repetitive cognitive focus on potential negative outcomes and uncertainty, whereas intuitive appraisals may heighten emotional reactivity and vigilance. Over time, these processes may together lead to prolonged stress and vigilance that contribute to diminished long-term well-being, as evidenced in studies of disaster recovery and chronic health conditions (Adams et al., 2011; Bränström & Brandberg, 2010; Persoskie et al., 2014).

However, uncertainties emerge given that competing theoretical frameworks propose contradictory directional relationships between risk perceptions and well-being. Indeed, other theoretical models appear to predict bidirectional or reverse-directional associations. For example, the broaden-and-build theory presents a competing prediction suggesting that feeling good signals safety and may lead to broadened cognitive-behavioral patterns that are reflective of reduced risk appraisals (Fredrickson, 2004). Indeed, recent findings suggest that improvements in well-being may foster greater optimism and self-control, rather than optimism or self-control necessarily driving later psychological well-being (Joshanloo, 2024; Khoo et al., 2025). *Mutatis mutandis*, the evidence does not preclude the possibility that alternative theoretical models in which well-being leads individuals to perceive less risk could be better supported. Further complicating any theoretical certainty on this issue, many studies rely on cross-sectional designs that preclude conclusions about directionality (e.g., Martos et al., 2020; Matthew et al., 2015; Xu et al., 2017). For instance, Gerrard et al. (2008) examined primarily short-term, cross-sectional

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relationships, whereas Loewenstein et al. (2001) emphasized immediate emotional responses to specific risks rather than how chronic emotional states may shape risk judgments over time. Even among longitudinal studies, timeframes are often short, spanning only weeks or months, limiting insights into long-term dynamics involving chronic risk appraisals (e.g., Grazioli et al., 2022; Peng et al., 2023). Resolving this issue requires a longitudinal analytic framework capable of explicitly testing bidirectional associations between risk perceptions and well-being over time.

Relatedly, risk perception is conceptualized as comprising both stable, trait-like tendencies and dynamic state-like fluctuations across time. Contemporary models characterize risk perception as a dynamic appraisal process shaped by personal experiences, environmental cues, social information, and emotional states (Keller et al., 2012). As individuals encounter new information, life events, or changing situational demands, their subjective evaluations of threat may shift even when objective risk levels remain stable (Paterson & Neufeld, 1987). From this perspective, risk perceptions can be understood both as individual differences as well as dynamic appraisals that may both influence and be influenced by one's well-being. There is thus a theoretical and methodological need to separately account for enduring between-person individual differences as well as within-person dynamics in risk appraisals and well-being across time.

A final theoretical uncertainty concerns specificity. Appraisal-based models of affect often question the extent to which specific forms of negative appraisals or judgments indeed play independent or theoretically distinct roles from broader, generic negativity (Roseman & Evdokas, 2004; Siemer et al., 2007; Smith & Ellsworth, 1985). Specifically, it is unclear whether appraising one's life as prone to risk necessarily plays an independent explanatory role in well-being relative to simply appraising one's life as unpleasant. By and large, the evidence supports this as threat-based appraisals often play independent explanatory roles that are not reducible to general negativity (Lerner & Keltner, 2001; Roseman et al., 1990). We note that neuroticism is particularly relevant here as it is conceptualized as one's global tendency to appraise and react with negativity and is conceptually directly linked to both perceived risk and psychological well-being (Kroencke et al., 2020; Wenzel et al., 2026). While neuroticism is typically conceptualized as a stable personality trait that shows strong conceptual links with both heightened risk estimations and lower levels of mental health outcomes (Struijs et al., 2021), a broad range of evidence also suggests that neuroticism-related experiences can fluctuate within individuals over time, reflecting dynamic changes in affective functioning alongside stable trait differences (Lindner et al., 2024; Ormel & Rijsdijk, 2000; Scollon & Diener, 2006). Indeed, recent work has suggested that well-being may be primarily predicted by personality traits (Mõttus et al., 2024), raising questions about whether risk perceptions offer any independent predictive value beyond general negative affect. A theoretical model of how risk appraisals are linked to well-being would therefore be much more conclusive if the alternative interpretation that any such links could be reducible to general negativity could be ruled out, both at the between-person and within-person levels.

The present work addresses these uncertainties and provides greater clarity regarding the longitudinal interrelationship between risk perceptions and well-being, operationalized based on psychological well-being. Using a random intercepts cross-lagged panel modeling (RI-CLPM) framework, we examine both between-persons associations and within-person dynamics between risk perceptions and psychological well-being over time. This enables a test of predictions made based on diverse theoretical models in which risk appraisals are expected to be linked to well-being, as well as competing theories and findings in which well-being may also be linked to subsequent risk appraisals. In addition, to test the theoretical specificity of risk

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appraisals in being associated with psychological well-being independently of general negativity, the present study models both stable, trait-like individual differences and within-person fluctuations in neuroticism. Demographic factors including age, gender, education, income, and race are also adjusted for. Notably, much of the literature focuses on crisis-specific or occupationally exposed populations, such as health-care workers and reducing generalizability (e.g., Badía et al., 2024; Giurgiu et al., 2016). By examining a large-scale sample of adults in general from the United States (U.S.), the present work therefore also allows greater external validity in examining the relationship between risk perceptions and psychological well-being. Accounting for autoregressive pathways as well as between-person and within-person variation in neuroticism, we hypothesize that higher risk appraisals will show significant within-person lagged associations with subsequent psychological well-being. Given inconsistencies in the existing literature, we make no a priori hypotheses concerning the reverse pathway.

METHOD

Participants

As publicly available secondary data were used, the present study was exempt from review by the Singapore University of Social Sciences Institutional Review Board under the code APL-0195-2023-EXE-01. Data for this study came from the Understanding America Study (UAS), and informed consent was obtained from participants by the original owners of the dataset. The UAS is maintained by the Center for Economic and Social Research (CESR) at the University of Southern California. The content of this paper is solely the responsibility of the authors and does not necessarily represent the official views of USC or UAS. Data for the relevant variables were available across four waves of data collection (2014 [T1], 2016 [T2], 2018 [T3], and 2020 [T4]). In total, data for 7289 participants (3059 males, 4230 females; $M_{age} = 47.45$, $SD_{age} = 15.62$, age range: 18–108 years) with complete data on demographic covariates (age, gender, education, income, and race) were available. After accounting for missing data, complete data for key variables at each wave were T1: 5853, T2: 5278, T3: 4654, and T4: 3874. Missing data because of nonresponse within waves and attrition across waves resulted in complete data being available for 3630 participants (1531 males, 2099 females; $M_{age} = 48.39$, $SD_{age} = 14.85$, age range: 18–98 years).

Measures

Risk perceptions

Data on participants' perceptions of risky events as being likely to happen was collected across all four time points using a total of 11 items from the Adult Decision-Making Competence index (A-DMC; Bruine de Bruin et al., 2007), a measure commonly used to assess consistency in risk perceptions and risk-related judgement (e.g., Weller et al., 2015). Participants rated the likelihood that a variety of negative scenarios were likely to occur either in the next year or in the next 5 years on a scale of 0–100. The events were "flu next year"; "car accident next year"; "cavity filled next year"; "stolen from next year"; "home broken into next year"; "no driving accidents next year" (reverse coded); "car accident next 5 years"; "cavity filled next 5 years"; "stolen

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from next 5 years"; "home broken into next 5 years"; and "no driving accidents next 5 years" (reverse coded). Items were then aggregated to compute participants' overall risk perceptions at each time point ($\alpha_{T1} = 0.81$; $\alpha_{T2} = 0.83$; $\alpha_{T3} = 0.85$; $\alpha_{T4} = 0.85$).

Psychological well-being

The participants' psychological well-being across all four time points was assessed using a battery of seven items drawn from the UAS survey battery assessing happiness and satisfaction across various domains (Cummins, 1996).[1] Specifically, the participants reported their overall life satisfaction; overall happiness; and satisfaction with income, health, job or daily activities, family life, and number of friends. All items were rated on 11-point Likert scales (0 = *Not at all*; 10 = *Completely*), and the seven items were aggregated to compute the overall psychological well-being at each time point ($\alpha_{T1} = 0.88$; $\alpha_{T2} = 0.90$; $\alpha_{T3} = 0.90$; $\alpha_{T4} = 0.91$).

Neuroticism

The participants' neuroticism across all four time points was assessed using eight items from the Big Five personality battery (John, 1990), reflecting the neuroticism domain of the Five-Factor Model (e.g., "depressed," "worries a lot"), of which three were reverse-coded (e.g., "relaxed"). Items were rated on 5-point Likert scales (1 = *Strongly Disagree*; 5 = *Strongly Agree*), and the items at each time point were aggregated to compute neuroticism ($\alpha_{T1} = 0.83$; $\alpha_{T2} = 0.84$; $\alpha_{T3} = 0.84$; $\alpha_{T4} = 0.84$).

Demographic covariates

Age, gender (0 = *Male*, 1 = *Female*), education level (from 1 representing "*Less than first grade*" to 16 representing "*Doctorate degree*"), race (0 = *White*, 1 = *non-White*), and household income in raw values divided by 10,000 were included as demographic covariates

Analytic approach

RI-CLPM was performed using the *lavaan* package on *R* (R version 4.4.2; lavaan version 0.6-19; Rosseel, 2012). This provides a highly sophisticated analytic approach for disentangling stable between-person associations between variables from within-person changes over time and further allows a strong empirical test of reciprocity and directionality (Bracegirdle et al., 2023; Mulder & Hamaker, 2021). Risk perceptions, psychological well-being, and neuroticism were modeled simultaneously in a multivariate RI-CLPM, with each construct specified equivalently (i.e., decomposed into between-person random intercepts and within-person components). Specifically, using RI-CLPM, we test whether individual differences in risk perceptions and

[1]A longitudinal confirmatory factor analysis of the psychological well-being items demonstrated good model fit (CFI = 0.96, TLI = 0.95, RMSEA = 0.05, SRMR = 0.06). Standardized factor loadings were strong across all waves ($\lambda = 0.49$–0.94), with all items loading significantly on their respective latent factors.

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neuroticism covary with individual differences in psychological well-being, as well as whether within-person differences in risk perception or neuroticism would be associated with subsequent changes in psychological well-being or vice versa. The model included four waves of data. For each construct (risk perception, psychological well-being, and neuroticism), observed wave-level composite scores were decomposed into a stable between-person component and within-person deviations. A latent random intercept factor, with factor loadings fixed to 1 across waves, captured stable between-person differences across time. Wave-specific latent within-person factors represented deviations from individuals' own cross-wave means, thereby isolating within-person fluctuations from trait-like stability.

Autoregressive and cross-lagged paths were specified among the within-person latent factors across adjacent waves (T1 to T2, T2 to T3, T3 to T4). Within-wave covariances among the within-person factors were freely estimated at each time point. To evaluate whether a more parsimonious and time-invariant structure was supported, we compared the unconstrained model with a model in which corresponding autoregressive and cross-lagged paths were constrained to equality across waves, following recommendations for testing time-invariance in RI-CLPMs (Mulder & Hamaker, 2021). Imposing equality constraints significantly worsened model fit, $\Delta\chi^2(18) = 194.51$, $p < .001$, indicating that the constraints were untenable. Therefore, the unconstrained model provided a better representation of the data, and all lagged paths were freely estimated in the final model. Given the extended study period and the dynamic nature of the constructs examined, mean-level change was theoretically plausible; accordingly, means were not constrained to equality across waves in the RI-CLPM. Time-invariant covariates (age, gender, education, income, and race) were included as predictors of the observed wave-level composite scores at each time point. We have provided a schematic of the estimated RI-CLPM model in Figure S1.

We addressed missing data by applying full-information maximum likelihood (FIML), which is the gold-standard approach to addressing missing data that largely outperforms other techniques (Enders & Bandalos, 2001; Xiao & Bulut, 2020). FIML was applied at the scale level, with aggregated scale scores included in the model. No auxiliary variables were included beyond the demographic covariates specified in the primary model, consistent with previous work applying FIML in the context of RI-CLPM (e.g., Khoo et al., 2025). Missing data patterns were examined using Little's test of missing completely at random (MCAR). The test was significant, $\chi^2(892) = 1{,}335$, $p < .001$, indicating that the data were not missing completely at random. In large-scale longitudinal panel studies, deviations from MCAR are common because of intermittent nonresponse within waves and attrition across waves. Moreover, differences between participants with complete versus incomplete data were very small, such that participants with incomplete data had slightly higher T1 risk perceptions ($r = 0.04$, $p = .002$) and lower T1 psychological well-being ($r = -0.05$, $p < .001$) but did not differ in T1 neuroticism ($r = 0.02$, $p = .187$). We thus applied FIML as the primary approach to addressing missing data but performed supplementary analyses without FIML to test the robustness of the findings regardless of missing data.

Transparency and openness

As all analyses are based on secondary datasets that were already publicly available prior to the conceptualization of the research question, no pre-registrations or a priori power analyses were

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performed. Nevertheless, we have transparently reported all analyses, and all datasets, materials, and analytic codes are publicly available. Moreover, the available sample size is large and far exceeds typical sample sizes that are needed to achieve sufficient statistical power for an RI-CLPM (Mulder, 2023). Data and materials are available from https://uasdata.usc.edu/index.php. Analytic codes are available from https://osf.io/khws7/?view_only=7e5a65d447864c3d9f16de1a5e1be6b4.

RESULTS

Descriptive statistics are presented in Table 1, while a correlational table is provided in Table S1. Findings showed that the RI-CLPM model of risk perception, psychological well-being, and neuroticism, while controlling for demographics, was a good fit to the data, $\chi^2(57) = 274.61$, $p < .001$, Comparative Fit Index (CFI) = 0.99, Root Mean Square Error of Approximation (RMSEA) = 0.02, Standardized Root Mean Square Residual (SRMR) = 0.02.

To quantify stability across waves, we estimated unconditional random-intercept models for each construct and derived intraclass correlation coefficients (ICCs). ICCs indicated substantial between-person stability for neuroticism (ICC = 0.74), risk perception (ICC = .61), and psychological well-being (ICC = .68), alongside meaningful within-person variability over time. These results suggest that a considerable proportion of variance reflects stable individual differences, while also indicating sufficient within-person fluctuation to warrant longitudinal modeling. All

TABLE 1 Descriptive statistics.

Variable	*M*	*SD*
Age	47.45	15.62
Gender	3059 males, 4230 females	
Education	11.33	2.32
Income	13780.42	46600.48
Race	5,805 White, 1,484 non-White	
T1 psychological well-being	6.92	1.67
T2 psychological well-being	6.93	1.74
T3 psychological well-being	6.86	1.82
T4 psychological well-being	6.77	1.85
T1 risk perceptions	0.30	0.15
T2 risk perceptions	0.30	0.16
T3 risk perceptions	0.29	0.15
T4 risk perceptions	0.29	0.16
T1 neuroticism	2.65	0.81
T2 neuroticism	2.74	0.81
T3 neuroticism	2.74	0.82
T4 neuroticism	2.77	0.82

Note: Education ranged from 1 = less than first grade to 16 = doctorate degree. Household income ranged from $0 to $1,085,000.

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three variables had strong autoregressive stability ($ps < 0.001$) except for psychological well-being from T1 to T2 ($\beta = 0.06$, $p = .060$).

Between-person correlations

Results from the RI-CLPM showed that the random intercept for psychological well-being was negatively correlated with the random intercept for risk perception ($r = -0.16$, $p < .001$) and neuroticism ($r = -0.49$, $p < .001$), whereas the random intercept for neuroticism was positively correlated with the random intercept for risk perception ($r = 0.22$, $p < .001$).

Within-person coefficients

In the interest of brevity, we summarize key results in Table 2, while full results are summarized in Table S2. Figure 1 illustrates the focal RI-CLPM paths between risk perception and psychological well-being, which are central to the present hypotheses. Neuroticism was modeled simultaneously in the same three-variable RI-CLPM (with both between- and within-person components), but paths involving neuroticism are omitted from the figure to maintain interpretability.

After adjusting for between-person stability, the within-person relationships of psychological well-being on risk perception were non-significant ($\beta s = -0.03$ to -0.04, $ps > .123$), whereas the within-person relationships of risk perception on psychological well-being were significant ($\beta s = -0.07$ to -0.05, $ps \leq .010$) (see Table 2). These relationships were statistically significant across all adjacent waves, although their magnitude varied over time. In other words, we found that an increase of an individual's risk perception relative to their typical level was associated with a *decrease* in psychological well-being relative to their typical level at the subsequent wave. Conversely, we found no evidence for reciprocal relationships between risk perception and psychological well-being.[2]

The within-person associations of risk perception with neuroticism were sporadic. Only an increase of one's risk perception relative to their typical level in Wave 2 was associated with an increase in *neuroticism* from trait-level in Wave 3 ($\beta = 0.06$, $p = .012$). Notably, there was some evidence of a reciprocal relationship between psychological well-being and neuroticism from Waves 3 to 4. A decrease of one's psychological well-being relative to their typical level in Wave 3 was associated with an *increase* in neuroticism relative to their typical level in Wave 4 ($\beta = -0.10$, $p < .001$), whereas an increase of one's neuroticism relative to their typical level in Wave 3 was associated with a *decrease* in psychological well-being relative to their typical level in Wave 4 ($\beta = -0.10$, $p < .001$). Overall, results for neuroticism were much less consistent or replicable across waves.

[2]To test the robustness of the key findings, we also performed a series of robustness checks. First, we performed analyses without including the key covariates (Table S3). Second, we performed analyses without performing FIML to determine whether the key findings would be robust regardless of how missing data were handled (Table S4). Third, we conducted multigroup RI-CLPM analyses by race to examine whether the focal associations differed across groups (Table S5). Across all robustness checks, the key conclusions remained unchanged, such that within-person risk perceptions predicted lower subsequent psychological well-being unidirectionally, while reverse-directional pathways were generally not supported.

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TABLE 2 Summary of RI-CLPM within-person effects of every variable at wave $t-1$ on each variable at wave t.

Wave $t-1$ predictors	Wave 2			Wave 3			Wave 4		
	Risk	Well-being	Neuro	Risk	Well-being	Neuro	Risk	Well-being	Neuro
Risk perceptions	0.14***	−0.07**	0.04	0.19***	−0.06*	0.06*	0.26***	−0.05**	0.02
Psychological well-being	−0.04	0.06	−0.03	−0.03	0.17***	−0.02	−0.03	0.31***	−0.10***
Neuroticism	0.02	0.02	0.16***	0.00	−0.02	0.16***	0.06*	−0.10***	0.19***

Note: All coefficients reported are standardized. The model was a good fit to the data. $\chi^2(57) = 274.61$, $p < .001$, CFI = 0.99, RMSEA = 0.02, SRMR = 0.02. Covariates controlled for included age, gender, education, income, and race.

Abbreviation: CFI, Comparative Fit Index, RI-CLPM, random-intercepts cross-lagged panel model; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual.

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

DISCUSSION

Across four time points spanning 6 years and controlling for key demographics as well as neuroticism, the current study provides longitudinal evidence that within-person increases in risk perception were associated with lower subsequent psychological well-being, whereas within-person changes in psychological well-being were not significantly associated with later risk perceptions. At the between-person level, individuals with chronically higher risk perceptions also tended to report lower overall psychological well-being, indicating stable individual differences that coexist alongside dynamic within-person processes. These results support our hypothesis and further provide support favoring theoretical models predicting a unidirectional association between risk appraisals and subsequent well-being over reverse-directional or bidirectional models. Critically as well, we found no evidence that neuroticism, which was modelled simultaneously with risk perceptions and well-being, was similarly linked to subsequent well-being, indicating that risk perceptions play a unique and independent predictive role that is irreducible to general negative emotionality.

Theoretical and practical implications

A key theoretical advancement made in the present work is that it provides evidence addressing contrasting perspectives on the directionality of the relationship between risk perceptions and well-being, offering relatively stronger support for a unidirectional model in which increases in perceived risk relative to one's typical level preceded later decreases in psychological well-being at the subsequent wave. This pattern suggests that the longitudinal association operated primarily from risk perception to well-being rather than reflecting a reciprocal feedback process. This is further consistent with the perspective of "positive illusions," in which perceiving negative things as being relatively less likely to happen to oneself could be beneficial for one's sense of wellness (Taylor et al., 2000). Drawing on appraisal theory (Ellsworth & Scherer, 2003; Lazarus, 1991), risk perceptions can be understood as arising from threat-specific appraisals (e.g., perceived vulnerability), rather than from general affective states alone. Thus, general feelings of wellness may not substantively elicit shifts in risk perceptions, which arise primarily

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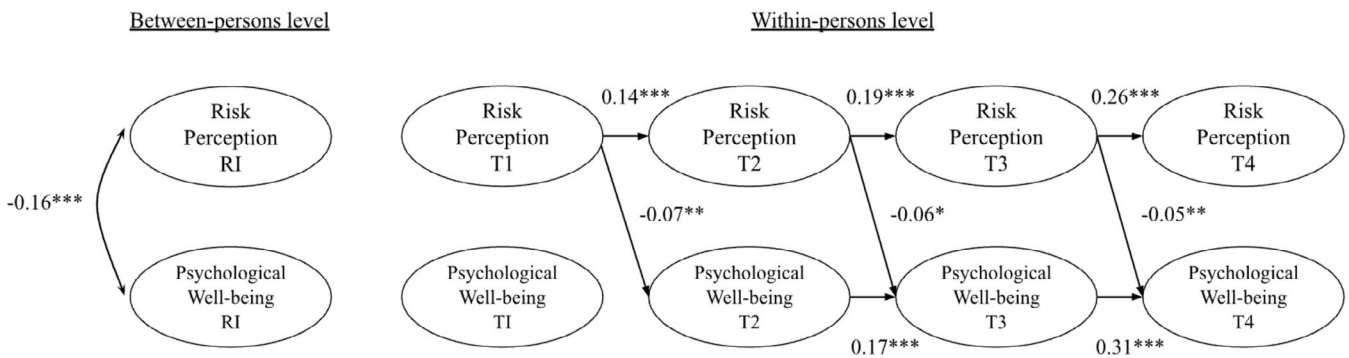


FIGURE 1 Standardized parameter estimates of the random-intercepts cross-lagged panel model (RI-CLPM) for risk perception and psychological well-being. *Note*. Ellipses represent latent factors, where between-person factors (random intercepts) are shown in the left panel and within-person factors across time (T1–T4) shown in the right panel. Values on the single-headed arrows signify standardized path coefficients, and values for double-headed arrows represent correlations between latent factors. For visual clarity, only statistically significant within-person and between-person paths are displayed. Covariates and measurement components are omitted for simplicity but are accounted for in analyses: age, gender, education level, income, and race were adjusted for at the between-person level, while neuroticism was accounted for at both between-person and within-person levels. Focal within-person lagged effects are reported in Table 2 (see Table S2 for complete model results). RI = random intercept; T1–T4 = time 1 to time 4.

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from specific appraisals involving perceived threat rather than general appraisals of wellness. Indeed, within-person changes in well-being were not reliably associated with later changes in risk perception in the present analyses, whereas shifts in risk perception were linked to subsequent well-being. Thus, although risk perceptions showed meaningful within-person variability over time, improvements in psychological well-being did not appear to contribute to predicting this variability, and the explanatory pathway supported was primarily from risk perceptions to well-being rather than the reverse.

Notably, in line with theoretical perspectives arguing that specific perceptions and judgments involving risk ought to have independent and specific explanatory roles that are irreducible to general negativity (Ormel & Rijsdijk, 2000; Scollon & Diener, 2006), our findings support the theoretical specificity of risk perceptions as a unique within-person explanatory factor of future psychological well-being. Although neuroticism reflects a global tendency toward negativity, risk perceptions are specific appraisals concerning the likelihood of external threats (Keller et al., 2012). Indeed, although dispositional aspects of negativity may be associated with well-being, we found that risk perceptions showed more consistent prospective associations with well-being than neuroticism, whose cross-lagged relationships were inconsistent across waves. Risk perceptions involve context-sensitive evaluations that may be more directly tied to behavioral responses and coping strategies. Consistent with this view, recent evidence suggests that threat-related perceptions may be especially damaging as they may be particularly overwhelming in ways that go beyond simply experiencing stress (McLoughlin et al., 2016), possibly because of the anticipatory nature of threat perceptions that captures attention in especially powerful ways (Fournier et al., 2026). Conversely, affective states involving a present-focused sense of safety in which anticipated threats are absent have been found to free cognitive resources (Chua et al., 2023). These findings suggest that there are unique costs to experiencing inflated risk perceptions, which may perpetuate psychological strain independently of one's global tendency toward negative affect, possibly owing to the sustained anticipatory nature of risk perceptions. Future research can examine anticipatory stress and its consequences for attention as a potential mechanism that may explain relationships between risk perceptions and well-being.

Practically, our findings suggest that risk perceptions are not merely passive reflections of distress but may precede changes in psychological well-being over time. Consistent with prior work during crises such as the COVID-19 pandemic, heightened risk perceptions have been associated with greater anxiety and depressive symptoms (Li & Lyu, 2021; Robinson & Daly, 2021). Importantly, these findings should not be interpreted as suggesting that awareness of objective risks is maladaptive, as context-appropriate perceptions of risk may facilitate adaptive behaviors. However, while serving important adaptive functions in motivating threat avoidance or protective behaviors, the present work suggests that there may be costs to such perceptions, such that persistently elevated risk appraisals may contribute to poorer subsequent well-being. The evidence for temporal ordering found in our large-scale, naturalistic sample further supports the argument that temporary elevations in risk appraisals may function as a cognitive–emotional filter that shapes how individuals interpret events, potentially reinforcing future distress (Wise et al., 2020). Moreover, based on recent benchmarks developed for cross-lagged panel models (Orth et al., 2024), the observed within-person associations of risk perception on subsequent well-being ($\beta \approx 0.06$–0.07) fall within the medium range, indicating meaningful longitudinal associations after accounting for substantial autoregressive stability and between-person variance. These effect sizes suggest that risk appraisals in everyday life may have important practical implications for individuals' psychological well-being. Greater

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attention to the role of such perceptions may thus have substantial implications for furthering our understanding of the conditions that foster or hinder psychological wellness across various contexts.

Limitations, constraints to generalizability, and future directions

We note several key limitations and future directions. First, although the study is based on a large-scale public sample across multiple years, the generalizability of the findings is constrained by the cultural specificity of the sample, which consisted exclusively of American participants. Risk perceptions are shaped by cultural norms and values (Weber & Hsee, 1999), and individuals in collectivistic contexts may perceive and cope with risk differently than those in individualistic settings (Wu & Zhong, 2025). Contemporary perspectives further highlight substantial cultural variation beyond simple East–West distinctions (Kitayama & Salvador, 2024), including dimensions such as relational mobility, which may influence risk differences and within-person dynamics. Thus, the between-person associations or within-person processes examined here may not necessarily generalize beyond the current cultural context. In addition, the study period (2014–2020) included the early stage of the COVID-19 pandemic, during which public health messaging and heightened uncertainty may have influenced both perceived risk and well-being. Although the longitudinal design captures associations across multiple years, it remains possible that pandemic-related conditions amplified or altered these relationships.

Second, the study focused on general risk likelihood estimates and did not distinguish between specific domains of risk (e.g., health, financial, or social), which may differ in their psychological consequences (Do et al., 2025; Ferrer & Klein, 2015). Likewise, although the present work is informed by broader models of well-being, the measure does not exhaustively represent all facets of well-being such as eudaimonic indices of well-being, which may show different patterns of association with risk perceptions. Third, although the RI-CLPM framework separated stable between-person differences from within-person change, unmeasured variables may still influence both risk perceptions and well-being, and residual confounding cannot be fully ruled out. In addition, we did not assess potential mediating mechanisms, such as intolerance of uncertainty or perceived control (Morriss et al., 2024), which may help explain how perceived risk influences later well-being. This remains to be examined in future research.

Finally, the analyses relied on relatively long measurement intervals (approximately 2 years between waves), and the observed directional patterns may not generalize to shorter-term dynamics in which risk perceptions and well-being fluctuate more rapidly. Moreover, objective indicators of actual risk exposure were unavailable, preventing differentiation between the relative roles of subjective risk appraisals and real-world events. Elevated risk perceptions could also reflect the accurate anticipation of future stressors or adverse events, and the present analyses do not clearly delineate whether the observed longitudinal associations are attributable to appraisal processes or to the genuine and accurate expectation that anticipated stressors may actually occur. Notably, however, research in other domains has found that subjective processes predict psychosocial outcomes independently and often even more strongly than objective circumstances (Cohen et al., 2008; Singh-Manoux et al., 2005). Nevertheless, future work that directly integrates measures of objective occurrences of adverse events alongside subjective risk appraisals can more clearly disentangle the relative contributions of both subjective and objective risks.

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CONCLUSION

Taken together, these findings offer meaningful implications for both theory and practice. Theoretically, the study advances models of cognitive–affective processing by identifying risk perception as a reliable prospective correlate of later well-being. The results suggest that modifying maladaptive risk appraisals (e.g., through targeted cognitive interventions or public communication strategies) may offer a promising route to improving long-term psychological outcomes. In an increasingly uncertain world, understanding how individuals perceive and respond to risk may be critical for promoting mental health across diverse contexts.

CONFLICT OF INTEREST STATEMENT

The authors disclose no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data and materials are available from https://uasdata.usc.edu/index.php. Analytic codes are available from https://osf.io/khws7/?view_only=7e5a65d447864c3d9f16de1a5e1be6b4.

ETHICS STATEMENT

The present study was exempted from review by the Singapore University of Social Sciences Institutional Review Board under the code APL-0195-2023-EXE-01.

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