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RESEARCH ARTICLE

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The mediating effects of anxiety on the relationships between persistent thinking and life satisfaction: A two-wave longitudinal study in patients with anxiety disorders

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Abstract

Objective: According to cognitive theories, anxiety disorders may result from distorted beliefs, sensations, feelings, and decisions, leading to an overestimation of the danger presented by various stimuli.

Methods: In this two-wave longitudinal study of 435 German patients with anxiety disorders, we assessed the association of negative persistent thinking, anxiety, and life satisfaction.

Results & Conclusion: Structural equation modeling results suggest that persistent thinking may initiate the occurrence of anxiety, which in turn influences a decrease in life satisfaction. The convergence of the evidence from this longitudinal study with earlier results of evidence-based trials fortifies the case supporting the need to identify and reduce cognitive distortions in therapeutic interventions to improve health in people with anxiety disorders.

KEYWORDS
anxiety, anxiety disorders, life satisfaction, persistent thinking

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1 | INTRODUCTION

Anxiety disorders are the most common psychiatric complaint, and they place a significant burden on affected individuals, their loved ones, and wider society (Baxter et al., 2014; Wittchen et al., 2011). The primary symptom of anxiety disorders is a chronic feeling of psychophysiological arousal characterized by a sense of danger and helplessness, accompanied by specific somatic symptoms resulting from stimulation of the vegetative nervous system (Craske et al., 2017). The lifetime prevalence of anxiety disorders is estimated to be 15%–35% (Bandelow & Michaelis, 2022). According to researchers, people with anxiety disorders may have difficulty building social relationships, present poorer academic and work performance, and experience lower life satisfaction and well-being (Craske et al., 2017; Heikkinen et al., 2019; Stein & Heimberg, 2004). Anxiety is also a major risk factor for developing comorbidities, such as depression (Wittchen et al., 2003). Because about 40%–60% of people with anxiety disorders will experience a sustained course of them (Penninx et al., 2011), it is important to quickly identify patients with a poor prognosis, so that the disease burden can be reduced through optimized care and prevention strategies (the naturalistic course of anxiety disorders is characterized by high heterogeneity; see Bruce et al., 2005). This state of affairs requires an understanding of factors that may increase the risk of persistent anxiety. Of particular interest is the assessment of the relationship between anxiety disorders severity and persistent thinking because according to *Clark's* (1986) *Catastrophic Misinterpretation Model*, anxiety disorders can result from distorted beliefs, experiences, feelings, and decisions, leading to an overestimation of the danger of various stimuli. The present paper addresses a problem that arises from these findings and seeks to empirically elucidate the potential mechanism for the impact of these distorted beliefs on well-being through changes in anxiety.

According to LeDoux (2003), anxiety can be an emotional consequence of negative persistent thinking (obsession). This psychopathological type of information processing is based on dysfunctional assumptions and core beliefs that result from misinterpretations of information (Bresler, 2020). Obsessions are characterized by passively maintaining attention to recurring thoughts, ideas, or impulses (Papageorgiou, 2008). Persistent thoughts are *egodystonic*, that is they occur against the individual's will, making it impossible to focus on anything else (Langlois et al., 2000). According to Beck et al. (1988), cognitive distortions such as obsessions cause increasing tension and pathological anxiety to a person because they lead to the absorption of perceived threat and an underestimation of one's own coping possibilities. This relationship can also be explained on the basis of self-regulatory executive function (S-REF; Wells & Matthews, 1996) theory, according to which information-processing mechanisms initiate and sustain persistent thinking and its pathological health consequences. The S-REF views ruminations, obsessions, and threat monitoring as maladaptive coping strategies that lead to the perpetuation of emotional disturbances. According to this paradigm, negative persistent thinking is problematic for emotion self-regulation because of its multiple effects on cognitive processing. For example, preoccupation can focus a person's attention on negative judgements, thus preventing the processing of positive information that could change negative beliefs. On the other hand, trying to suppress obsessive thoughts can activate automatic processing at a low level of cognition, which in turn increases the likelihood that unwanted material will intrude into one's consciousness (Papageorgiou, 2008). Accordingly, individuals with anxiety disorders may prefer worrying as a coping strategy to deal with negative intrusive thoughts, which consequently leads to behavioral reactions, in the form of avoidance and comfort-seeking, and emotional symptoms, such as anxiety, tension, dissociation, and even panic attacks and depression (Reinholdt-Dunne et al., 2019).

There is strong support in the literature for the assumption that obsessive thinking not only reflects unresolved problems or an inability to cope with worries but also predicts psychological suffering (Taku et al., 2009; Tsai & Lu, 2019; Wong et al., 2019). It would follow that individuals who report high levels of persistent thinking would also declare low levels of life satisfaction (Ghafil, 2023; Park et al., 2010). Rather indirect effects were obtained by Skalski et al., (2020, 2022) in a study of the psychological effects of COVID-19, in which persistent pandemic thinking was found to have dysfunctional effects on mental health because it intensified anxiety and disrupted well-

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being. On the other hand, studies of people experiencing posttraumatic growth have consistently indicated that active information processing helps one develop some understanding of life events, thereby helping one cope with difficulties in a more reflective and purposeful way rather than in an automatic and intrusive way, which in turn reduces emotional tension (anxiety and distress), thereby increasing a sense of meaning in life and life satisfaction (Triplett et al., 2012).

On the basis of the literature review just described, we decided to test the hypothesis that the association of negative persistent thinking and life satisfaction in people with anxiety disorders would be mediated by anxiety (in light of previous works, we believe that persistent thinking will have an even stronger effect in people with anxiety disorders than in the general population; Ruscio et al., 2015). Because most of the available reports in this area are cross-sectional in nature (e.g., Olatunji, Naragon-Gainey, et al., 2013; Szabo et al., 2017), we adopted a longitudinal perspective in this study, so that it would be possible to verify whether individual variables are related in the way proposed by the theories.

2 | MATERIALS AND METHODS

2.1 | Participants and procedure

This project, conducted with the approval of the university's ethics committee, consisted of a two-wave longitudinal study across 2 months. Data were collected between 2017 and 2023 among patients with anxiety disorders under the care of Schön Klinik in Bavaria, Germany. All participants at the time of the first measurement were hospitalized for a diagnosis of an anxiety disorders (F41 according to *International Classification of Disease* [11th ed.; WHO, 2021). During the 2 month study time, patients participated in "Coping with Anxiety" therapy, including exposure to real situations (climbing a tower, riding a gondola, visiting a mine, etc.), and remained on pharmacotherapy (i.e., selective serotonin reuptake inhibitors). Each participant gave informed consent. They were given anonymous paper-and-pencil questionnaires at the meeting with the attending physician. The date of the first survey was recorded in each participant's chart, and the second survey was made available 2 months later, at the follow-up visit. To guarantee anonymity, participants were asked to sign both surveys with an invented ID that did not identify them. The retention rate was 67%. We analyzed data from 435 participants ages 18–63 years (M = 32.4, SD = 12.3) who completed questionnaires during the two waves. The procedure for both measurements consisted of completing questionnaires that measured negative persistent thinking, anxiety, and life satisfaction. The time to complete the survey was about 7 min.

2.2 | Measures

Negative persistent thinking was assessed with the Obsession subscale of the Obsessive-Compulsive Inventory (OCI; Foa et al., 2002) in German standardization form (Gönner et al., 2007). In the OCI, the respondent reports the frequency of various phenomena during the past week on a scale that ranges from 0 (*not at all*) to 4 (*extremely*). The subscale consists of three items (α = .83). Example statements are "I find it difficult to control my own thoughts" and "I frequently get nasty thoughts and have difficulty in getting rid of them."

Anxiety was assessed with the Anxiety subscale of the Brief Symptom Inventory (BSI; Derogatis, 1982) in German (Geisheim et al., 2002). In the BSI, the respondent reports the frequency of various phenomena during the past week on a scale that ranges from 0 (*not at all*) to 4 (*extremely*). The subscale consists of six items (α = .89). Sample statements are "How much were you distressed by… spells of terror or panic?" and "… feeling so restless you couldn't sit still?"

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To measure life satisfaction, we used the Satisfaction with Life Scale (SWLS; Diener et al., 1985) in a German adaptation (Janke & Glöckner-Rist, 2014). The SWLS consists of five items that load onto a single factor ($\alpha = .91$) that assesses subjective well-being. The participant's task is to respond to each statement on a scale that ranges from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample statements are 'In most ways my life is close to my ideal' and "I am satisfied with my life."

2.3 | Statistical analyses

Statistical analysis of the data was carried out in IBM SPSS Statistics (Version 28) and IBM SPSS Amos 28. We verified the normality of the distributions using the Kolmogorov–Smirnov test. We used Levene's test to verify the homogeneity of variances. The results obtained allowed the use of parametric tests. To determine the relationships between variables, Pearson's *r* correlation analysis was used. We employed path analysis using the maximum-likelihood method. Goodness-of-fit indices (Byrne, 2016) included: comparative fit index (CFI; required value >.9, root-mean-square error of approximation (RMSEA; required value <.08, and a statistically insignificant χ^2 test value. The significance level was set at $p \leq .05$.

3 | RESULTS

Before conducting our main analysis, we examined correlations among persistent thinking, anxiety, life satisfaction, age, and gender (see Table 1).

To test our hypothesis on the mediating role of anxiety in the association of persistent thinking and life satisfaction, we conducted a longitudinal mediation analysis using structural equation modeling (SEM) on the data set of the two waves. We investigated whether persistent thinking at the first wave had a longitudinal effect on life satisfaction measured at the second wave and whether this is mediated by anxiety (see Figure 1). An assumption in this procedure is *stationarity* (Kenny & Harackiewicz, 1979), which implies that "the degree to which one set of variables produces a change in another set remains the same over time" (Cole & Maxwell, 2003, p. 560). Compared with three or more waves, the stationarity assumption is necessary to investigate the longitudinal associations in two-wave longitudinal studies. Thus, in Cole and Maxwell's (2003) procedure it is assumed that the effect of anxiety on life satisfaction is constant over time, allowing for a test of longitudinal mediation in our two-wave panel data instead of three waves.

TABLE 1 Means (standard deviations) and correlations between observed variables in two waves.

	M (SD)	1.	2.	3.	4.	5.	6.
1. Persistent thinking T1	2.3 (1.2)	--					
2. Anxiety T1	1.4 (0.9)	.56***	--				
3. Life satisfaction T1	3 (1.3)	−.26***	−.57***	--			
4. Persistent thinking T2	2.3 (1.1)	.92***	.47***	−.21***	--		
5. Anxiety T2	0.8 (0.6)	.61***	.64***	−.40***	.62***	--	
6. Life satisfaction T2	3.7 (1.4)	−.32***	−.48***	.68***	−.31***	−.68***	--
Age		.06	.05	.07	.06	.06	.03
Gender (0 = female, 1 male)		−.10*	−.16***	.10*	−.11**	−.12**	.11*

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

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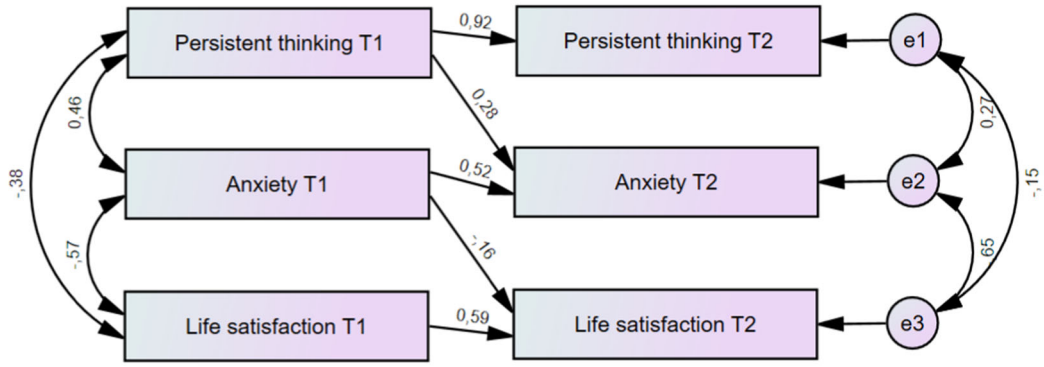

FIGURE 1 Empirical longitudinal model, with relations among persistent thinking, anxiety, and life satisfaction (coefficients are standardized regression estimates).

In sum, this test allowed us to examine whether (1) persistent thinking at Time 1 (T1) predicted anxiety at Time 2 (T2) and (2) whether anxiety at T1 predicted life satisfaction at T2, above and beyond the autoregressive effects (i.e., paths predicting a construct from its prior level). As depicted in Figure 1, included in the longitudinal model were the autoregressive paths, the cross-time paths, and correlations among the three constructs within T1 and within T2 (dotted arrows).

In our model, the three variables were allowed to covary at both T1 and T2. The conceptual model showed good fit with the data, $\chi^2(4) = 3.09$, $p = .543$; CFI = 0.99; RMSEA = 0.001 (90% confidence interval [0.001–0.058]). As shown in Figure 1, in this model T2 anxiety was predicted by persistent thinking at T1, and T2 life satisfaction was predicted by anxiety at T1, controlling for the initial level of the constructs. The two cross-time paths and the three autoregressive paths were significant and positive. Both the paths, from T1 persistent thinking → T2 anxiety ($B = .16$, $SE = .06$, $p = .01$), and T1 anxiety → T2 life satisfaction ($B = -.30$, $SE = .08$, $p < .001$), were significant, which indicates partial mediation. We also examined the total indirect effect (i.e., multiplication of path estimates) and found a significant estimate ($B = .08$, $SE = .02$, $p < .001$). Overall, our model explained 85% of the variance of life satisfaction at T2.

4 | DISCUSSION

In this two-wave study, we looked for evidence of links among negative persistent thinking, anxiety, and well-being among people with anxiety disorders. In addition to previous correlational reports (e.g., Skalski et al., 2020, 2022), the results of this study are, to our knowledge, the first to suggest a causal relationship between these concepts. As expected, persistent thinking appeared to positively predict anxiety, which in turn negatively predicted life satisfaction. This implies that obsessions may be detrimental to the health of people with anxiety disorders because they lead to dysfunctional emotional, cognitive, and behavioral consequences. The resulting effects can be described using the S-REF theory, which posits that ruminations and obsessions represent maladaptive coping strategies and, as such, lead to the perpetuation of emotional disturbances. Our findings correspond to those of Arnáez et al. (2021), who in addition to the negative correlation between persistent thinking and anxiety, indicated that the relationship may be further explained by overestimation of threats and assessment of the likelihood of thought–action fusion. Satici et al. (2020) noted that the relationship between uncertainty intolerance and well-being may be serially mediated by persistent thinking and anxiety. In contrast, in Skalski et al.'s (2022) study, resilience appeared to protect well-being by reducing persistent thinking and anxiety (serially).

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The consequences associated with persistent thinking were found to be more pronounced in women than men, which is in line with the consensus in the literature, both in studies of clinical patients (MacSwain et al., 2009) and nonclinical participants (Arnáez et al., 2017). However, conclusions in this regard should be made with some caution because the magnitude of the correlation effects was weak, and the model fit did not allow for sex to be included as a covariate in the SEM. Pascual-Vera and Belloch (2018) analysed the content of obsessive thoughts by gender and noted that women were significantly more likely to experience intrusive beliefs related to eating disorders and appearance defects.

Our results have applied value and suggest that treating persistent thinking in people with anxiety disorders may have a mediated effect, through reductions of anxiety, in improving well-being in this clinical group. Future therapeutic interventions in anxiety disorders may consolidate new strategies for coping with obsessions by shifting attention from the thoughts themselves to the reactions they elicit to challenge the beliefs that lie at the root of persistent thoughts (Allen, 2022). The beginning of therapeutic work, in addition to psychoeducation on the cognitive model, may require that one learn how to identify automatic thoughts to identify cognitive distortions and the unwanted avoidant behaviors (compulsions) undertaken under their influence that are geared toward discharging obsessions but actually lead to the development of intrusive thoughts (Olatunji, Davis, et al., 2013). In the mastery of stopping compulsions, *desensitization*, which consists of putting the patient into a state of deep relaxation and, in the next step, exposing them to situations that cause a gradual increase in the level of anxiety, seems to be helpful. Gradually increasing the strength of the aversive stimulus, alternating with relaxation, can raise the threshold for a patient's anxiety response (Chen et al., 2015).

Before generalizing our results more broadly, we should note some limitations of this study. First, data were collected only among people with anxiety disorders who had no comorbidities at the time of the study, which limits the generalizability of the results to other clinical samples or to the general population. Second, patients participated in cognitive-behavioral therapy and remained on pharmacotherapy during the study, which may have impacted the severity of the experience of anxiety. On the other hand, treatment should not have interfered with predictive effects between model terms, whose evaluation was the purpose of this research. Third, we tested only the effect of persistent thinking on life satisfaction through anxiety; the partial mediation effect we obtained indicates the potential presence of other mediating variables that were not controlled for in this study. Finally, our data are longitudinal which is an important advance, but more time points would be helpful in future data collection efforts.

In this longitudinal study, we have demonstrated a partial mediating role for anxiety in the relationship between negative persistent thinking and life satisfaction in individuals. The data we obtained highlight the role of cognitive processes in anxiety disorders and indicate that life satisfaction may decrease under the influence of anxiety, the origins of which can be traced to cognitive distortions arising from interpretations based on dysfunctional assumptions and core beliefs. Thus, persistent thinking may be a simple and noninvasive indicator of risk for the development and persistence of anxiety disorders and the detriment they cause in people's satisfaction with life.

AUTHOR CONTRIBUTIONS

Methodology: Sebastian Binyamin Skalski-Bednarz, Karol Konaszewski, Andreas Hillert, and Janusz Surzykiewicz. *Formal analysis*: Sebastian Binyamin Skalski-Bednarz, Karol Konaszewski, and Loren L. Toussaint. *Investigation*: Sebastian Binyamin Skalski-Bednarz and Loren L. Toussaint. *Writing—original draft preparation*: Sebastian Binyamin Skalski-Bednarz. *Writing—review and editing*: Sebastian Binyamin Skalski-Bednarz, Karol Konaszewski, Loren L. Toussaint, J-PH, Andreas Hillert, and Janusz Surzykiewicz. All authors have read and agreed to the published version of the manuscript.

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CONFLICTS OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data sets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

ETHICS STATEMENT

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Ethics Committee of the University of Economics and Human Sciences in Warsaw. Informed consent was obtained from all individual participants included in the study.

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