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Falling Into Nothingness: Modeling Suicidal Ideation as the Person × Situation Interaction of Personality Functioning and Loneliness

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Suicidal ideation (SI) is understood to emerge usually from the interplay of stable vulnerabilities and fluctuating situational stressors. This study explicitly tested this notion by examining whether impairments in personality functioning moderate the relationship between momentary loneliness and SI in daily life. A total of 180 participants ($N = 85$ inpatients, $N = 95$ community members) completed a baseline assessment of personality functioning (Operationalized Psychodynamic Diagnosis Structure Questionnaire) and a signal-contingent 10-day ecological momentary assessment of loneliness and passive SI. Linear mixed-effects models disaggregated between- and within-person components of loneliness and examined both concurrent and lagged effects on SI, including interactions of within-person loneliness with personality functioning. There were 9,001 observations in total ($M = 48.37$, $SD = 18.82$, per participant). Impairments in personality functioning were associated with higher mean levels of loneliness and SI. At the same measurement point, within-person increases in loneliness were associated with heightened SI, particularly among individuals with more severe impairments in personality functioning. Prospective models failed to identify a significant lagged effect of loneliness or its interaction with personality functioning; only trait-level loneliness and the level of personality functioning remained predictive of subsequent SI. Findings support a Person × Situation interaction model of SI, indicating that experiences of loneliness are a particularly strong risk factor for SI for individuals with low levels of personality functioning. By integrating trait- and state-level perspectives on risk, ecological momentary assessment offers a promising tool for capturing dynamic processes and real-time, personalized intervention approaches.

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The data are available at https://osf.io/hjrba/?view_only=95f5e9f70c53443983b3b07893822516.

The experimental materials are available at https://osf.io/hjrba/?view_only=95f5e9f70c53443983b3b07893822516.

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General Scientific Summary
This study examined whether people with difficulties in understanding themselves and building close relationships with others are at increased risk of suicidal thoughts when they feel lonely. The findings suggest that loneliness and suicidal thoughts are more strongly linked in this vulnerable group than in others, which may help clinicians identify individuals at higher risk and tailor support accordingly.

Keywords: personality pathology, loneliness, suicidal ideation, ecological momentary assessment, Person × Situation interaction

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In recent years, loneliness has garnered attention as a significant public health concern and is now at the forefront of international research and policy agendas (Office of the Surgeon General, 2023; Qualter et al., 2022). Loneliness is increasingly recognized not only as a painful subjective experience but also as a risk factor for both mental and physical health (Holt-Lunstad, 2024). For example, loneliness was longitudinally associated with anxiety and depression symptoms (Wickramaratne et al., 2022) and also with the new onset of depression (Mann et al., 2022). From a theoretical perspective, loneliness is understood as a biologically ingrained motivational state that has been likened to hunger or thirst and is evolutionarily adaptive in that it prompts individuals to seek reconnection (J. T. Cacioppo & Cacioppo, 2018; Hawkley & Capitanio, 2015). On this basis, Qualter et al. (2015) developed the reaffiliation motive model, proposing that loneliness activates a set of cognitive-affective processes aimed at restoring social bonds, thus positioning loneliness not as inherently pathological but as a normative emotional signal that may, under conducive conditions, lead to reparative action. This view is supported by a recent meta-analysis (Ernst, Niederer, et al., 2022) that demonstrated a global increase in loneliness in conjunction with the COVID-19 pandemic, suggesting it was a collective response to unprecedented circumstances, as many were confronted with unwanted social isolation due to externally imposed restrictions on social contact. Previous research has also highlighted that loneliness increases following more normative life transitions such as parenthood and marriage, because they alter social networks and routines (Buecker et al., 2021). However, at the same time, loneliness plays a central role in contemporary theoretical models of suicide, such as in the interpersonal theory of suicide (Joiner, 2005), as part of which thwarted belongingness—the subjective sense of being disconnected or excluded—is a necessary condition for suicidal desire. A systematic review of longitudinal studies has found consistent, positive associations between loneliness and both suicidal ideation (SI) and behavior (McClelland et al., 2020).

This polyvalent nature of loneliness, ranging from a ubiquitous human experience to a potential risk factor for suicidality, raises important questions for both research and clinical practice as to why the same experience may have different implications across individuals. One of the differences might lie in a person's disposition. A theoretical lineage for this idea can be traced to Fromm-Reichmann (1959), who, based on clinical observation, highlighted that people "vary a great deal in their tolerance of aloneness" (p. 2). She described how solitude, as an enriching form of chosen aloneness, can be enjoyed, and unwanted, temporary aloneness can be well integrated by a mentally healthy, socially connected individual. However, in individuals in or at risk of psychosis, loneliness is more likely to be linked to terrifying, intolerable states, which individuals desperately try to escape from.

From the perspective of suicide research, this maps onto the construct of psychache: Shneidman (1993) posited that suicide is not primarily a desire to die, but rather an attempt to escape unbearable psychological pain that arises from unmet psychological needs, particularly the need for affiliation, belonging, and relational significance—all of which are deeply threatened in severe experiences of loneliness. Newer psychological theories, such as the integrated motivational-volitional model of suicidal behavior (O'Connor & Kirtley, 2018), further contextualized the emergence of SI against a person's background (in the sense of individually different vulnerability and resilience factors). This also reflects the evidence that suicidal crises do not merely arise from external or situational factors, but from their interplay with more stable, time-invariant characteristics of the person (Turecki et al., 2019).

This is where an exploration through the lens of contemporary psychodynamic theory and personality science becomes useful to illuminate how enduring personality structures shape the association of loneliness with suicidal crises. Specifically, within this work, we explore the assumption that the strength of this link is different at different levels of personality functioning. Over the past decade, personality functioning has become a cornerstone of dimensional models of personality disorders, as reflected in the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition, Alternative Model for Personality Disorders and *International Statistical Classification of Diseases and Related Health Problems*, 11th edition. Both frameworks conceptualize personality pathology as a continuum, rather than as discrete categories, and emphasize a global dimension of impairment of the severity of self- and interpersonal dysfunction as the defining feature (American Psychiatric Association, 2013; Morey et al., 2022). The present study operationalized personality functioning using the 12-item version of the Operationalized Psychodynamic Diagnosis Structure Questionnaire (OPD-SQS; Ehrenthal et al., 2023), a self-report measure derived from the multiaxial system of OPD (Arbeitskreis OPD, 2024; OPD Task Force, 2008). The OPD captures personality functioning within its structure axis as a hierarchical and developmentally rooted capacity shaped by early internalized object relations (Doering et al., 2014). This approach differs conceptually from descriptive trait models (e.g., the five-factor model) in that it focuses on the structural integration of personality, rather than stylistic differences between individuals. The OPD-SQS assesses personality functioning as three interrelated domains: self-perception, referring to the ability to access and differentiate internal states and maintain a coherent sense of self; interpersonal contact, encompassing the capacity to initiate and sustain

emotionally meaningful relationships; and internal object relations, reflecting the stability, valence, and complexity of internal representations of others. Obbarius et al. (2021) showed that the OPD-SQS and its short forms exhibit a pronounced general factor that accounts for the majority of variance within a large patient sample, justifying the use of the total score as an indicator of overall severity. Similarly, Zimmermann et al. (2020) demonstrated that different widely used self-report measures of personality disorder severity, including the OPD-SQS, can be scaled on a common latent dimension, reflecting the shared underlying construct of general personality. Investigations employing dimensional conceptualizations of personality functioning, including the OPD-SQS total score (Ernst, Brähler, et al., 2022; Gemke et al., 2024), have been shown to be associated with SI and behavior (Boone et al., 2025; Kampe et al., 2018; Williams et al., 2023). However, none of them have tested the level of personality functioning as a potential modifier of the effects of loneliness. Conceptually, the closest operationalization of this question was achieved in experimental studies that tracked how responses to social disconnection differed between individuals with a borderline personality disorder (BPD) diagnosis versus others, thus employing a categorical distinction. Therefore, they are informative in the context of the present research question, especially given arguments that BPD may effectively index general personality dysfunction due to its overlap with the general factor of personality pathology and its strong emphasis on impairments in self and interpersonal (Sharp et al., 2015). Furthermore, social disconnection was induced through tasks that simulate exclusion or rejection. Although exclusion and rejection are not the same as loneliness, they share core features of the experience, namely, unmet needs for belonging and social connection (S. Cacioppo & Cacioppo, 2016). In studies using the "cyberball" paradigm, as part of which participants experience exclusion from a virtual ball game, individuals with BPD reacted comparatively more negatively, felt less like they belonged, less in control, and experienced greater threats to their self-esteem than controls without a BPD diagnosis (Dixon-Gordon et al., 2013; Domsalla et al., 2014). They reported greater emotional arousal during exclusion and anger after the game than healthy controls and depressed patients (Ernst et al., 2018). Also, different from chronically depressed patients without a personality disorder diagnosis, individuals with BPD further reported other-focused negative emotions and dangerous behavioral intentions such as self-harm (Seidl et al., 2020).

While the above-summarized experimental studies provide valuable insights into differential reactions to social disconnection under controlled conditions, other study types are needed to understand how loneliness and SI co-occur in daily life: In a student sample employing six assessments per day, daily loneliness was associated with both same-day and next-day SI (Mournet et al., 2022). Another daily-diary investigation of loneliness and SI in the pandemic context (Lewis et al., 2023) found that trait loneliness was associated with higher levels of SI, and that individuals high in avoidant attachment were particularly vulnerable to suicidal thoughts on days with reduced in-person contact. However, within-person loneliness was not associated with SI, mirroring other studies employing more frequent ambulatory assessment methods in clinical and at-risk samples, which reported contemporaneous, but no prospective associations of loneliness and SI (Kivelä et al., 2024; Kleiman et al., 2017; Wolf et al., 2025). While international evidence consistently supports a positive association between trait loneliness and SI (McClelland et al., 2020), the lack of consistently robust prospective state-loneliness effects suggests that this relationship may not be universal. Instead, it is likely shaped by individual vulnerability factors (one of which we suggest is the level of personality functioning) that modify the relevance of loneliness for suicidal crises over time. However, to our knowledge, no study to date has used a transdiagnostic, dimensional conceptualization of personality functioning and ascertained whether it modifies the association of loneliness with SI in real-life contexts. Such an approach would give insight into the interpersonal dynamics of personality pathology (Hopwood et al., 2013) with high ecological validity (Kaurin et al., 2023). For the first time, the present work thus aimed to expand on previous research by using ecological momentary assessment (EMA), that is, an intensive longitudinal data collection of loneliness and SI in daily life. Specifically, we aimed to test the level of personality functioning as a moderating variable of the association between momentary loneliness and SI, hypothesizing that individuals with lower personality functioning are more likely to experience suicidality during moments of loneliness.

Method

Data were collected as part of the project TempRes ("Temporal Variability of Risk and Resilience Factors for Suicidal Ideation"; Ernst, Tibubos, et al., 2022) from 2022 to 2024. The project consisted of different parts. The present work uses the baseline assessment and the 10-day EMA protocol following it.

Participants

Participants were recruited from two sources: the German general population and inpatient units of the Department of Psychiatry and Psychotherapy as well as the Department of Psychosomatic Medicine and Psychotherapy at the University Medical Center Mainz, Germany. The population sample was recruited via mailing lists of the departments and social media advertisements on Twitter. These did not mention SI, but referred to the assessment of changes in mental health and well-being throughout the day. Individuals in inpatient treatment were approached in person by trained research staff who were independent from the clinical care team. Individuals in the general population received written information about the study and were provided with contact details (email and phone number) in case of questions. Interested patients were informed face-to-face, and research staff assisted them with installing the study app that delivered push notifications for the EMA protocol. Before participation, all individuals received detailed information regarding the study's purpose, procedures, data collection, anonymity, and data protection measures. They were informed that participation was voluntary and that consent could be withdrawn at any time without adverse consequences. Informed consent was obtained from all participants. To incentivize participation, all participants could choose to enter a raffle to win a supermarket voucher worth 15€.

For ease of reference, the general population and inpatient samples are hereafter referred to as the "participant groups." Inclusion criteria were identical for both groups: participants had to be at least 18 years old, have sufficient German language proficiency, not be imminently suicidal (self-assessment/self-report), and possess a personal smartphone. No additional exclusion criteria were applied.

For the present investigation, we selected participants with at least 11 observations (i.e., more than one full day) in the EMA protocol, irrespective of how they were spaced. This yielded an analysis sample of 180 participants in total (population sample: $N = 95$, patient sample: $N = 85$) with altogether 9,001 observations.

Procedure

The signal-contingent design was realized through the Samply app (Shevchenko et al., 2021), which sent prompts over the next 10 days, starting in the morning after study entry and baseline assessment. The baseline assessment and EMA protocol were linked by an anonymous code that participants generated themselves. Ten prompts per day were sent at pseudorandomized intervals between 8 a.m. and 10 p.m., with a minimum interval of 45 min. Each message contained the same link to the EMA survey on SoSci Survey that was active for 15 min and then filled out in the browser. Participants were informed that the links were only valid for this time and instructed not to change their daily routines but to attend to those possible to fill out at a given time. Hence, we did not expect to attain perfect compliance (i.e., 100 prompts/person), but still decided on a high-frequency sampling interval as the project aimed to capture constructs subject to rapid changes. The study procedure and its contents were approved by the ethics committee of the Department of Psychology of the University of Mainz (2021-JGU-psychEK-019).

Information and Measures

At the baseline assessment, we assessed sociodemographic information. It also included the 12-item OPD-SQS (Ehrenthal et al., 2023) to assess the level of personality functioning. It has been validated based on multiple representative population samples and clinical samples and showed good internal consistency, measurement invariance across age, gender, and immigrant groups (Ehrenthal et al., 2023; Klein et al., 2025; Obbarius et al., 2019). The measure comprises the three scales self-perception, interpersonal contact, and relationship model, with four items each, for example, "I sometimes feel like a stranger to myself." Response options range from $0 =$ *fully disagree* to $4 =$ *fully agree*. The sum score ranges from 0 to 48, with higher scores indicating more severe impairments in personality functioning. In the combined sample, its internal consistency was excellent ($\omega = .91$).

The baseline assessment further included the depression module of the Patient Health Questionnaire (PHQ-9), a widely used self-report instrument designed to screen for depressive symptoms based on *Diagnostic and Statistical Manual of Mental Disorders* criteria (Kroenke et al., 2001). The PHQ-9 consists of nine items rated on a 4-point Likert-type scale, ranging from $0 =$ *not at all* to $3 =$ *nearly every day*, assessing symptom severity over the past 2 weeks. Its ninth item specifically addresses SI by asking respondents how often they have been bothered by "thoughts that you would be better off dead, or of hurting yourself in some way." This item is frequently dichotomized for screening purposes or to ascertain prevalence rates in large cohort studies (e.g., Otten et al., 2022), and in the present work, we also use it to calculate the prevalence of SI at baseline.

The EMA protocol comprised fewer than 25 items per measurement occasion. Questions regarding state variables, of which the present work focuses on loneliness and SI, used the same response format: The instruction at the top of the screen that applied to all items was "In this moment, … ." Participants responded on a Likert-type scale ranging from $1 =$ *not at all* to $7 =$ *very*. To assess loneliness, we used a single, direct item ("I feel lonely") adapted from previous intensive longitudinal studies (e.g., Buecker et al., 2020). To assess SI, the protocol included items adapted from the German version of the Beck Scale for Suicide Ideation (Kliem et al., 2017). Here, we focus on passive SI, assessed with the item "I have the wish to die," as we conceive of passive SI as the starting point of suicidal crises.

Statistical Procedure

Descriptive statistics are reported as mean values and standard deviations or as numbers and percentages, respectively. Data were processed and analyzed using R Version 4.5.0 with the packages dplyr, EMAtools, esmpack, ggplot2, lme4, lmerTest, interactions, MuMin, nlme, patchwork, psych, pwr, and rmcorr. Missing data were not imputed. For all analyses, we first report the results within the combined sample and then stratify by participant group.

Reported group-level averages of items assessed as part of the EMA protocol were first calculated at the person level and then averaged across the participant group. This also applies to percentages, as we coded the SI item in a binary manner to report the percentage of beeps and assessment days per person that included an endorsement of at least some level (i.e., ratings >1) of SI.

To investigate the respective relevance and the interplay of the level of personality functioning and momentary loneliness for the statistical explanation of momentary SI, we calculated mixed-effects models of participants' responses on the passive SI item. We calculated six models in total: First, a model regressing momentary SI on momentary loneliness at the same measurement point, which was then carried out stratified by participant groups; and then a model regressing momentary SI on momentary loneliness at the preceding measurement point, which was then also repeated separately within the participant groups. Lagged predictors were computed using temporally ordered observations within the same calendar day (not overnight), that is, for each time point t, lagged variables at $t - 1$ were included only if both t and $t - 1$ occurred on the same day. If the next assessment occurred on the following day, no lagged value was assigned.

Loneliness was disaggregated into its within- and between-person components (Bolger & Laurenceau, 2013; Curran & Bauer, 2011) by calculating the person-level mean and subtracting it from the responses at each measurement point, and then including both values as predictors in the models. We included a random intercept and a random slope for within-person loneliness to account for individual differences not only in baseline levels of SI, but also in heterogeneous associations of loneliness with SI. In contrast, between-person predictors such as the person-mean of loneliness and the OPD-SQS sum score represent time-invariant characteristics at the participant level and were, therefore, modeled with fixed slopes. The interaction between within-person loneliness and OPD-SQS was included as a fixed effect to test whether personality functioning moderates the moment-to-moment association between loneliness and SI. To account for the temporal structure inherent in intensive longitudinal data, a first-order autoregressive covariance structure was specified as each observation is correlated with the one immediately preceding it, with the strength of that correlation declining exponentially as the interval between observations increases (Bolger &

Laurenceau, 2013). Model performance was evaluated using the conditional R^2 (R^2c), which quantifies the proportion of total variance explained jointly by fixed and random effects, thereby offering a comprehensive estimate of the model's explanatory power (Nakagawa & Schielzeth, 2013).

We conducted power analyses based on the available data, once for the size of the combined sample ($N = 180$) and the smallest subsample ($N = 85$), considering the criterion's intraclass correlation and number of observations. Regarding the combined sample, large effects can be detected with high power (>0.80) even with relatively few observations per participant (e.g., 20–30). In contrast, medium effects require approximately 50 completed responses per person to approach conventional power thresholds. Small effects remain underpowered. For the smallest subsample, large within-person effects can be detected with acceptable power, but medium effects require a completion rate that is higher than the mean number of responses observed in the sample (60+). Small effects are underpowered across the full range of response rates. With this in mind, we report models in the stratified participant groups only in the online supplemental materials and focus on the combined sample.

Transparency and Openness

The study was not preregistered. All data and code underlying the present work are provided via the Open Science Framework at https://osf.io/hjrba (Ernst, 2025).

Results

Participant Characteristics

The combined sample included 110 women, 66 men, and four individuals identifying as diverse. Gender proportions were similar in the population (62.1% women) and patient sample (60% women). In the population sample, participants' age ranged from 24 to 68 ($M = 41.38$, $SD = 10.07$), and in the patient sample, it ranged from 18 to 73 ($M = 37.42$, $SD = 13.01$). The mean OPD-SQS sum score was 25.52, $SD = 11.05$ (population: $M = 21.47$, $SD = 9.29$; patients: $M = 30.05$, $SD = 11.15$). At baseline, based on the PHQ-9 SI item, 65 (39%) participants reported SI ($N = 20$, 21.1% of the population and $N = 45$, 52.9% of the patient sample).

Participants' mean number of responses within the EMA protocol was 48.37 ($SD = 18.82$). As the largest possible number of observations per person was 100, the number of responses can be directly interpreted as their compliance with the protocol. The mean level of loneliness was $M = 2.98$, $SD = 1.60$ (population: $M = 2.14$, $SD = 1.29$; patients: $M = 3.93$, $SD = 1.36$), and the mean level of SI was $M = 1.94$, $SD = 1.36$ (population: $M = 1.44$, $SD = 1.01$; patients: $M = 2.50$, $SD = 1.49$). The binary coding of the SI item within the EMA protocol showed that more than a third of observations included ratings of some level of SI (percentage of the total number of observations): $M = 0.36$, $SD = 0.42$ (population: $M = 0.17$, $SD = 0.34$; patients: $M = 0.58$, $SD = 0.40$). This corresponded to a proportion of $M = 0.45$ ($SD = 0.45$) of days with such reports (population: $M = 0.21$, $SD = 0.35$; patients: $M = 0.70$, $SD = 0.39$).

Correlations

In the combined sample, there were moderate, positive correlations between personality dysfunction and participants' mean levels of loneliness ($r = .518$, $p < .001$) and SI ($r = .540$, $p < .001$) averaged across the EMA protocol (Figure 1). Correlations were also calculated stratified by group (population: OPD-SQS and mean loneliness: $r = .479$, $p < .001$; OPD-SQS and mean SI: $r = .321$, $p < .001$; patients: OPD-SQS and mean loneliness: $r = .320$, $p < .001$; OPD-SQS and mean SI: $r = .547$, $p < .001$).

The repeated-measures correlation of loneliness and SI within the EMA protocol was $r = .396$, $p < .001$ (Figure 2). It was $r = .240$, $p < .001$, within the population sample and $r = .460$, $p < .001$, within the patient sample.

Explaining SI in Daily Life: The Interaction of the Level of Personality Functioning and Loneliness at the Same Measurement Point

In the combined sample, between-person loneliness and personality dysfunction were both significant positive statistical predictors of SI (Table 1). The interaction term between within-person loneliness and OPD-SQS was also significant, indicating that momentary increases in loneliness were more strongly associated with SI in individuals with greater personality dysfunction (Figure 3).

Simple-slopes analyses using the Johnson-Neyman technique (Johnson & Fay, 1950; Figure 1 in the online supplemental materials) were used to clarify the nature of this interaction. The association between within-person loneliness and SI was statistically significant ($p < .05$) when OPD-SQS scores were either below −6.18 (which is outside of the observed or possible range for this instrument) or above 12.75. This suggests that the interaction should be interpreted with confidence primarily above these levels of the moderator. As the lowest value shown in Figure 1 was 1 *SD* below the sample mean (14.47), this is still within the interpretable range.

The models that were conducted stratified by participant group are presented in Table 1 in the online supplemental materials. In both participant groups, between-person loneliness was significantly associated with SI, indicating that individuals who are generally lonelier tend to report higher SI in daily life. However, the OPD-SQS sum score was only relevant in the clinical sample. The interaction between within-person loneliness and OPD-SQS was significant in both groups but notably stronger in the clinical group. The Johnson-Neyman technique indicated a restricted range of values on the OPD-SQS for which the interaction term was interpretable (population: −79.22 to 14.31; patients: −45.43 to 12.59). No main effect of within-person loneliness was found in either group. The population sample model explained a smaller proportion of variance.

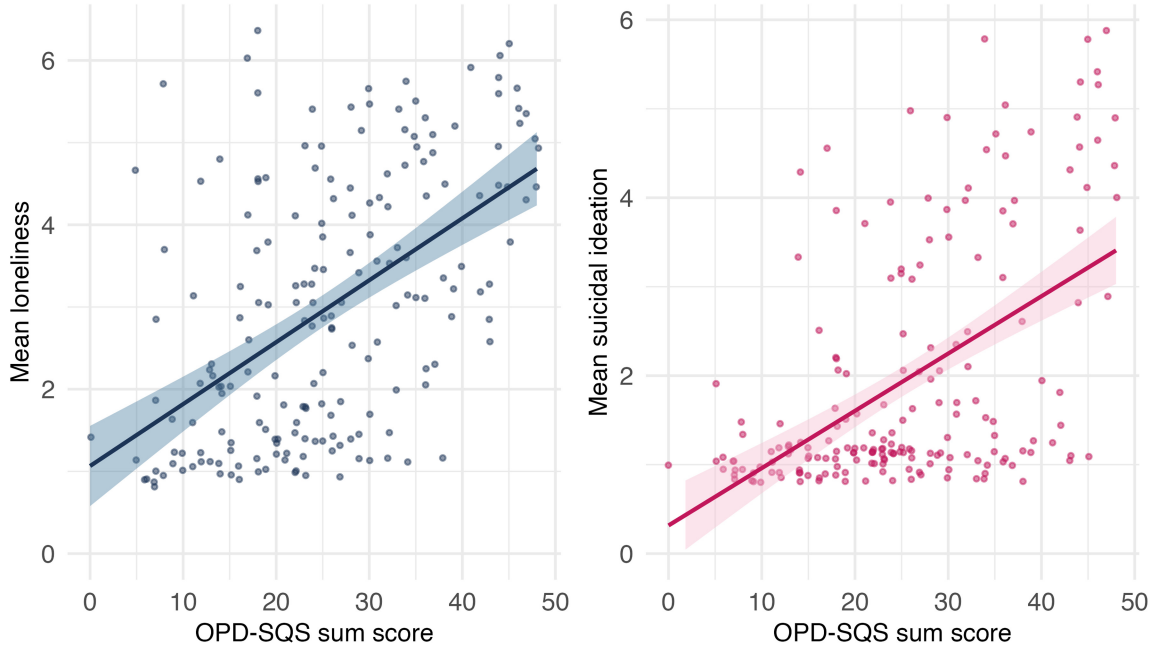
Predicting SI in Daily Life: The Interaction of the Level of Personality Functioning and Loneliness at the Preceding Measurement Point

The results of the model (Table 2) indicated significant, positive main effects of between-person loneliness and impaired personality functioning. In contrast, the main effect of lagged momentary loneliness and its interaction with personality functioning were not statistically significant predictors of SI.

Table 2 in the online supplemental materials depicts the stratified models. In the population sample, lagged within-person loneliness and its interaction with the level of personality functioning were not significant predictors either. Regarding between-person effects,

Figure 1

Association Between Personality Functioning and Loneliness and Suicidal Ideation



Note. Association between personality functioning assessed at baseline and mean loneliness and mean suicidal ideation over 10 days of ecological momentary assessment in the combined sample. The shading indicates the 95% confidence interval. A higher OPD-SQS sum score reflects greater deficits in personality functioning. OPD-SQS = Operationalized Psychodynamic Diagnosis Structure Questionnaire. See the online article for the color version of this figure.

there was also an effect of trait loneliness, and, in addition, of the level of personality functioning. The fixed effects explained a greater proportion of variance compared to the population model.

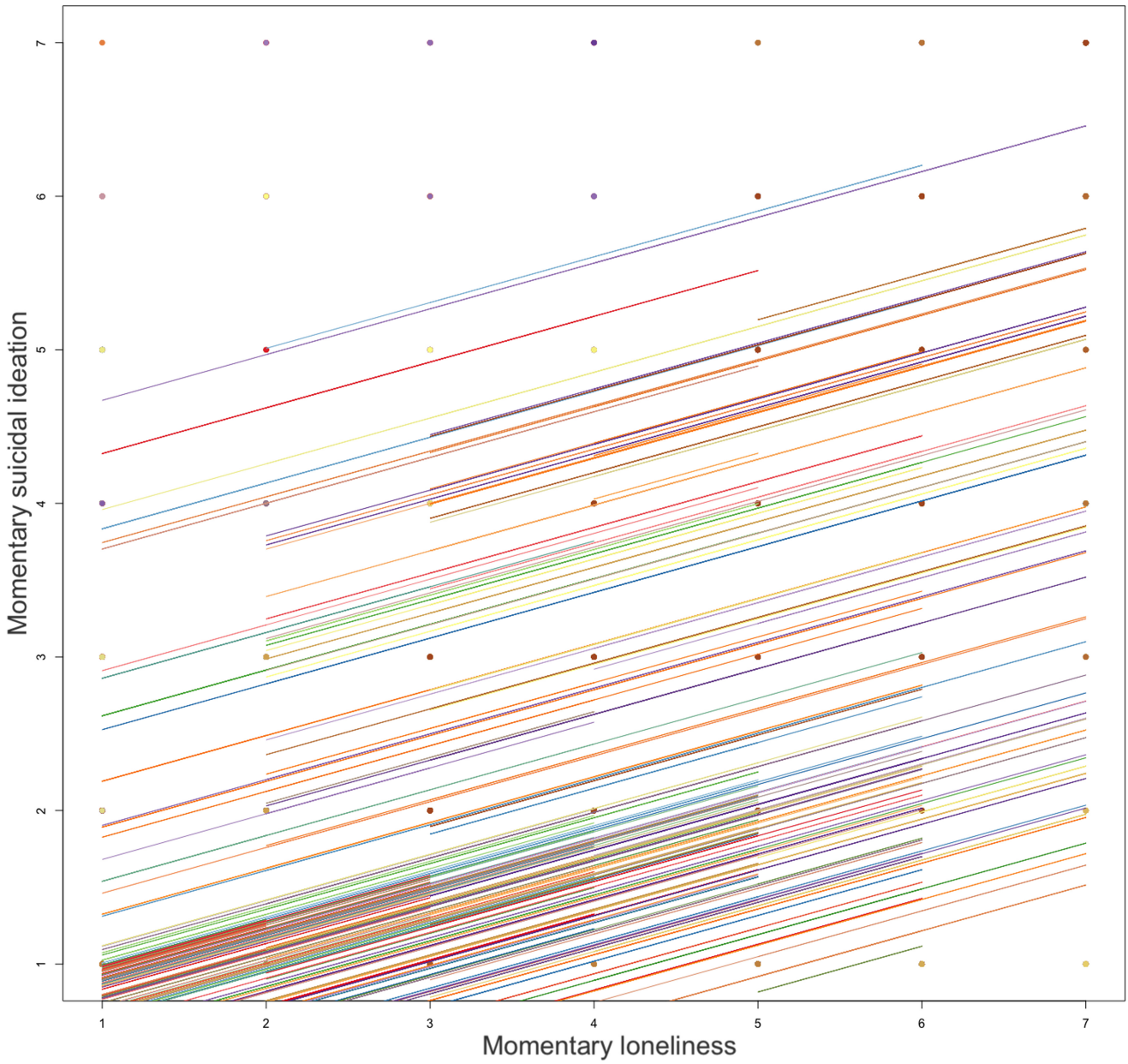
Discussion

The present study set out to investigate how loneliness and personality functioning interact to explain SI in daily life, using a high-resolution EMA protocol and investigating participants from both the general population and an inpatient treatment setting. Drawing on dimensional, transdiagnostic approaches to personality pathology and established theories of suicide, we aimed to move beyond static trait models by exploring dynamic, within-person associations. Specifically, we hypothesized that deficits in personality functioning would exacerbate the momentary link between loneliness and SI. The use of EMA in this context allows to observe psychological vulnerability in situ, offering a window into how individuals experience and respond to social disconnection in their natural environments. Intensive longitudinal designs further allow for the disaggregation of between- and within-person level effects (Bolger & Laurenceau, 2013). Much of the existing evidence linking loneliness to suicidal thoughts and behavior has been based on cross-sectional or longitudinal designs with relatively few measurement points, where between-person variance is dominant (Farooq et al., 2021; McClelland et al., 2020). However, without separating between- from within-person processes, it remains unclear whether such associations reflect stable interpersonal vulnerability or dynamic, state-like risk, including reactions to real-life situations. Methodologically, between-person associations are more susceptible to confounding by unmeasured third variables that may simultaneously influence both loneliness and SI (including personality functioning; Boone et al., 2025; Ernst, Brähler, et al., 2023; Ikhtabi et al., 2022). In contrast, within-person analyses track fluctuations within the same individual over time and allow for a more fine-grained test of whether momentary increases in loneliness coincide with changes in SI.

We first examined the concurrent associations between loneliness and SI, finding that both between-person loneliness and personality functioning were relevant in the statistical explanation of SI in daily life. There was also a significant interaction between within-person loneliness and personality functioning in the statistical explanation of SI: individuals with greater impairments in personality functioning were more likely to report elevated SI during moments of heightened loneliness. First, these observations resonate with previous work (Lewis et al., 2023), which showed that within-person loneliness (at the same measurement point) was independently associated with SI within a model that also included between-person loneliness. Second, the interaction effect is consistent with experimental studies showing that the distress associated with social disconnection is magnified in individuals with personality disorders compared to those without (Ernst et al., 2018; Seidl et al., 2020). The interaction effect was more robust at higher values of the OPD-SQS, indicating a dose–response relationship between the degree of structural impairment and sensitivity to loneliness. This reflects the rich, clinically oriented literature that has previously associated vulnerabilities in self and interpersonal functioning with increased susceptibility to emotional dysregulation in the context of social challenges

Figure 2

Repeated-Measures Correlation of Loneliness and Suicidal Ideation Within the Combined Sample ($r = .396$, $p < .001$)



Note. See the online article for the color version of this figure.

or threats (Fonagy & Target, 1997; Luyten et al., 2020; Mikulincer et al., 2021; Schechter et al., 2022a, 2022b). It fits with clinical approaches to personality pathology from different theoretical orientations, such as Linehan's biosocial model (Linehan, 1993; Livingston & Stanton, 2024) and mentalization theory models (Luyten et al., 2020), which propose that structural dysfunction impairs individuals' ability to tolerate distress and maintain emotional coherence in response to interpersonal challenges. It also relates to dynamic diathesis-stress models of SI, such as the integrated motivational-volitional model (O'Connor & Kirtley, 2018), which conceptualize suicidal thinking as emerging from the interplay between dispositional vulnerabilities and situational triggers.

In the prospective models, which predicted SI at the subsequent measurement point, only the main effects of between-person loneliness and personality functioning remained relevant, while the interaction term and the effect of lagged within-person loneliness were nonsignificant. These results echo patterns observed in other EMA studies, showing that real-time predictors, including loneliness, lose predictive power even across short lags (e.g., Czyz et al., 2019; Hallensleben et al., 2019; Kleiman et al., 2017; Wolf et al., 2025).

Table 1
Linear Mixed-Effects Model of Suicidal Ideation at the Same Measurement Point Based on Within- and Between-Person Loneliness and Personality Functioning

Predictor	Estimate (*B*)	*SE*	*t*	*p*
Intercept	−0.024	0.200	−0.12	.904
Fixed effects				
Loneliness (within-person)	−0.093	0.059	−1.58	.115
Loneliness (within-person) × OPD-SQS Sum Score	0.012	0.002	5.77	<.001
Loneliness (between-person)	0.239	0.046	5.26	<.001
OPD-SQS sum score	0.049	0.008	6.26	<.001
Random effects				
σ_0 (intercept)	1.025			
σ_1 (slope: loneliness within)	0.273			
σ_e (residual)	0.595			
φ, AR(1) autocorrelation	0.244			

Note. Marginal R^2 (fixed effects) = .35; conditional R^2 (fixed + random effects) = .84; OPD-SQS = Operationalized Psychodynamic Diagnosis Structure Questionnaire; AR(1) = first-order autoregressive.

One interpretation is that the processes linking loneliness to SI are temporally bounded and may unfold over a matter of minutes rather than hours, consistent with high-frequency fluctuation models of SI (Bryan et al., 2020; Coppersmith et al., 2023). The emotional reactivity to social stressors, in particular, that is associated with personality pathology (Chapman et al., 2014; Hopwood, 2018) may manifest in such tight temporal coupling that lagged effects are overshadowed by immediate responses. In this view, loneliness may fail to predict SI hours later because, for vulnerable individuals, the psychological distress is immediate. This is in line with high-frequency fluctuation models (Bryan et al., 2020; Coppersmith et al., 2023), including the fluid vulnerability theory (Rudd, 2006), which describes SI as a dynamic process in which baseline vulnerabilities interact with situational stressors to produce shifts in risk states.

At the same time, we must critically contend with the limited statistical power of the present sample to detect small effects, which might still hold clinical relevance. This limitation is particularly pertinent for the stratified and prospective models, where smaller effects might have gone undetected. Nevertheless, it is noteworthy that personality functioning was a significant predictor of SI within the combined model and the clinical sample, even when accounting for trait loneliness, highlighting it as a stable, transdiagnostic risk factor whose inclusion could enrich contemporary suicide risk models.

Limitations

Despite the strengths of this study, several limitations should be noted. First, although our use of EMA allowed for the assessment of dynamics within days, the sampling interval of roughly 1 hr may still have been too coarse to capture the most immediate fluctuations in SI, especially if participants missed some assessments, as suicidal thoughts can emerge and dissipate even more quickly (Coppersmith et al., 2023). Thus, even brief lags may miss critical processes. Studies employing burst sampling or event-contingent designs may offer more granular insight.

Second, while the study included both clinical and community samples, the group sizes were modest, particularly in the stratified models. We also did not achieve perfect compliance. This was expected given the way the study was set up, meaning participants received neither feedback nor incentives for responding to more prompts, which has been associated with better compliance in the past (Wrzus & Neubauer, 2023), but was not possible due to a lack of funds for the present study. The small sample and limited responses restrict our ability to detect smaller effects, especially in the lagged models. Indeed, power analyses suggested that our design was underpowered to detect small effects. As a result, the absence of prospective (interaction) effects should be interpreted cautiously and not taken as definitive evidence of absence. Larger samples, or meta-analytic synthesis across EMA data sets, are needed to clarify the observed patterns. Given the nonprobabilistic nature of the sampling procedures, the samples are furthermore unlikely to be representative of their respective populations. Regarding the patient sample, however, the prevalence of SI is comparable to previous investigations of routine clinical data from the inpatient clinic where the present sample was recruited (Ernst, Zwerenz, et al., 2023). Regarding the population sample, the prevalence of SI was higher than in representative surveys of the German general population (e.g., Otten et al., 2022). Although we did not intend to recruit particularly distressed populations, this suggests an oversampling of vulnerable individuals (e.g., through self-selection, because they were more interested in participating in a study assessing dynamics of well-being and distress in everyday life than others). The inpatient setting could also have constrained variance in loneliness compared to outpatient treatment.

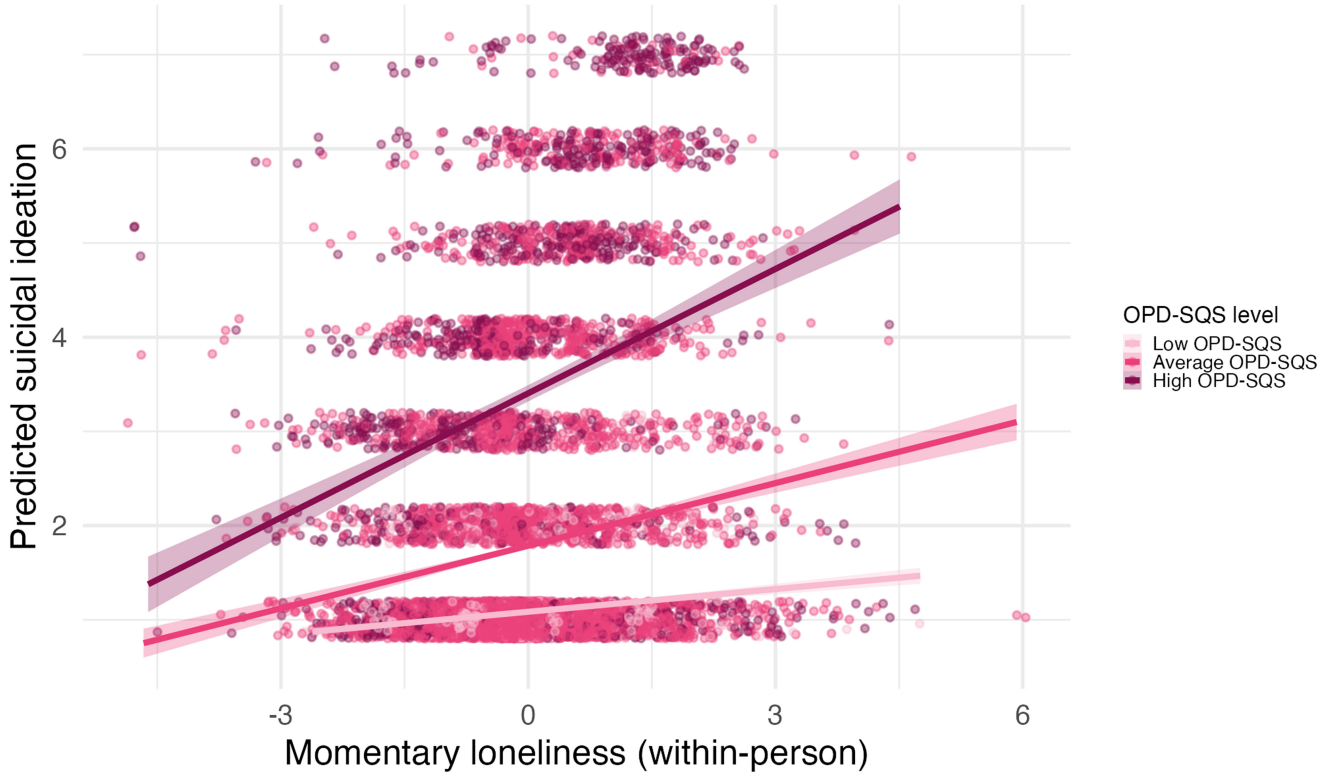
Third, our reliance on self-report may have introduced shared method variance and may not fully capture underlying affective processes. Although EMA circumvents recall bias, momentary reports are still constrained by subjective awareness and willingness to disclose sensitive states such as SI. The inclusion of passive sensing data or physiological markers could enrich future assessments. Also, as the EMA data were collected anonymously and could not be linked to patients' clinical records due to data protection requirements, it could not be integrated with and compared to, for example, diagnoses made by clinicians.

Finally, regarding the measurement of the constructs of interest, while the OPD-SQS is a validated self-report instrument of personality functioning, it represents only one operationalization of this complex construct. Broader assessments grounded in the Alternative Model for Personality Disorders or *International Statistical Classification of Diseases and Related Health Problems, 11th edition*, frameworks, and/or an expert-led interview such as the OPD or the Structured Interview of Personality Organization, could provide a more differentiated understanding of how specific structural deficits influence affective vulnerability. Moreover, the present study did not examine specific maladaptive personality traits, which would contribute to characterizing how personality pathology manifests heterogeneously across individuals. This is also consistent with the mentioned diagnostic frameworks, which recommend jointly assessing personality functioning and maladaptive traits to capture both the severity and the specific manifestation of personality pathology.

Loneliness was assessed using a single item, which does not allow for the representation of multidimensional conceptions of loneliness (e.g., differentiating social and emotional loneliness). However, evidence suggests that single-item measures show moderate to high correlations with longer scales and can validly capture the core subjective experience of loneliness (Mund et al., 2023). The other EMA item used in the present study assessed passive SI rather

Figure 3

Interaction of Momentary Loneliness and the Level of Personality Functioning in Predicting Suicidal Ideation



Note. The plot displays model-based predicted values of suicidal ideation as a function of momentary loneliness, stratified by low, average, and high OPD-SQS values ($M \pm 1$ *SD*). Data points represent observed suicidal ideation scores and are jittered for visibility, with their color intensity corresponding to the level of personality functioning: darker for greater impairment. The regression lines (with shading for the 95% confidence intervals) show that momentary increases in loneliness are more strongly associated with suicidal ideation in individuals with the most pronounced deficits in personality functioning. In contrast, the flatter slope for those with low OPD-SQS scores indicates a weaker association. OPD-SQS = Operationalized Psychodynamic Diagnosis Structure Questionnaire. See the online article for the color version of this figure.

than active intent or planning. This operationalization is clinically meaningful as theoretical models of suicidal behavior (e.g., O'Connor & Kirtley, 2018; Van Orden et al., 2010), conceptualize passive ideation as the initial stage in the development of suicidal thinking. At the same time, active SI might be more relevant as an outcome in high-risk populations, for example, with a focus on the

Table 2

Linear Mixed-Effects Model of Suicidal Ideation at the Next Measurement Point Based on Lagged Within-Person Loneliness, Between-Person Loneliness, and Personality Functioning

Predictor	Estimate (*B*)	*SE*	*t*	*p*
Intercept	−0.10	0.196	−0.53	.596
Fixed effects				
Lagged loneliness (within-person)	0.040	0.038	1.06	.291
Lagged Loneliness (within-person) × OPD-SQS Sum Score	0.036	0.001	1.37	.172
Loneliness (between-person)	0.386	0.008	4.48	<.001
OPD-SQS sum score	0.036	0.001	1.37	<.001
Random effects				
σ_0 (intercept)	0.998			
σ_1 (slope: loneliness within)	0.136			
σ_e (residual)	0.739			
φ, AR(1) autocorrelation	0.221			

Note. Marginal R^2 (fixed effects) = .37; conditional R^2 (fixed + random effects) = .78; OPD-SQS = Operationalized Psychodynamic Diagnosis Structure Questionnaire; AR(1) = first-order autoregressive.

transition from ideation to action when intent to act becomes more pronounced. The present results may therefore be more applicable to the beginning of a suicidal process and less so for its escalation.

Regarding the experience of loneliness, the inpatient setting itself may shape the experience and reporting of loneliness, as patients interact with staff and fellow patients within a structured, yet constrained, social environment that differs from their usual social networks. Hence, the patterns observed in this setting may not be entirely generalizable to patients' experiences of loneliness in everyday life.

Conclusion

This study contributes to the understanding of the dynamic interplay between interpersonal experience and suicidal thinking by delineating a subgroup of particularly vulnerable individuals. By leveraging the temporal resolution of EMA and drawing on contemporary personality theory, it showed that in individuals low in personality functioning, the momentary link between loneliness and SI in daily life is stronger. These insights may inform the development of personalized EMA-based risk monitoring systems and support the use of momentary loneliness as a clinically meaningful warning signal, especially in individuals with personality-related vulnerabilities. Here, loneliness could represent a more approachable and actionable topic of intervention than SI itself.

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