Balancing Burden and Resolution: Effects of EMA Survey Schedule on Compliance and Study Evaluation in Suicide-Focused Research

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Abstract

Introduction/Background

Ecological momentary assessment (EMA) enables fine-grained, real-time prediction and monitoring of suicidal ideation and related experiences, but participant burden and declining compliance pose challenges. This study examined how EMA survey schedules influence EMA compliance, response likelihood, and participant burden.

Methods

Participants (N = 137) with recent suicidal ideation completed 28 days of EMA under one of three schedules: fixed (six surveys/day), 4+burst (four/day with one week of 10/day), or randomly varying (3–15 surveys/day). Bayesian mixed-effects and logistic regression models examined the effects of schedule type and time on overall and momentary compliance. Associations between compliance and schedule type with perceived burden, emotional reactions, and satisfaction were examined.

Results

Schedule type was not associated with overall compliance; however, time-by-schedule interactions showed that 4+burst and randomly varying conditions exhibited less decline over time than the fixed condition. Prior survey completion increased momentary response likelihood, while time in study decreased the likelihood of responding. Higher compliance was associated with fewer perceived drawbacks; no other effects of compliance or study schedule were found.

Discussion

Although overall compliance did not differ across schedules, those that incorporated some variability in survey frequency showed more sustained compliance over time. Responding to the previous survey increased response likelihood, indicating a momentum effect, whereas longer study participation reduced momentary compliance, consistent with cumulative survey fatigue.

Conclusion

Incorporating variability in survey frequency sustained greater compliance over time without increasing perceived burden, suggesting that varying EMA schedules may help mitigate study fatigue.

Keywords: suicide; suicidal ideation; ecological momentary assessment; compliance; intensive longitudinal design; survey methodology

Introduction

Ecological momentary assessment (EMA) has emerged as a valuable tool in clinical psychological research, offering high-resolution data on real-time fluctuations in psychological states and behaviors. In suicide research, EMA enables the assessment of suicidal ideation and related affective and cognitive experiences as they unfold in daily life, thereby reducing retrospective recall bias and enhancing ecological validity (Gratch et al., 2021; Kivelä et al., 2022) (Gratch et al., 2021; Kivelä et al., 2022). As a result, EMA has contributed to important advancements in identifying proximal risk factors for suicidal thoughts and behaviors(Kivelä et al., 2022; Melia et al., 2025). However, the utility of EMA is often tempered by concerns about participant burden and compliance, especially in clinical populations (i.e., individuals with recent suicidal ideation), who may be more likely to disengage from repeated assessments (Ammerman & Law, 2022; Kleiman et al., 2017; Porras-Segovia et al., 2023). In their systematic review of EMA in suicide research, Kïvela et al. (2022) found that compliance rates ranged from 44% to 90% (median = 70%), with lower rates typically observed in clinical versus in non-clinical samples and considerable variability across study sampling schedules, protocol durations, and participant characteristics. Other research has shown that high compliance can be achieved in high-risk samples (Kaurin et al., 2022) though rates below 50% have also been reported (Schatten et al., 2020).

Two design choices critical to EMA compliance are the timing and frequency of surveys. These parameters directly affect both the scientific yield of the data and participants' willingness and ability to comply with the protocol (Businelle et al., 2024; Smyth et al., 2021; Vachon et al., 2019). Denser sampling can capture low base-rate or rapidly fluctuating experiences, but it may also heighten perceived burden and reduce compliance (Schneider & Stone, 2016; Wang et al.,

2025). Conversely, lighter schedules may improve feasibility but limit temporal resolution. This balance is particularly important in suicide research, where suicidal ideation can shift within hours (Blacutt et al., 2025; Hallensleben et al., 2019; Kleiman et al., 2017), so surveys must be frequent enough to detect rapid change without overburdening participants. Despite the importance of this trade-off, few studies have systematically evaluated how specific schedule designs, such as fixed, burst, or randomly varying schedules, influence compliance and burden. Preliminary work suggests that longer intervals between surveys and fixed schedules may enhance compliance (Jacobucci et al., 2024; Tonkin et al., 2023) and recent reviews highlight that within-day survey density may increase burden, even as it improves representativeness (Wang et al., 2025). In contrast, a meta-analysis and review suggest that the overall assessment volume may not have a meaningful impact on compliance (Davanzo et al., 2023; Wrzus & Neubauer, 2023) (Wrzus & Neubauer, 2023; Davanzo et al., 2023). However, few studies have directly manipulated schedule features in a systematic way.

Although participant-level characteristics (e.g., age, symptom severity, momentary emotion) have been associated with compliance in prior EMA studies there is growing recognition that study-level (Bloom et al., 2024; Jacobucci et al., 2024; Tate et al., 2024) variables, such as schedule timing, spacing, and duration, may play an equally or more important role. Unlike individual characteristics, these design features are under the direct control of the researcher and thus represent key leverage points for improving data quality and feasibility. Prior work has shown that compliance often declines over the course of multi-week protocols, likely due to cumulative burden or fatigue (Bloom et al., 2024; Niznik et al., 2023; Rintala et al., 2019). Yet few studies have systematically tested how these patterns vary across different scheduling

structures. Without this evidence, researchers lack clear guidance for selecting protocol designs that are both scientifically informative and acceptable to participants.

Beyond behavioral compliance, researchers have increasingly called for evaluating participants' subjective experiences of EMA protocols. While some studies have captured participant-reported burden and intrusiveness (Ball et al., 2025; Spangenberg et al., 2026), these assessments are often limited to single-item ratings or qualitative feedback (Eisele et al., 2022; Tate et al., 2024). As EMA becomes more widely used in both clinical and non-clinical samples, understanding how different assessment schedules influence participant evaluations of perceived burden, acceptability, and satisfaction is essential for building feasible, ethically sound, and participant-centered research designs.

Current Study

The present study systematically examined the impact of the EMA survey schedule on participant compliance, momentary-level response likelihood, and study evaluations across two samples of individuals with recent suicidal ideation. Participants were randomly assigned to one of three 28-day EMA protocols, reflecting designs commonly used in suicide research (Ammerman & Law, 2022; Coppersmith et al., 2023): (a) a fixed schedule of six surveys per day, (b) a burst schedule of four daily surveys with one week of ten daily surveys, or (c) a randomly varying schedule ranging from 3 to 15 surveys per day. We hypothesized that EMA schedules with lower survey frequency will demonstrate higher daily compliance rates (Hypothesis 1). Further, we hypothesize that compliance will decrease throughout the study for all groups (Hypothesis 2a); however, a smaller drop-off in compliance will be observed in those receiving fewer surveys per day (Hypothesis 2b). At the momentary level, we hypothesize that having responded to the previous survey and more time elapsed since the previous survey will

increase the odds of response to the current survey (Hypothesis 3a), while number of days in the study and time of day will decrease the odds of response to a survey (e.g., participants will be less likely to respond later in the day; Hypothesis 3b). By integrating behavioral and subjective outcomes, this study aims to inform evidence-based recommendations for EMA protocol design in those with recent suicidal ideation. Although findings may be applicable beyond our specific motivating clinical context, since these are common elements of EMA study design, readers should extend these findings to other populations with caution.

Method

Participants

Sample 1

74 participants were recruited from the local community based on past-month suicidal thoughts and behaviors (STB), defined as repeated lifetime active suicidal ideation with at least one instance in the past month, or a suicide plan or attempt in the past month. Eligibility was screened by phone and confirmed at baseline using the SITBI-SF (Nock et al., 2007). Participants were required to be 18 years or older, have an Android-based smartphone (based on the aims of the larger study), live in the U.S., and be English-speaking. To obtain reliable estimates, we removed participants with fewer than 20 responses, as excessively low response rates can lead to unreliable within-person estimates and convergence problems (Asparouhov & Muthén, 2024). The final sample from this study included 70 participants (Age = 35.2 ±10.9, 17.1% non-White, 70.0% female, and 50.0% non-straight). Following an in-person diagnostic assessment session, participants completed a 28-day EMA period using the LifeData smartphone application. Participants were compensated $40 for the baseline assessment, $100 for the 28-day EMA period, and $10 for the end-of-study survey, plus a bonus of up to $35 (distributed across

study weeks; $5 per week) for completing at least 75% of EMA surveys. Research staff monitored compliance throughout the study and provided technical assistance as needed. Details regarding the EMA schedule are provided in the *Measures* section. All procedures were approved by the [BLINDED FOR REVIEW] Institutional Review Board (Protocol: Blinded).

Sample 2

71 participants were recruited from the local community based on past-month suicidal thoughts and behaviors (STB), defined as repeated lifetime active suicidal ideation with at least one instance in the past month, or a suicide plan or attempt in the past month. As with Sample 1, eligibility was screened by phone and confirmed at baseline using the SITBI-SF (Nock et al., 2007). Participants were required to be 18 years or older, live in the U.S., and be English-speaking. Consistent with Sample 1, participants with fewer than 20 EMA responses were excluded to ensure stable within-person estimates (Asparouhov & Muthén, 2024). The final sample from this study included 67 participants (Age = 34.1 ±11.5, 35.8% non-White, 65.7% female, and 34.3% non-straight). Following a virtual baseline session, participants completed a 28-day EMA period using the LifeData smartphone application. Participants were compensated $25 for the baseline assessment, $165 for the 28-day EMA period, $20 for completing at least 75% of EMA surveys (determined across the entire EMA period), and $10 for the end-of-study survey. Research staff monitored compliance throughout the study and provided technical assistance as needed. All procedures were approved by the [BLINDED FOR REVIEW] Institutional Review Board (Protocol: Blinded).

Measures

Survey Response

Both EMA software packages allowed researchers to determine whether participants responded to a survey or not. This variable was recoded as 1 for "Yes, responded" and 0 for "No, didn't respond".

Compliance

A compliance variable was created each day and each week per person, which was defined as the proportion of surveys answered relative to the total number of surveys a person received that day or week, respectively.

Schedule

Across the samples, there were three *general* 28-day EMA schedules: 1) 6 daily surveys ("fixed daily schedule"), 2) 4 daily surveys with a random "burst week" of 10 daily surveys ("burst week schedule", and 3) 3-15 daily surveys where the number varied per day ("varying daily schedule"), which will be *referred to as "general schedule" type* (see Figure 1). Sample 1 was only assigned the first schedule type, while Sample 2 was only assigned the latter two schedule types. The 4+burst can be further decomposed into four groups according to the placement of the burst week (Week 1-4) – creating six total groups: six daily (n = 70), 4+burst week 1 (n = 4), 4+burst week 2 (n = 10), 4+burst week 3 (n = 7), 4+burst week 4 (n = 13), varying daily (n = 33), which will be *referred to as "specific schedule" type*.

Surveys across both samples were delivered using semi-random signaling within fixed time windows (e.g., 9:00–11:00 AM) to ensure independence of reports. In Sample 1, surveys were sent within a participant-selected 12-hour window, occurring randomly within 2-hour signaling blocks; participants had 30 minutes to complete each survey, with a reminder at 15 minutes. In Sample 2, surveys were distributed across a 12-hour window with a minimum 20-minute spacing between consecutive surveys, and participants had two reminders sent 5 and 10

minutes after the initial alert. For both samples, each survey assessed momentary affect, self-injurious thoughts and behaviors, interpersonal experiences and cognitions, substance use, and daily activities, though Sample 1 surveys were more extensive (58–65 items per survey) than Sample 2 (40–46 items per survey). Full surveys for both are available in the Supplement.

Suicidal Ideation and Planning

The Self-Injurious Thoughts and Behaviors Interview – Short Form (Nock et al., 2007) was used to assess the history and past-month frequency of suicidal ideation, reported in the *Sample Characteristics* section. Further, each EMA prompt assessed suicidal ideation in the moment using two items ("I want to die" and "I think about taking my life") rated on a 5-point Likert scale (1 = very slightly or not at all; 5 = extremely), validated for use in high-risk samples and intensive longitudinal research (Forkmann et al., 2018). Responses were rescaled to 0 to 4 to ease interpretation of the intercept, and items were summed to create a composite active suicidal ideation score (Ammerman & Jacobucci, 2023). Internal consistency for suicidal ideation was acceptable *(*ω_{within} = .75; $\omega_{between}$ = .85).

Participant Evaluation

Participant evaluation measures were administered in both samples using the Reactions to Research Participation Questionnaire (Kassam-Adams & Newman, 2002). This measure is a 23-item questionnaire assessing five domains: 1) participation: willingness and voluntary nature of the study, 2) personal benefits: participants gained something meaningful from the study, 3) emotional reactions: participation elicited emotional reactions for the participant, 4) perceived drawbacks: substantial drawbacks to participating in the study, and 5) global evaluations: the study was overall useful and ethical. Each item is rated on a 5-point scale (1 = strongly disagree, 5 = strongly agree). Of note, higher scores on the 3) emotional reactions and 4) perceived

drawbacks scale indicate fewer (not more) emotional reactions and perceived drawbacks, respectively.

Risk Management

The EMA platform used across both studies, LifeData, automatically delivered pre-made crisis resources (e.g., crisis numbers, local resources) when participants reported any active or passive suicidal ideation (responses ≥2 out of 5). Reports of high active ideation (responses ≥4 out of 5) triggered an alert to the research team, who attempted to contact the participant by phone within 12 hours (a trained graduate student or the faculty investigator, who is a licensed psychologist) to complete a suicide risk assessment and engage in appropriate risk management. Up to three contact attempts were made, after which crisis resources were emailed.

Data Analysis

Preprocessing was consistent with the framework outlined by Revol et al. (2024). We examined survey completion times for evidence of careless responding. We observed that median completion times were 167 seconds (IQR: 118–255) in Sample 1 and 74 seconds (IQR: 54–109) in Sample 2, with fewer than 0.03% of surveys completed in under 15 seconds (3 out of 15,684 included surveys. The longer completion times in Sample 1 are consistent with its more extensive battery compared to Sample 2. As a preliminary analytic step, Bayesian regression was used to examine differences in overall compliance across general schedule types. Schedule type was dummy coded, and the fixed schedule served as the reference group. Bayesian mixed-effect models were used to examine the effect of EMA schedule on daily compliance, where schedule type (Hypothesis 1), number of days in the study (Hypothesis 2a), and their interaction (Hypothesis 2b) predicted the percentage of surveys completed per day. Two versions of this model were conducted: one with the general schedule (fixed daily schedule vs. burst week

schedule vs. varying daily schedule) as a predictor, and the other with the specific schedule type as a predictor (e.g., fixed schedule vs. burst week schedule with week 1 burst vs. burst week schedule with week 2 burst, etc.). For both models, schedule type was dummy coded, and the fixed schedule served as the reference category, given their similarities to commonly used EMA schedules in suicide research (Ammerman & Law, 2022). Each model included a random intercept to account for individual differences in average compliance.

Multilevel Bayesian logistic regression was used to examine specific factors that influenced the odds of responding to an EMA survey at the momentary level. This model regressed survey response (1 = yes, 0 = no) on participants' response to the previous survey and hours since the previous survey (Hypothesis 3a), as well as time of day (Hypothesis 3b). A random intercept was included to account for individual differences in response likelihood. Schedule type was not included because it largely governs how many hours have elapsed since the last survey.

All Bayesian models used Monte Carlo Markov Chain estimation with 4 chains and 4,000 iterations per chain. Chains were determined to show good convergence if $\hat{R}$ values were below 1.05 (Gelman & Rubin, 1992) and their trace plots were visually inspected. Significance in Bayesian models was determined if 95% credible intervals (CI) did not cross 0.

Transparency and Openness

All data and code necessary to replicate these analyses can be found on the corresponding author's Open Science Framework: [link blinded for review]. This study's design and its analysis were not pre-registered.

Results

Sample Characteristics

Full demographics for participants can be seen in Table 1. The sample was primarily young to middle-aged adults, female, White, non-Hispanic, and heterosexual. Due to recruitment requirements, all participants had a past-month history of suicidal ideation, with a median of 2 episodes per month (M = 15.1 ±62.2, range 0 to 630). Across the EMA period, participants reported active suicidal ideation on 2,900 out of 16,259 completed surveys (17.8%). Active suicidal ideation was endorsed at least once by 94 unique participants, who endorsed it on an average of 28.3% ±27.5 of their completed surveys (range = 0.63% to 92.5%).

Preliminary Analysis: Overview of Compliance Rates

Overall compliance rates were 64.2±24.5%. Compliance rates per general schedule were as follows: 64.1±32.5% for fixed schedule, 76.6±26.8% for burst week schedule, and 68.4±30.2% for daily varying schedule. Overall compliance rates per specific schedule type were as follows: 64.1±32.5% for six daily (fixed schedule), 69.7±30.0% for burst week with week 1 burst, 75.2±29.3% for burst week with week 2 burst, 73.9±27.9% for burst week with week 3 burst, 81.0±22.3% for burst week with week 4 burst, and 68.4±30.2% for varying daily schedule (Figure 2).

General Schedule on Daily Compliance

Bayesian mixed effects models did not reveal a main effect of general schedule on daily compliance; however, they did reveal a main effect of time, where compliance rates diminished as participants were in the study for longer (Table 2). Further, we found that both the burst week and varying daily schedules had a significant interaction with time, indicating that these schedule types experienced a smaller drop-off in compliance throughout the study duration compared to the fixed schedule. Compliance rates across the study duration can be seen in Figure 3.

Specific Schedule

Bayesian mixed effects models did not reveal a main effect of specific schedule on daily compliance; however, we found a main effect of time, as with the general schedule models (Table 3). We found that two burst week schedules (burst week 1 and burst week 2) and the varying daily schedule had significant interactions with time, suggesting these schedule types experienced a smaller drop-off in compliance throughout the study duration compared to the fixed schedule. Compliance rates across the study and according to the specific study schedule can be seen in Figure 4.

Momentary Compliance

As seen in Table 4, Bayesian mixed effects logistic regression showed that responding to the previous survey increased the odds of responding to the current survey, while the number of hours in the study decreased these odds. Neither the time elapsed since the previous survey nor the time of day influenced the odds of responding.

End of Study Evaluations

Full results for the effect of compliance on end-of-study evaluations are reported in Table 5. When examining the effect of compliance on the five end-of-study evaluation subscales, there was a significant effect of compliance on the perceived drawbacks subscale. Specifically, individuals with higher compliance reported higher scores on the subscale, indicating that higher compliance predicted fewer perceived drawbacks to the research study. There were no significant effects of compliance on the participation, personal benefits, emotional reactions, or global evaluations subscales. Full results for the effect of the EMA schedule on end-of-study evaluations are reported in Table 6. There were no statistically significant effects of the EMA schedule on any of the 5 study evaluation subscales.

Sensitivity Analyses

Given that some participants had fewer than 20 responses, we conducted sensitivity analyses with the full sample (N = 145). The full sample was demographically and clinically similar to the final sample, and models yielded the same pattern of results as the primary analyses (see Supplement, Tables S2–S4).

Discussion

This study aimed to systematically examine the impact of EMA schedule design on compliance, momentary response likelihood, and participants' evaluation of the research experience in a sample with recent suicidal ideation. By comparing three common survey structures—a fixed six-per-day schedule, a burst schedule, and a randomly varying schedule—we sought to identify scheduling approaches that maximize engagement while minimizing perceived burden. Our first hypothesis was not supported as we found no overall differences in compliance across the three schedule types. Our second hypotheses were partially supported; Hypothesis 2a was supported, as compliance declined over time across all groups, consistent with prior intensive longitudinal research. Hypothesis 2b was partially supported, as we found that the burst and varying schedules exhibited less steep declines compared to the fixed schedule. Our third hypothesis was also partially supported; specifically, Hypothesis 3a indicated that responding to the previous survey, but not the time elapsed since the previous survey, increased response likelihood. Similarly, for Hypothesis 3b, findings indicated that days in the study decreased response likelihood; however, time of day did not. Our findings contribute to growing efforts to optimize EMA protocols for clinical populations by offering new evidence about how schedule characteristics relate to participant behavior and perceptions.

Overall compliance across the three schedules (64.1% to 76.6%) fell within the range reported in suicide research using EMA (44% to 90%) (Kivelä et al., 2022). Consistent with

prior work (Bloom et al., 2024; Jacobucci et al., 2024; Rintala et al., 2019), we found that compliance generally declined over time, underscoring the well-documented challenge of study fatigue in intensive longitudinal designs. Contrary to our hypothesis, there were no overall differences in compliance rates across the three schedule types, a finding consistent with prior research showing null effects of fixed versus random EMA schedules on overall compliance (Businelle et al., 2024). However, a particularly novel finding in this study is the significant time-by-schedule interaction; participants in the 4+burst and randomly varying schedules exhibited a less steep decline in compliance over the 28-day study period compared to those in the fixed six-survey condition. This suggests that incorporating variability in the frequency of EMA surveys throughout an intensive longitudinal study may help to sustain participant engagement in EMA protocols over time. Vachon et al. (2019) conducted a meta-analysis of EMA studies among individuals with various serious mental illnesses (e.g., psychotic disorders) and, in contrast to the present study, found higher compliance among fixed survey schedules compared to those that varied. The divergence in results is likely driven by differences in clinical populations and the considerable heterogeneity of study designs included in the meta-analysis. Our findings carry practical implications for EMA study design. Although fixed schedules are commonly used and analytically convenient, they may not represent the most participant-friendly option, particularly for extended protocols. In contrast, burst or variable designs may reduce monotony or help participants anticipate and manage periods of increased burden, thereby promoting more consistent compliance. Maintaining compliance over extended protocols is especially important for suicide-focused EMA studies, where adherence is essential for modeling risk factors that dynamically shift within hours and monitoring imminent risk.

At the momentary level, we found that participants were more likely to respond to a survey if they had responded to the previous one, suggesting a momentum or habit-like effect. This pattern aligns with Howard and Lamb (2024), who observed that participants with initially high engagement maintained stable response rates across 14 weeks, implying that early participation may foster a self-reinforcing response pattern that sustains EMA compliance over time. However, these findings diverge slightly from prior work (Jacobucci et al., 2024), which indicates that longer inter-survey intervals can enhance response probability. One possible explanation is that schedule design in the present study constrained the range of time intervals, making their independent effects less detectable. Notably, time in study negatively predicted momentary compliance, reflecting the cumulative toll of repeated assessments and the gradual erosion of engagement over extended participation. This highlights the potential value of adaptive engagement strategies, such as dynamically adjusting survey schedules. Other research supports that providing visual feedback (Lanza et al., 2024), gamifying EMA response (Kleiman et al., 2025), and sending one to two survey reminders before expiration of the survey (Srinivas et al., 2019) can enhance compliance, ostensibly without increasing burden. Together, these findings suggest that EMA response behavior may be shaped more by prior participation patterns and accumulating study fatigue than by momentary situational factors. This underscores the importance of real-time engagement monitoring systems that can detect early lapses and trigger supportive interventions to maintain participation.

While participants' evaluations of the research experience were generally positive across schedule types, consistent with prior EMA work in clinical samples (Ball et al., 2025; Eisele et al., 2022; Spangenberg et al., 2026), higher compliance was associated with fewer perceived drawbacks, suggesting that individuals who remained engaged found the study more

manageable. However, no other evaluation domains, including perceived personal benefit, emotional response, or global satisfaction, were related to compliance. Critically, participants' evaluations did not differ by schedule type, challenging the assumption that either denser or more variable EMA designs increase perceived burden (Smyth et al., 2021; Tate et al., 2024). While additional research is needed to confirm these findings, the present study provides initial evidence that aspects of study design beyond survey intensity may influence participants' subjective experiences in EMA research (Eisele et al., 2022).

This study has several strengths. The randomized design improves internal validity by reducing bias across schedule conditions and allows clearer interpretation of schedule effects. Comparing three common EMA schedules, fixed, burst, and randomly varying, provides a systematic evaluation of how design features influence engagement and perceived burden. Integrating behavioral measures with self-report data gives a fuller picture of participation by connecting observed behavior with subjective experience. Assessing compliance at both daily and momentary levels extends prior work by capturing engagement across different time scales, while the momentary analyses reveal within-person dynamics that are often obscured when data are aggregated. The inclusion of a clinical population with recent suicidal ideation also strengthens the study by showing that intensive longitudinal methods are feasible in sensitive clinical contexts. Despite these strengths, several limitations should be noted. The modest sample size within each schedule condition may have limited power to detect small differences. Although compliance and evaluation were measured carefully, baseline expectations, cognitive resources, and contextual factors were not assessed and could have influenced schedule effects. Generalizability is restricted to individuals with recent suicidal ideation who volunteered to participate and may not extend to those with greater clinical severity or less access to technology.

Participant evaluations were collected only at the end of the study, preventing analysis of within-person changes in perceived burden or satisfaction over time. Moreover, not including free responses for the end-of-study feedback likely restricted our ability to capture important sentiments regarding EMA schedules.

Future research should examine adaptive EMA systems that adjust survey frequency based on early compliance patterns or participant preferences, thereby allowing engagement strategies to evolve in response to individual needs. Notably, recent evidence suggests that smartphone use itself predicts EMA response likelihood, with participants more likely to respond when actively using their phones (Jacobucci et al., 2025). Qualitative and idiographic methods may further clarify the mechanisms linking compliance and perceived burden by capturing participants' experiences in greater detail. Beyond schedule design, compliance is shaped by a range of factors including item content and length, response windows, incentive structure, employment status, and the clinical burden of the target population (Eisele et al., 2022; Wrzus & Neubauer, 2023). Compliance may also fluctuate with suicidal ideation, as recent qualitative work suggests that participants may disengage from EMA precisely during periods of acute stress or suicidal crisis (Spangenberg et al., 2026). Future research should examine how these participant- and protocol-level factors interact with schedule design to influence EMA compliance. Extending this work to more diverse samples and study durations would inform best practices for maintaining engagement in intensive longitudinal research.

Constraints on Generality

The present study has several limitations that constrain the generalizability. First, due to the inclusion criteria, participants were exclusively individuals with a history of suicidal thoughts and behaviors. While this warrants careful interpretation when extending to other populations,

these findings seem to align with observed patterns in those without SI histories (Howard & Lamb, 2024; Rintala et al., 2019; Vachon et al., 2019; Wrzus & Neubauer, 2023). Second, most participants identified as White, non-Hispanic, female adults living in the United States, which limits the generalizability of results to individuals of different racial, ethnic, gender, cultural, and developmental backgrounds. Third, inclusion criteria required participants to own a smartphone to download EMA software, restricting generalizability to those with sufficient technological and financial resources to own and operate these devices.

Conclusion

This study is one of the first to systematically compare EMA schedule designs in individuals with recent suicidal ideation. Our findings suggest that while different schedules yield comparable overall compliance rates, burst and variable designs may better maintain engagement over time. Participant evaluations of study burden were not associated with the schedule received, indicating that perceptions of feasibility may depend more on individual characteristics and motivational factors than on structural aspects of the protocol. Together, these findings support the feasibility of flexible EMA designs that promote sustained engagement without increasing burden. More broadly, they highlight the need for participant-centered methodological innovation in suicide-focused EMA research, where balancing scientific rigor with participant well-being remains a central consideration.

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TABLES

Table 1. Participant characteristics across both samples (N = 137)

Demographic	Mean(SD) or *n*(%)
Age	34.7 (11.2)
Sex at birth	
Male	44 (32.1%)
Female	93 (67.9%)
Sexual Orientation	
Lesbian or gay	6 (4.4%)
Bisexual	28 (20.4%)
Pansexual	11 (8.0%)
Asexual	4 (2.9%)
Straight	79 (57.7%)
Other	9 (6.6%)
Race	
White	101 (73.7%)
Black or African American	20 (14.6%)
Asian	3 (2.2%)
American Indian / Alaska Native	6 (4.4%)
More than one race	6 (4.4%)
Other	1 (0.7%)
Ethnicity	
Hispanic / Latino	14 (10.2%)
Not Hispanic / Latino	123 (89.8%)

Note: SD = Standard deviation

Table 2. Bayesian regression examining the effect of time (number of days in study), general schedule type (burst week schedule and varying daily relative to fixed schedule), and their interaction on daily compliance

Term	Estimate	95% CI	Rhat
Intercept	71.5	[66.0, 76.8]	1.00
Burst week	5.01	[-4.24, 14.5]	1.00
Varying daily	-2.28	[-11.6, 7.38]	1.00
Time	**-0.50**	**[-0.62, -0.38]**	**1.00**
Time*4+Burst week	**0.49**	**[0.26, 0.71]**	**1.00**
Time*Varying daily	**0.46**	**[0.34, 0.58]**	**1.00**
sd(Intercept)	**21.3**	**[18.8, 24.2]**	**1.00**

Note: Time = Number of days in study (1-28). Bolded findings denote significance

Table 3. Bayesian regression examining the effect of time (numbers of days in study), specific schedule type (each type of burst week schedule and varying daily schedule relative to fixed schedule), and their interaction on daily compliance

Term	Estimate	95% CI	Rhat
Intercept	**71.4**	**[65.9, 76.9]**	**1.02**
Time	**-0.50**	**[-0.62, -0.38]**	**1.00**
4+burst week 1	-8.90	[-31.9, 14.6]	1.00
4+burst week 2	-0.52	[-16.2, 14.9]	1.01
4+burst week 3	6.73	[-11.6, 24.7]	1.00
4+burst week 4	12.6	[-1.55, 26.5]	1.00
Varying daily	-1.94	[-11.3, 7.90]	1.01
Time*4+burst week 1	**0.85**	**[0.31, 1.40]**	**1.00**
Time*4+burst week 2	**0.82**	**[0.43, 1.21]**	**1.00**
Time*4+burst week 3	0.23	[-0.20, 0.65]	1.00
Time*4+burst week 4	0.29	[-0.030, 0.61]	1.00
Time*Varying daily	**0.46**	**[0.34, 0.58]**	**1.00**
sd(Intercept)	**21.5**	**[18.9, 24.5]**	**1.00**

Note: Time = Number of days in study (1-28). Bolded findings denote significance

Table 4. Bayesian logistic regression examining the effect of previous survey response, hours since last survey, hour of day, and time (number of days) in the study on the odds of responding to a survey

Term	OR	95% CI	Rhat
Intercept	**82.8**	**[36.1, 208]**	**1.01**
Responded to previous	**2.21**	**[2.01, 2.42]**	**1.00**
Time	**0.97**	**[0.97, 0.98]**	**1.00**
Hours since last survey	1.00	[0.99, 1.01]	1.00
Hour of the day	1.01	[0.99, 1.02]	1.00
sd(Intercept)	**4.03**	**[3.35, 5.43]**	**1.00**

Note: OR = Odds Ratio. Time = Number of days in study (1-28). Bolded findings denote significance

Table 5. EMA Compliance Effects on End-of-Study Subscales

Subscale	Coefficient	Std. Error	t-statistic	95% CI	p-value
Participation	0.27	0.75	0.36	-1.21, 1.74	0.719
Personal Benefits	0.62	1.01	0.61	-1.38, 2.61	0.542
Emotional Reactions	-0.65	1.17	-0.55	-2.85, 1.66	0.581
Perceived Drawbacks	**3.28**	**1.49**	**2.21**	**0.34, 6.22**	**0.029**
Global Evaluation	0.69	0.85	0.81	-0.99, 2.36	0.491

Note. Bolded findings denote significance. Std. = Standard.

Table 6. EMA Schedule Effects on End-of-Study Subscales

Subscale	Coefficient	Std. Error	t-statistic	95% CI	p-value
Participation	-0.06	0.30	-0.21	-0.66, 0.54	0.836
Personal Benefits	-0.76	0.41	-1.87	-1.57, 0.43	0.063
Emotional Reactions	0.43	0.47	0.90	-0.51, 1.37	0.370
Perceived Drawbacks	-0.20	0.62	-0.32	-1.42, 1.02	0.750
Global Evaluation	-0.49	0.34	-1.43	-1.17, 0.19	0.154

Note. Std. = Standard.

FIGURES

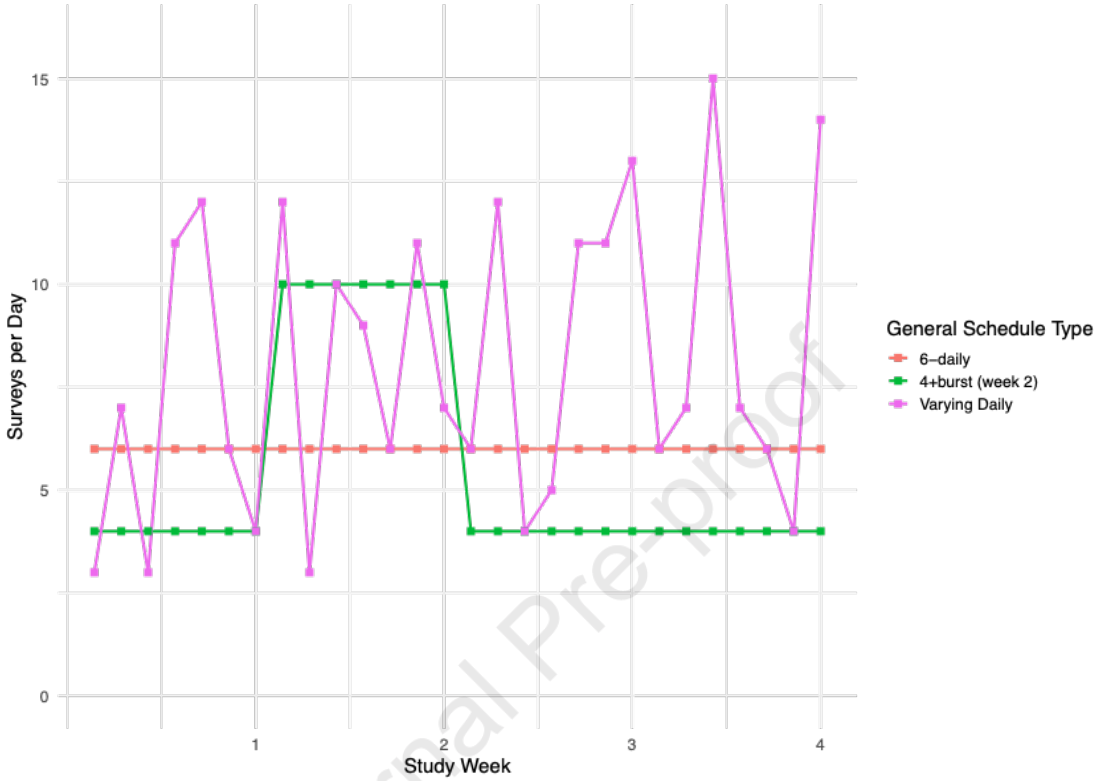

Figure 1. Example of surveys per day by general schedule type.
Note. The x-axis reflects study week. 4+burst shows an example of a week 2 burst (e.g., 10 daily surveys during week 2).

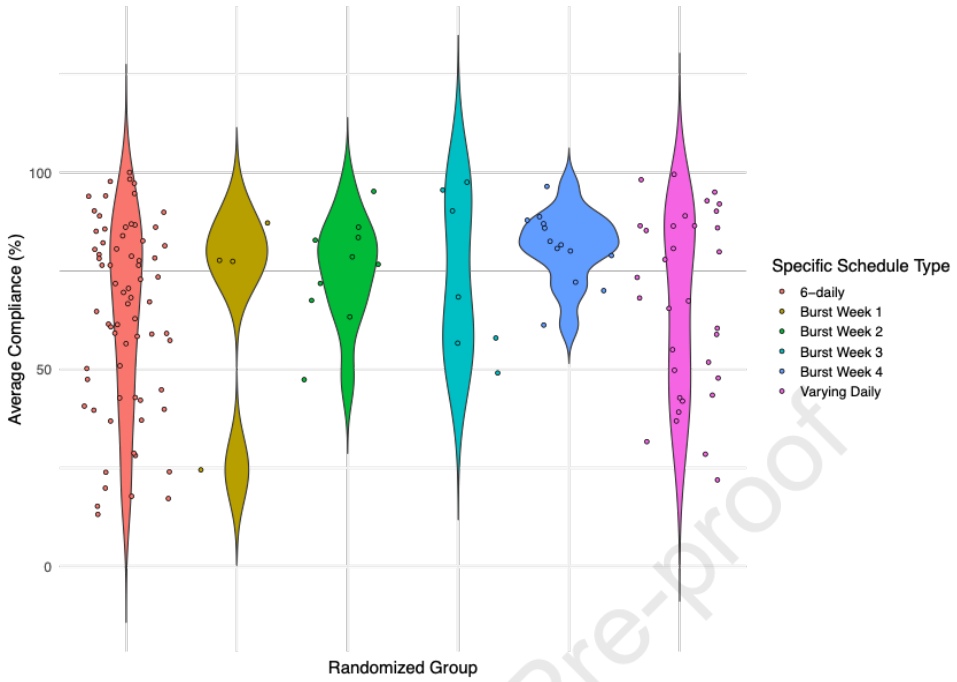

Figure 2. Overall compliance rates by specific schedule type

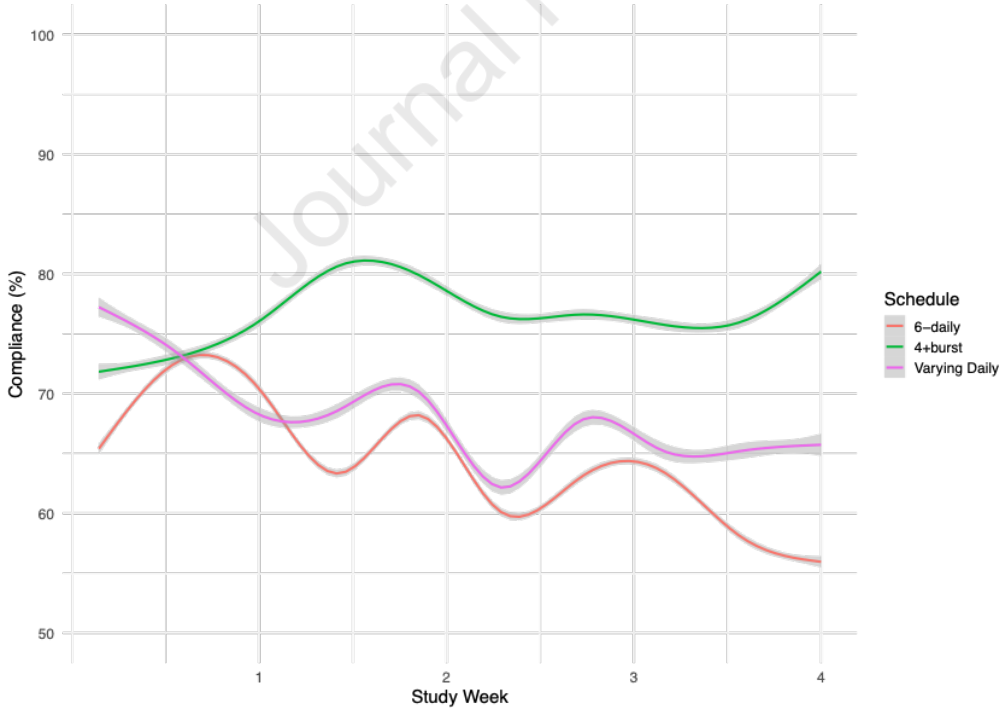

Figure 3. Daily compliance rate throughout the study period according to general schedule. The x-axis reflects study week. Grey reflects the pooled standard error.

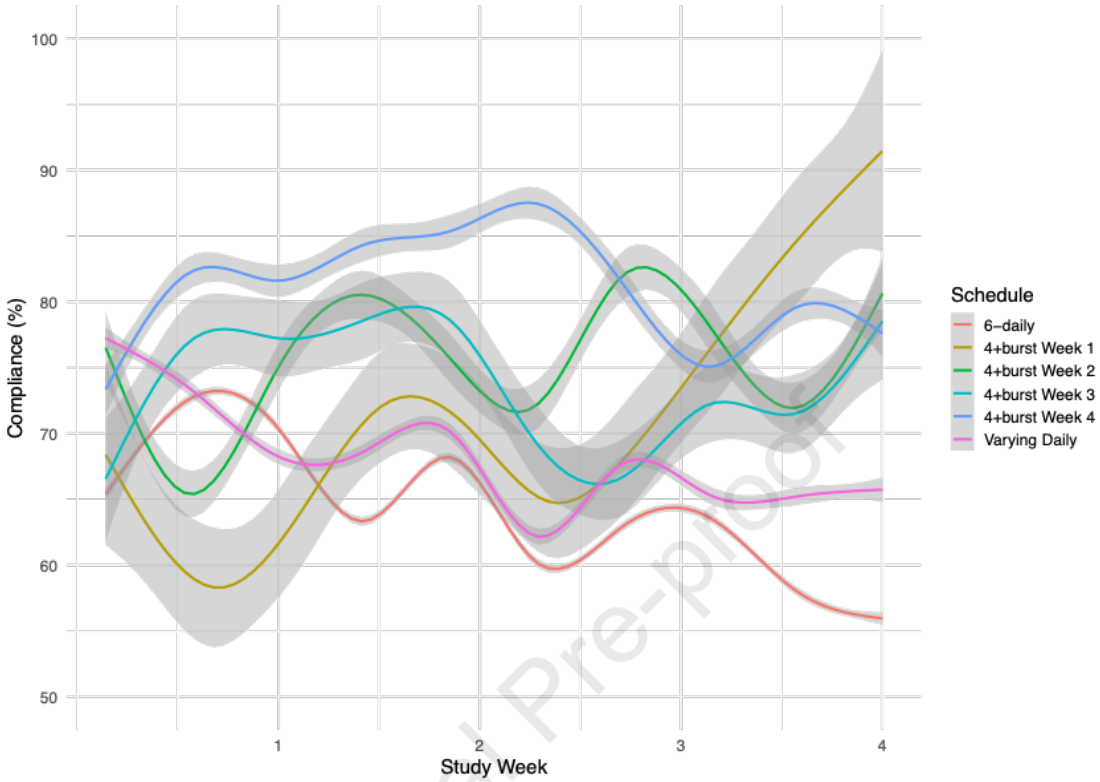

Figure 4. Daily compliance rate throughout the study period according to specific schedule. The x-axis reflects study week. Grey reflects the pooled standard error.

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: