

Disentangling Prompt-, Day-, and Participant-Level Risk for Suicidal Behaviors Using Ecological Momentary Assessment



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Introduction

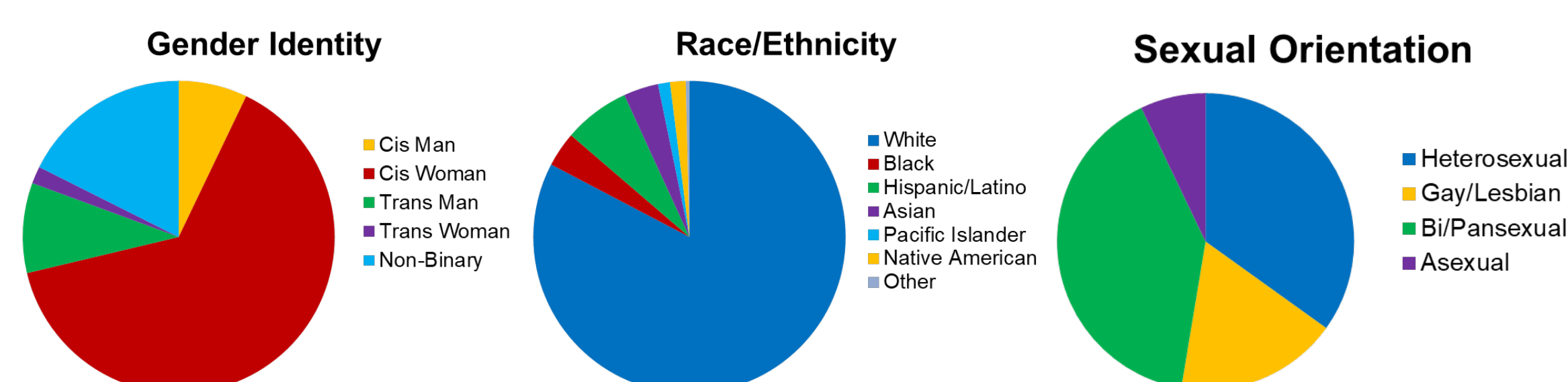
- Intensive longitudinal designs—like **ecological momentary assessment (EMA)**—have been increasingly leveraged to examine and understand **short-term risk factors** for suicidal ideation and intent¹
- Less understood are the **underlying factors** and **temporal patterns** that may increase short-term risk for **suicidal behaviors** (i.e., suicide plans, preparations, and attempts)
- Risk factors for suicidal behaviors differ from risk factors for suicidal ideation,² necessitating **examination of factors that facilitate a transition** from suicidal thoughts to actions,³ especially over the course of hours to days⁴

Study Aims

- The aim of the present study was to examine **commonly cited transdiagnostic risk factors and warning signs** as predictors of momentary engagement in suicidal behaviors
- Three timeframes were tested, centered within context:**
 - Average responses by individuals across the study period (**Participant level**)
 - Deviations from average responses within individual days (**Day level**)
 - Deviations from day levels within individual assessments (**Prompt level**)

Methods

- A sample of 237 **community-based adults who reported severe suicidal ideation at screening** participated in a two-week EMA protocol
 - Ages ranged from 18-55 years ($M = 27.12$, $SD = 8.60$)



- EMA prompts were administered **6 times per day**, delivered in stratified intervals between 9:00 AM and 9:00 PM, for **14 consecutive days**
- Participants received \$20 for **completion of the study** and a \$20 bonus if they completed **at least 80%** of the prompts

Results

Preliminary Analyses

- Adherence Rates:** Participants completed, on average, 12.29 days of EMA monitoring ($SD = 2.92$) and 4.13 prompts per day ($SD = 1.82$), reflecting a response rate of 87.8% for days completed, 68.8% of assessments completed each day, and 69.1% of total prompts ($n = 12,781$ total prompts)
- Rates of Suicidal Behaviors:** Suicidal behaviors were reported in 177 prompts (1.4%)
 - Suicide Plans:** 111 prompts (0.9%)
 - Suicide Preparations:** 75 prompts (0.6%)
 - Suicide Attempts:** 20 prompts (0.2%)

Primary Analyses

- Three-level generalized linear mixed models** (prompts nested within days nested within participants) were computed to examine the degree to which each risk factor was associated with **concurrent** (same time point) and **prospective** (next time point) suicidal behaviors. Concurrent effects are below.

PREDICTOR	B	SE	p	ODDS RATIO	95% CI (OR)
PROMPT-LEVEL					
General Rumination	.71	.36	.049	2.03	[1.004, 4.09]
Suicide-Specific Rumination	2.63	.53	< .001	13.88	[4.92, 39.14]
Hopelessness	.21	.47	.656	1.23	[.49, 3.06]
Perceived Burdensomeness	.89	.46	.051	2.44	[.997, 5.99]
Thwarted Belongingness	.03	.32	.927	1.03	[.55, 1.94]
Fearlessness about Death	-.24	.47	.614	.79	[.31, 1.99]
Physical Distance: Suicide Methods	1.13	.37	.002	3.09	[1.49, 6.41]
Psychological Distance: Suicide Methods	.85	.42	.042	2.34	[1.03, 5.31]
Agitation	.06	.38	.872	1.06	[.51, 2.22]
Life Stress	.67	.20	< .001	1.96	[1.33, 2.87]
DAY-LEVEL					
General Rumination	.51	1.33	.702	1.66	[.12, 22.42]
Suicide-Specific Rumination	1.20	1.27	.346	3.31	[.27, 40.09]
Hopelessness	1.04	1.49	.486	2.83	[.15, 52.63]
Perceived Burdensomeness	-.32	1.56	.839	.73	[.03, 15.50]
Thwarted Belongingness	-.06	1.13	.955	.94	[.10, 8.64]
Fearlessness about Death	1.56	1.42	.270	4.77	[.30, 76.47]
Physical Distance: Suicide Methods	.77	1.02	.451	2.15	[.29, 15.84]
Psychological Distance: Suicide Methods	.92	1.10	.400	2.52	[.29, 21.73]
Agitation	.06	.94	.952	1.06	[.17, 6.67]
Life Stress	.37	.91	.689	1.44	[.24, 8.67]
PARTICIPANT-LEVEL					
General Rumination	.04	1.14	.970	1.04	[.11, 9.67]
Suicide-Specific Rumination	.53	.84	.526	1.70	[.33, 8.81]
Hopelessness	.38	1.31	.775	1.46	[.11, 18.97]
Perceived Burdensomeness	-.10	1.23	.937	.91	[.08, 10.06]
Thwarted Belongingness	.01	.85	.986	1.01	[.19, 5.42]
Fearlessness about Death	.58	.57	.309	1.79	[.58, 5.53]
Physical Distance: Suicide Methods	-.30	.74	.687	.74	[.17, 3.18]
Psychological Distance: Suicide Methods	1.04	.93	.263	2.83	[.46, 17.49]
Agitation	-.19	.86	.826	.83	[.15, 4.48]
Life Stress	.31	1.03	.766	1.36	[.18, 10.13]
Random Effects					
Day			Variance		
Participant			28.98		
			1.40		

Discussion

Summary of Findings:

- Several **prompt-level risk factors**—general and suicide-specific rumination, physical and psychological distance to suicide methods, and life event stress—were uniquely predictive of **concurrent suicidal behaviors**
- No **day-level** or **participant-level** factors were associated with concurrent suicidal behaviors, nor were factors **at any level** associated with the **likelihood of engaging in suicidal behaviors two hours later**

Implications and Future Directions:

- Cognitive fixations on suicide, suicide methods, and life stressors are **uniquely related to increased momentary risk** for suicidal behaviors. Day-level elevations in risk were non-significant, **highlighting the import of improving assessments and interventions in daily life**
- Replication/Extension among Diverse Samples:** This study was conducted in predominantly White Americans.
 - Do these findings replicate in individuals of various **ethnoracial, gender, and sexual identities** as well as **cross-culturally**? Are other risk factors **more relevant** in other cultures and subpopulations?
- Development of Digital Interventions:** The factors identified as relevant in this sample are **mechanistic** and **malleable** and, thus, could be utilized to save lives
 - Can digital phenotyping and assessments be leveraged to **develop and validate personalized real-time interventions** to aid individuals **in the moments in which they are in crisis**?

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