

Acquired Capability for Suicide as a Predictor of Virtual Reality Suicidal Behavior



Morgan Callahan, Andrew J. Lodge, B.S., & Sarah Brown Ph.D.

Department of Psychology, Florida State University



CENTER FOR UNDERGRADUATE RESEARCH & ACADEMIC ENGAGEMENT

INTRODUCTION

- Suicide is an increasingly prevalent public health problem, with a 37% increase in suicide rates in the United States from 2000- 2022 (Centers for Disease Control and Prevention [CDC], 2024)
- The interpersonal theory of suicide states that for an individual to engage in suicidal behavior (SB), one must have the desire to die as well as the capability to do so (Joiner 2005; Van Orden et al. 2010)
- Acquired capability for suicide is characterized by two key components (Van Orden et al. 2010):
 - Fearlessness about death (FAD) and elevated physical pain tolerance
 - Posited to develop through repeated exposure to painful or fear-inducing stimuli, such as trauma, physical abuse, self-harm, or prior suicide attempts
- FAD → greater number of previous suicide attempts (Wachtel et al., 2014)
- Suicide research faces inherent challenges, as ethical constraints limit the experimental manipulation of variables that may impact risk for suicide
- However, virtual reality (VR) enables the study of suicidal behavior in controlled environment (Franklin, Huang, & Bastidas, 2019)
- While previous literature has examined the associations between acquired capability for suicide and SB, the emergence of VR research allows us to directly examine factors that contribute to suicide, such as pain tolerance, in ways that were previously never possible

AIMS & HYPOTHESIS

- The current study aims to test if pain tolerance and fearlessness about death predict suicidal behavior in virtual reality simulations among an at-risk sample of young adults
- We hypothesized that greater pain tolerance and greater fearlessness of death would be associated with engagement in a VR suicide attempt

METHODS

Participants

- Participants were 63 young adults (ages 18-35; $M_{\text{age}} = 25.91$; $SD = 4.79$) recruited from a larger study on suicide risk
- Inclusion criteria: Recent suicidal ideation (2+ a month) and/or suicidal behavior in the past 4 months and current engagement in behavioral health care
- Gender: predominately female (78.1%)
- Race: 68.8% White; 14.1% Asian; 9.4% Black; 6.3% More than one race
- Suicide attempt history: $N = 26$ (40.6%)

Measures

- Acquired Capability with Rehearsal for Suicide Scale (ACWRSS; George et al., 2016): Assesses FAD (2 items; $\alpha = .86$), pain tolerance (2 items; $\alpha = .72$), and preparations for suicide (3 Items; $\alpha = .77$)
- Acquired Capability for Suicide Scale – Fearlessness about death (ACSS-FAD; Ribeiro et al., 2014): Assesses FAD (8 items; $\alpha = .89$) and pain tolerance (1 item)
- Columbia-Suicide Severity Rating Scale (CSSRS; Posner et al., 2011) was used to assess lifetime history of a suicide attempt (yes/no)

VR Suicidal Decision Scenario

- Jumping scenario (Richie's Plank Experience)
- Shooting scenario (Arizona Sunshine)
- VR suicide attempt: $N = 8$ (12.7%)

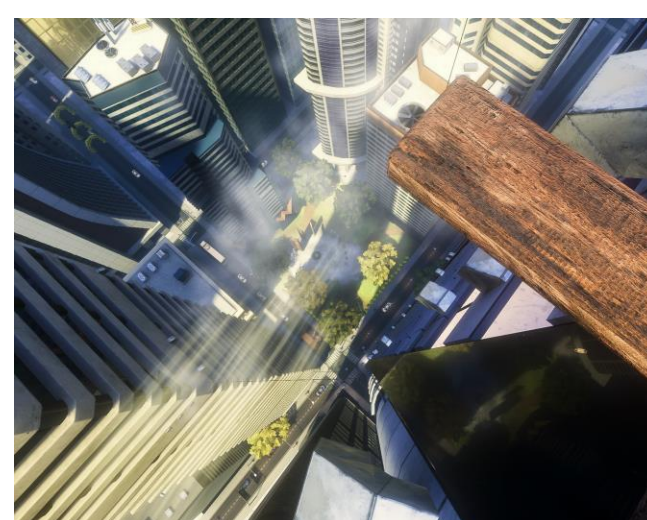


Figure 1. Comparisons between VR Attempters and Non-Attempters

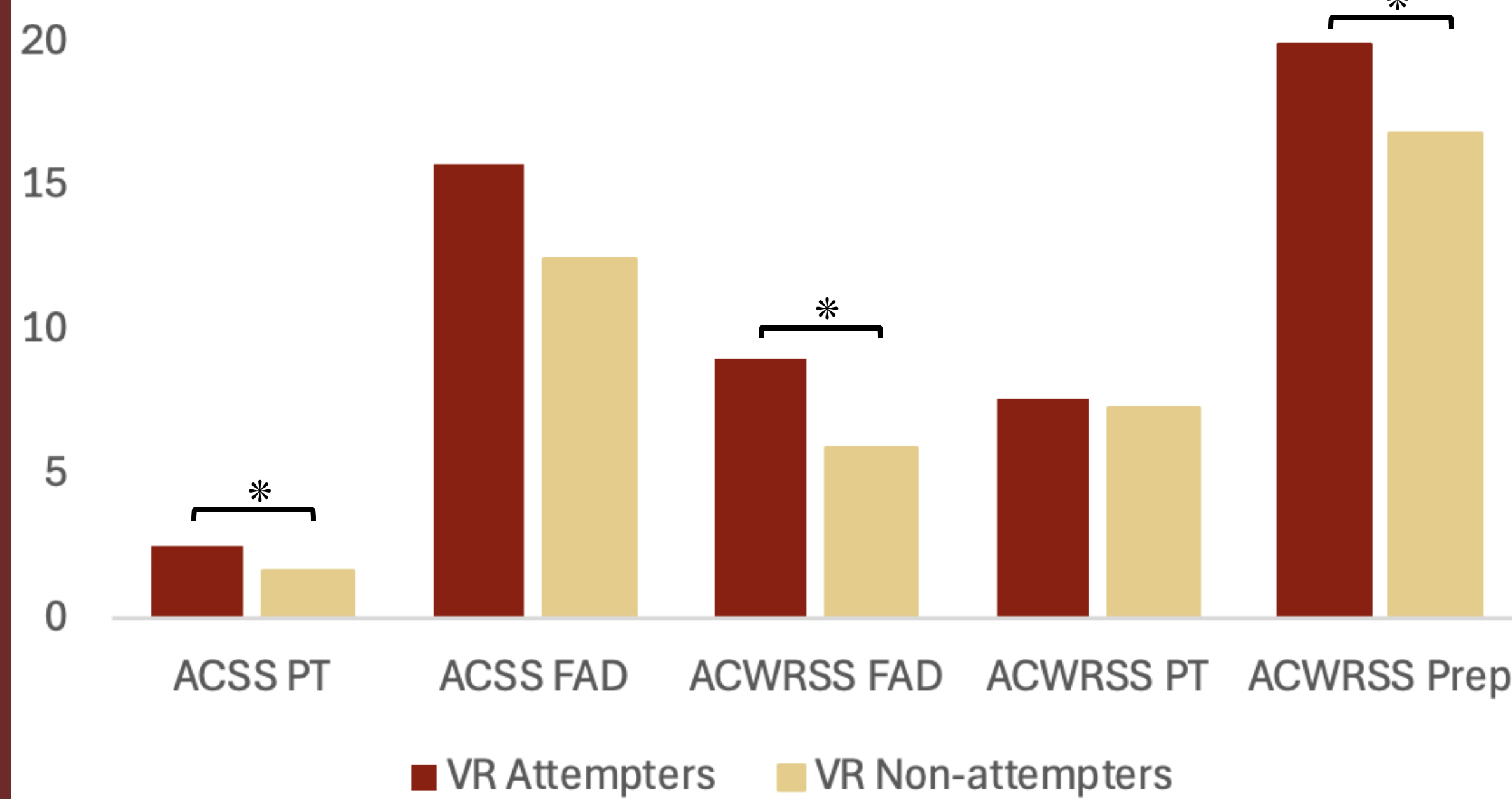


Table 1

Correlations Between Variables

Variable	Lifetime suicide attempt baseline	FAD total score	ACWRSS pain tolerance subscale	ACWRSS fearlessness of death subscale	Any VR behavior
Lifetime suicide attempt baseline	1	.25	.27	.27	.29
FAD total score	.25	1	.24	.73**	.19
ACWRSS pain tolerance subscale	.27	.24	1	.4**	.02
ACWRSS fearlessness of death subscale	.27	.73**	.4**	1	.15
Any VR behavior	.29*	.19	.02	.15	1

Note. * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Figure 3. Clustered Bar Count of Lifetime Attempt History by VR SB

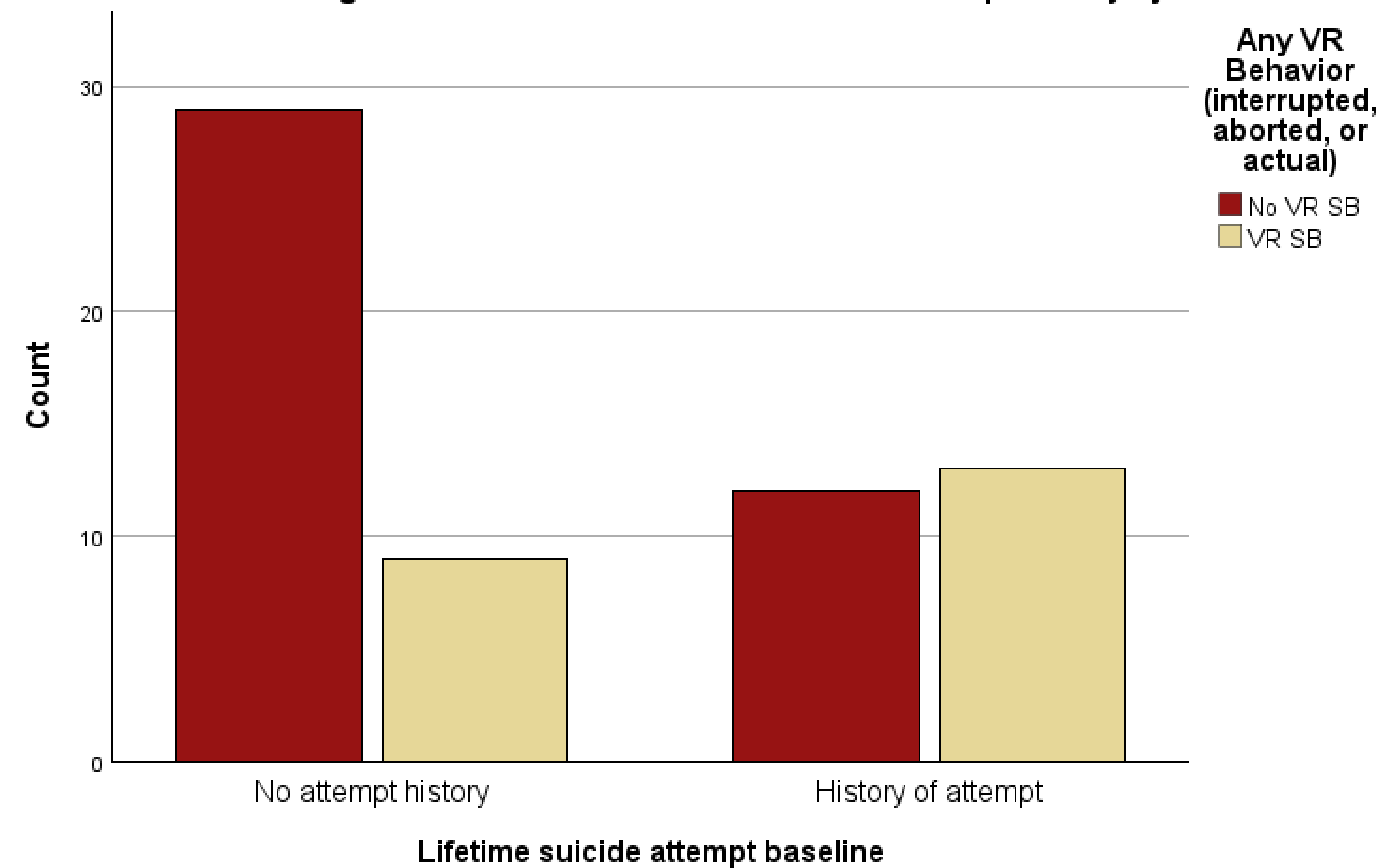
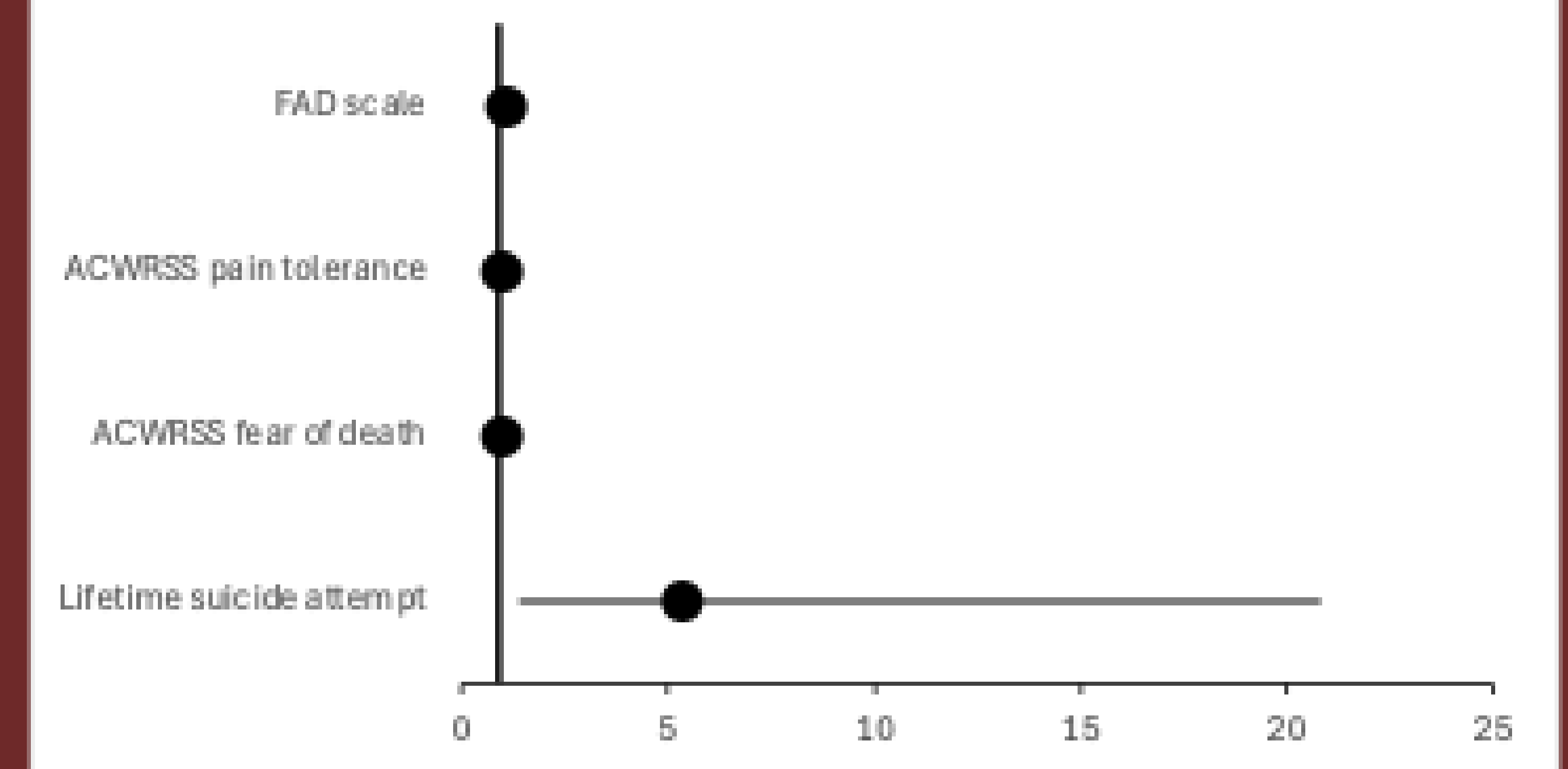


Figure 4. Forest Plot of Odds Ratio for Any VR SB



RESULTS

- A binary logistic regression was conducted to test the hypothesis. The omnibus tests of model coefficients for the ACWRSS ($\chi^2(3) = 5.43$, $p = .143$) and ACSS ($\chi^2(2) = 4.09$, $p = .129$) were not statistically significant
- We observed small non-significant effects consistent with the hypothesis, such that greater fearlessness about death and pain tolerance were associated with VR suicide attempts
- Independent sample T-test comparisons showed significant differences in ACSS-PT, ACWRSS-FAD, and ACWRSS Prep (**Figure 1**)
- Exploratory analysis revealed that lifetime suicide attempt history was a significant predictor of any VR suicidal behavior suicide attempt status ($Exp(B) = 3.49$, $p = .024$; **Figure 3**)

CONCLUSIONS

Implications

- These results suggest that pain tolerance and fearlessness of death do not play a direct role in engaging in suicidal behavior. This may suggest that other factors of suicide are more accurate predictors and should be explored, possibly in VR scenarios
- Given that prior attempt history is one of the strongest predictors of future SB, its correlation with VR SB supports the validity of VR for use in suicide research

Limitations and Future Directions

- Use of self-report measures of pain tolerance as opposed to physiological measures may possibly limit the accuracy of participants' measured pain tolerance
- VR may not fully replicate all factors of a real-life suicidal scenario
- Future studies should aim to measure pain tolerance via physiological assessment prior to engagement in VR scenarios, in order to reduce biases associated with self-report measures and better isolate pain tolerance from other factors that may contribute to suicidal behavior

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