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The Protective Potential of Family Relationship Strength as it Relates to Suicidal Thoughts and Behaviors in ACE-exposed Adolescents and Emerging Adults

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Honors Thesis

THE PROTECTIVE POTENTIAL OF FAMILY RELATIONSHIP STRENGTH AS
IT RELATES TO SUICIDAL THOUGHTS AND BEHAVIORS IN ACE-EXPOSED
ADOLESCENTS AND EMERGING ADULTS

by
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Submitted to Brigham Young University in partial fulfillment
of graduation requirements for University Honors

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ABSTRACT

THE PROTECTIVE POTENTIAL OF FAMILY RELATIONSHIP STRENGTH AS IT RELATES TO SUICIDAL THOUGHTS AND BEHAVIORS IN ACE-EXPOSED ADOLESCENTS AND EMERGING ADULTS

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Bachelor of Science

Introduction: Adverse Childhood Experiences (ACEs) are known to cause higher incidences of Suicidal Thoughts and Behaviors (STBs) in young people. Family Relationship Strength (FRS) is a known protective factor against STBs. However, there is little research on the protective nature of FRS once ACEs have been experienced by a young person. The aim of our analysis is to examine whether the strong protective nature of FRS holds true even in ACE-exposed youth. **Methods:** A sample of 139 patients at the Brigham Young University Comprehensive Clinic (aged 12-25) was obtained from the BYU Marriage and Family Therapy Practice Research Network. Linear regression was used to predict STBs from FRS based in youth who had experienced four or more ACEs. Another regression was used to predict STBs in all participants based on the interaction between ACEs and FRS. **Results:** Linear regression of participants exposed to four or more ACEs showed FRS negatively predicting

STBs. The linear regression of all participants showed that the interaction between ACEs and FRS also supported the hypothesis with STBs going up significantly even as FRS went down even in ACE-exposed youth. **Conclusion:** The results indicate that FRS remains a significant protective factor against FRS in ACE-exposed young people and should be considered when working with children who have been through traumatic experience.

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The Protective Potential of Family Relationship Strength as it Relates to Suicidal Thoughts and Behaviors in ACE-Exposed Adolescents and Emerging Adults

Childhood is a formative time in the life of a human being. Our future friendships, romantic relationships, and our mental, physical, and emotional health are all deeply affected by the things we experience in childhood. When these formative childhood experiences are negative they are referred to as Adverse Childhood Experiences (ACEs) and they can lead to an increased likelihood of many negative life outcomes, especially suicidal thoughts and behaviors (STBs).

The scientific and medical community were not always aware of this connection between childhood experiences and future mental and physical health problems. In an effort to better understand the long term mental and physical health consequences of ACEs, the CDC teamed up with researchers at Kaiser Permanente to conduct what would become a landmark study in psychology and public health (Felitti et al., 2019). This study set the initial basis for understanding ACEs as a catalyst for long term problems in mental and physical health.

The current literature on ACE's and suicidal thoughts and behaviors in adolescents and emerging adults is robust and shows that increases in the number of adverse experiences in a person's childhood the more likely they will be to seriously consider or attempt suicide (Felitti et al., 2019). Unfortunately, it is

impossible to prevent ACEs entirely. That is why it is imperative to understand how we can help negate the effects of these ACE's before they lead to STB's.

Family relationship strength (FRS) is a significant protective factor against suicide for all ages (Borowsky., 2001). However, there is much less data on how well this connection holds true when there have been ACEs in a person's past. One study showed that there was a strong overall helpful effect from strong family communication on people who experienced ACE's (Lensch et el., 2021). This research seems to indicate that the protective power of FRS against STBs ought to hold true, even after a young person has experienced ACEs.

The protective nature of family relationships after ACEs could be considered counterintuitive as the most common ACE reported by individuals in the Felitti study (2019) was physical abuse; usually carried out by a trusted adult. This might seem to contraindicate family relationships as protective factor against STBs. However, based on Lensch et al.,(2021) and the overall protective strength of FRS, strong relationships with extended family, siblings, and a non-abusing parent may still make a measurable difference in protecting young people from STBs.

The aim of our study is to examine FRS specifically as a protective factor against STBs in ACE-exposed youth. We hypothesize that someone who reports having experienced ACEs while also reporting a strong family relationship will be significantly less likely to report STBs than someone who has experienced ACEs but report relatively weak family relationships.

Methods

Participants

To examine the relationship between adverse childhood experiences, family relationship strength, and suicidal thoughts and behaviors we procured deidentified data from the Brigham Young University (BYU) Marriage and Family (MFT) Therapy Practice Research Network (PRN). This data was collected with consent by the PRN and consists of questionnaire responses from clients undergoing therapy at the BYU comprehensive clinic. We requested all available data from clients ages 12 through 25 at their first appointment who had filled out all of the necessary questionnaires. This request yielded 139 individuals about 82% of whom identified as white. The sample sexual identity was approximately 36% male, 58% female, and 6% gender non-conforming (Table 1).

About 25% of the data was missing from our dataset. To compensate for the missing data we completed multiple imputation using the “mice” package in R (Van Buuren et al., 2011). All further analysis was completed using this imputed data.

Measures

Adverse Childhood Experience Questionnaire

The Adverse Childhood Experiences (ACE) Questionnaire was created based on research by Felitti and colleagues as part of the original Adverse Childhood Experience study (2019). Their findings indicated that serious negative mental and physical effects of ACEs came into being after a child had

experienced at least four ACEs. The questionnaire asks about 10 types of childhood trauma. Half are related to the experiences of the individual including physical abuse, verbal abuse, sexual abuse, physical neglect, and emotional neglect. The other half are related to the experience of family members: a parent who is an alcoholic, a mother who is a victim of domestic violence, a family member in jail, a family member diagnosed with a mental illness, and the disappearance of a parent through divorce, death or abandonment.

Family Relationship Strength Questionnaire

This Family Relationship Strength (FRS) scale was developed by the BYU MFT PRN team (validation in review) and measures ten different aspects of relationship strength between a person and their family including emotional closeness, commitment, trust, safety, sense of being part of the same team, acceptance, lack of conflict, physical affection, overall happiness, and general personal well-being. Each of these ten items is rated on a sliding scale of 1-100, 1 being the worst it could be and 100 being the best it could be.

Suicide Behaviors Questionnaire-Revised

The Suicide Behaviors Questionnaire-Revised (SBQ-R) is a long-tested, well validated measure designed to give an idea of the suicide potential of the person taking it in four brief questions rated on different scales where lower score on an item equals less suicidality and higher scores on an item equals more suicidality (Osman et al., 2001).

Ohio Scales for Youth-Youth Report

The Ohio Scales for Youth (OSY) are brief measures of outcome for youth receiving mental health services. The scales include a 20 item Problem Severity scale and a 20 item Functioning scale rated from the youth, parent, and agency worker perspective (Ogles et al., 2004). The reason we included only the youth self-report in this analysis is that parents in the majority of cases had not filled out the parent report.

Patient Health Questionnaire-9

The Patient Health Questionnaire (PHQ) is a self-administered version of the PRIME-MD diagnostic instrument for common mental disorders. The PHQ-9 is the depression module, which scores each of the 9 DSM-IV criteria as “0” (not at all) to “3” (nearly every day) with lower scores indicating lower levels of depression and higher scores indicating the opposite (Kroenke et al., 2001).

Conceptualizing and Testing a new Brief Suicide Scale

When we received the requested data from the PRN, we discovered that the majority of SBQ-R data was not filled out by participants in our dataset. We had planned to use the SBQ-R as our operationalization for STBs. Since this was an analysis of existing data and no new data was collected for this study we worked around this problem by creating our own suicide scale. To do this we first conceptualized four different versions of a brief suicide scale to measure STBs using items from the OSY, PHQ-9, or a combination of the two. For these conceptual scales we used questions which have been validated by their creators in measuring concepts around and directly related to STBs. To test the

appropriateness of using these scales for measuring STBs we ran each version through a factor analysis. This and all further analyses were completed in r studio version 4.1.1 (R Core Team, 2021). For factor analysis we used the “psych” package in r (Revelle, 2021).

High ACE Model Methods

To test our original model for analysis we included in the analysis only those youths who had experienced four or more ACEs as this was the cutoff for serious harmful long term mental and physical health effects including suicide risk according to Felitti’s original experiment (2019) as well as future experiments (Anda et al., 2006; Austin et al., 2014; Cronholm et al., 2015). Using these criteria resulted in only 13 remaining eligible participants who were distributed basically the same as our larger overall sample (Table 2). With this subset of participants we tested a multiple regression model with our new suicide scale as the response variable and age, race, sexual identity, and FRS as the explanatory variables. All regression analysis was run using the “lm” function in r studio (R Core Team, 2021).

All ACE Model Methods

After running the initial analysis as planned and due to the very limited generalizability of a sample size of 13 people, we designed a second analysis to examine the question of how FRS can be protective against suicide even in the presence of ACEs. In this second model we included all 139 eligible participants ranging from no ACEs at all to eight total ACEs. In this analysis we continued to

use our new suicide scale as the response variable. For the explanatory variables we used age, race, sexual identity, FRS, ACEs, and an interaction variable made up of FRS and the ACEs combined.

Methodological Considerations Around Racial and Sexual Minorities

There is a growing movement to include discrimination on the basis of race in the list of experiences that qualify as an ACE. A good example of the thought behind this movement is the theoretical framework suggested by Bernard and colleagues (2020) in which they call for a culturally aware lens for looking at ACEs. We hoped to include some of the suggested framework in our analysis by seeing if race and number of ACEs or total ACEs correlated significantly. This would support the theory that the unique pressures of growing up as a racial minority might put someone at higher risk for ACEs than their non-minority peers. (Caballero et al., 2017; Dobbins et al., 2021). All correlation coefficients were produced using the “cor” function in r studio (R Core Team, 2021).

Similar to the calls for including experiences of racial prejudice as an ACE, some have also called for including the stress of experiencing discrimination or abuse do to one’s sexual orientation or sexual/gender identity as an ACE. In a study by Austin et al. (2016) it was found that 73.2% of LGB participants reported minimum one ACE compared to 59.6% of heterosexual participants. 69.5% of LGB participants reported four or more ACEs. This puts LGB people at a greater risk of poor health outcomes as a result of ACEs. A study by Schnarrs et al. (2019) showed that Transgender and Gender Non-Conforming (GNC) people

were also at significantly higher risk of ACE's, especially physical abuse. Our dataset did not include information on the sexual orientation of participants, but it did show sexual/gender identity. We ran correlations between sexual identity and other variables in our study such as STBs, FRS, and ACEs.

Results

Factor Analysis Results

Four conceptual suicide scales were run using questions from the OYS and PHQ-9. The third of the four performed the best in factor analysis (best model fit and factor loadings). This scale consisted of items 12 and 13 from the OSY and item nine from the PHQ-9 (Table 3). Preliminary parallel analysis of this scale showed the ideal number of factors to be one (Figure 1). This scale, hereafter referred to as the Conceptual Suicide Scale 3 (CSS-3), had the clearest loadings (Table 4). It also had acceptable fit indices (Table 5) and included the three most direct STB related questions we had access to in our dataset. The comparative fit index (CFI) of the CSS-3 single factor model was excellent at 1 (Hu et al., 1999). The RMSEA index did not load, likely due to our small number of items. The SRMR value was good at 0 (Hu et al., 1999).

High ACE Model Results

Linear regression of the small group of participants who had experienced four or more ACEs showed that STBs were negatively predicted by FRS ($r = -.02$, $df=8$, $p = 0.02$). This directly supports our hypothesis that FRS would be a significant protective factor, even in the presence of four or more ACEs. The

effect size coefficient of Cohen's f^2 (Selya et al., 2012) for this model was 1.33 which is excellent (Cohen, 1988), however, it is well documented that small sample sizes tend to increase effect sizes unrealistically (Sullivan et al., 2012), which almost certainly contributes to this large effect size. No other significant correlations were discovered in our linear regression of the High ACE group (Table 6).

All ACE Model Results

The linear regression of all participants (Table 7) showed that STBs were significantly negatively predicted by FRS ($r=-.003$, $df=132$, $p=.484$). This was expected, as the literature surrounding FRS as a protective factor against STBs is clear that it is a protective factor in all ages. The effect size coefficient of Cohen's f^2 for the entire "All ACE" multiple regression model was small (.05).

Linear regression results also showed that STBs were predicted by ACEs ($r=.708$, $df=132$, $p=.054$). This prediction was also expected as the research around ACEs shows clearly that they predict STBs in all groups. It should be noted that the p value of this correlation was just above the generally accepted cutoff for significance at 0.054.

This regression model found that STBs were significantly negatively predicted by an interaction between FRS and ACEs ($r=-.001$, $df=132$, $p=.024$). Exploration of this interaction through r with representation through the r package "ggplot2" (Wickham, 2016) showed that when reported FRS was higher in ACE-exposed youth, STBs were reported to be lower (Figure 2). This interaction also

showed the inverse, that when FRS was lower in ACE-exposed youth then STBs were higher.

Analysis of Race and Sexual Minority Status as they Relate to ACEs and STBs

None of our analyses of race as it correlates to ACEs, FRS, and STBs yielded significant results. This may be a function of our relatively small sample size and lack of diversity with 82% of our participants being white. We ran into a similar problem analyzing gender identity and ACEs in that our sample only included eight gender non-conforming individuals. Nothing significant was found in relation to sexual identity, ACEs, FRS, or STBs in either regression (Tables 6 & 7) or our correlational analysis (Table 8).

Conclusion

Our results provide further support for the generally accepted idea that ACEs are predictive of STBs in young people and that in regular circumstances FRS is protective against STBs in adolescents and emerging adults. Outside of the validation of these previously understood variables, we have provided support for our hypothesis that higher FRS is protective against STBs in already ACE-exposed youth.

The small sample size of the “High ACE” model and the small effect size of the “All ACE” model, does indicate that larger scale versions of this study would be valuable in determining the real-world usefulness of our findings. However, the results of even this small clinical sample clearly indicate that

researchers and clinicians should consider FRS as a significant factor in helping children to recover from traumatic experiences.

Limitations

While every effort was made to utilize best theoretical and methodological practices with the data available there remain some limitations to our study. One of the first limitations encountered was the limited sample size of participants. The relatively small sample size potentially affects our correlations and their effect sizes, making a larger study of a similar design ideal to validate the results herein.

Another limitation in our study is inherent to the cross-sectional design used to analyze the connections between variables. To establish concrete conclusions about the causative effects of family relationship strength and protecting against suicidal thoughts and behaviors in ACE-exposed youth, a controlled experimental design would be necessary.

While our conceptualized suicide scale was necessary and loaded well in factor analysis, it is not a previously tested or validated scale which is a potential limitation to our analysis. In future similar studies, it would be advantageous use a validated measure like the SBQ-R which has been tested before and proven to accurately show STBs in young people.

It is worth noting that the data we used was collected in a clinical setting. The very nature of a participant's presence at the clinic increases their likelihood to have adverse experiences in their life and for them to exhibit some level of

suicidality. This may limit the generalizability of our study to a more clinical sample. This is also a strength as it gives clinicians insight into the behavior of the young people who will be walking into their clinics.

One aspect of our analysis which is also worth noting is that the majority of young people in the sample did not report much or any suicidal thoughts or behaviors, causing the total skewness of STB in our sample to be 1.94 and kurtosis to be 3.48. According to George et al. (2010) this would indicate that our sample skewness is just within the boundary to show normal univariate distribution, which they argue is between -2 and +2, but puts our sample kurtosis well above their cutoff for acceptable kurtosis which is also between -2 and +2. This position presupposes that running our analyses through a regular linear regression model as we did in this study would not be effective in accurately predicting STBs.

While George and associates (2010) would place our sample STB outside of the normal distribution, Hair et al. (2010) argue that between -2 and +2 is an acceptable range for skewness and that between -7 and +7 is an acceptable range for kurtosis, which would put both our sample skewness and kurtosis within normal univariate distribution limits. Because there is evidence to support our sample being within acceptable bounds for normal distribution we continued our analysis as planned. However, to eliminate any concern raised by the sample's closeness to unacceptable levels of skewness and kurtosis in future

analyses STB could be separated into a dichotomous variable of 0 STBs or >0 STBs then predicted through logistic regression.

Areas for Future Study

Future studies using PRN data to analyze FRS as a meaningful protective factor against STBs in ACE-exposed could expand on this study by examining not only first appointment indicators, but how patients improved when different kinds of therapy were used. Our data indicates that the more family-focused the therapy intervention was, the better the outcomes would be for the patient, especially related to STBs.

Our findings also give support for further examining FRS as a protective factor against other negative outcomes in ACE-exposed youth. Depression, anxiety, other mental disorders, and physical health outcomes could all be examined through this same lens of FRS as a protective factor in ACE-exposed youth.

It would be valuable to examine whether other kinds of relationships are protective against STBs, emotional disorders, or other negative outcomes in ACE-exposed youth. For example, it may be found that the important variable is a strong relationship with a trusted person and that the relationship does not need to necessarily be a familial relationship.

Clinical Implications

Based on our findings, clinicians should recognize that trauma-exposed children and young adults with whom they work do not exist in a vacuum and that

efforts to help in their recovery will be helped significantly by involving parents and other family members in their recovery. Ignoring family relationships as potential support to the therapeutic alliance and treating only the child or adolescent by themselves would seem to be a mistake based on our data supporting FRS as a significant protective factor against suicide in young people.

Besides generally encouraging clinicians to include family members in recovery from trauma in young people, our findings support the use of specific therapeutic techniques which intentionally make parents and other family members part of the therapeutic process. For example, our findings support practices such as Attachment Based Family Therapy (Diamond et al., 2016) which specifically focuses on developing healthy attachment to one's parents as a remedy to psychological problems like depression, suicidality, and trauma.

The results of our study also indicate that on a community and public policy level, strengthening family relationships will help traumatized communities with young people in them to better recover and thrive. Walsh (2007) advocates for such an approach, indicating that communities would do best to implement programs which are not solely individual symptom-focused, but which recognize that many public systems contribute to a family's ability to form and nurture healthy relationship strength, especially in traumatic environments like those caused by war, poverty, and natural disaster.

In conclusion, our analysis shows a strong correlational relationship between higher FRS and lower STBs in ACE-exposed youth. This supports the

broadly accepted understanding that close family relationships are protective against suicide in young people and provides the added knowledge that this relationship holds true even when placed against the backdrop of ACEs. This information is valuable in guiding efforts to further understand what factors are most important in helping young people thrive after they have been exposed to trauma. Our findings can also inform clinical and community approaches to helping these young people through strengthening family relationships.

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Table 1.*Demographics and Outcome Means for "All ACE Model" (entire dataset)*

	N	% of total	STB (mean)	FRS (mean)	ACEs (mean)
Gender					
Male	50	35.97	1.32	672.04	1.24
Female	81	58.27	2.37	622.4	1.3
Gender Non-Conforming	8	5.76	2.13	666.38	1.63
Race					
"White"	115	82.73	1.83	641.52	1.24
"Hispanic, Latino, or Spanish"	7	5.04	3.14	601.71	2.43
"Black or African American"	1	0.72	2	468	0
"Asian"	2	1.44	5	784.5	0
"Multicultural (Endorsed more than one race)"	14	10.07	2.14	665.93	1.43
Age					
Adolescent 12-17	105	75.54	1.71	657.06	1.54
Emerging Adults 18-25	34	24.47	2.82	598.71	0.51
Totals	139	100	1.98	642.78	1.29

Note. STB = Suicidal Thoughts and Behaviors; FRS = Family Relationship Strength; ACEs = Adverse Childhood Experiences

Table 2.

Demographics and Outcome Means for “High ACE Group” (those with total ACEs equal to four or more)

	N	% of total	STB (mean)	FRS (mean)	ACEs (mean)
Gender					
Male	4	30.77	1.5	495.75	4.5
Female	7	53.85	2.57	425.71	4.71
Gender Non-Conforming	2	15.38	4	430	4
Race					
“White”	10	76.92	1.8	443.2	4.3
“Hispanic, Latino, or Spanish”	2	15.38	7	270	6
“Multicultural (endorsed more than one race)”	1	7.69	0	851	4
Age					
Adolescent (12-17)	12	92.31	2.58	444.92	4.58
Emerging Adults (18-25)	1	7.69	1	484	4
Total	13	100	2.46	447.92	4.54

Note. STB = Suicidal Thoughts and Behaviors; FRS = Family Relationship Strength; ACEs = Adverse Childhood Experiences

Table 3.*Items used to create Conceptual Suicide Scale 3*

Ohio Youth Scale Item 12	Hurting self (cutting or scratching self, taking pills)
Ohio Youth Scale Item 13	Talking or thinking about death
Patient Health Questionnaire 9 Item 9	Thoughts that you would be better off dead, or thoughts of hurting yourself in some way

Table 4.*Factor Analysis of Conceptual Suicide Scale 3 (Ohio Youth Items 12-13, and PHQ 9 Item 9)*

	<u>One Factor</u>	<u>Two Factor Solution</u>	
	<u>Solution</u>	Suicidal Behavior and Death Ideation	Suicidal Behavior and Suicidal Ideation
Item 1 (Ohio Youth 12)	0.73*	0.38	0.35
Item 2 (Ohio Youth 13)	0.91*	1*	0
Item 3 (PHQ 9)	0.91*	0	1*

Note. Factor loadings above |.30| are in bold. Factor loadings more than 2 times larger than the others are marked with an asterisk

Table 5.*Fit Indices for Conceptual Suicide Scale 3 Factor Analysis*

Factor #	Chi-Square	CFI	TLI	RMSEA	SRMR	BIC
1	238.51*	1*	dl	dl	0*	dl
2	238.51*	0.99*	1.013*	dl	0*	dl

Note: * indicates the model fit was at least acceptable, dl = didn't load

Table 6.

Regression for "High ACE Model" Predicting STB (only those with total ACEs equal to four or more)

	Estimate	Standard Error	T value	Pr(> t)
Estimate	13.534261	6.149454	2.201	0.0589
Age	-0.385650	0.286303	-1.347	0.2149
Sexual Identity	0.533264	1.404181	0.380	0.7140
Race	0.631665	0.523130	1.207	0.2617
FRS	-0.016101	0.005792	-2.780	0.0239*
<i>Model Statistics:</i>				
Multiple R-squared	0.5358			
Adjusted R-squared	0.3037			
F-statistic	2.309 on 4			
Degrees of Freedom	8			
Cohen's f ²	1.33			
P-value	0.1459			

Note. STB = Suicidal Thoughts and Behaviors; FRS = Family Relationship Strength; ACEs = Adverse Childhood Experiences

*Note. * p<.05, **p<.01, ***p<0.001*

Table 7.*Regression for "All ACE Model" Predicting STB (entire dataset)*

	Estimate	Standard Error	T value	Pr(> t)
Intercept	2.7666275	1.9949802	1.387	0.1678
Age	0.0231318	0.0792595	0.292	0.7709
Sexual Identity	0.4837774	0.4189124	1.155	0.2502
Race	0.0955346	0.0979474	0.975	0.3312
FRS	-0.0031331	0.0015725	-1.992	0.0484*
ACE	0.7077259	0.3633124	1.948	0.0535
FRS*ACE	-0.0014802	0.0006473	-2.287	0.0238*

Model Statistics:

Multiple R-squared	0.1846
Adjusted R-squared	0.1475
F-statistic	4.98 on 6
Degrees of Freedom	132
Cohen's f ²	.05
P-value	0.0001254

Note. STB = Suicidal Thoughts and Behaviors; FRS = Family Relationship Strength; ACEs = Adverse Childhood Experiences

*Note. * p<.05, **p<.01, ***p<0.001*

Table 8.*Correlations, Means, and Standard Deviation Across Study Items (N = 139)*

	Age	Sex Id.	Race	STB	FRS	ACEs
Age	1					
Sexual Identity	0.19*	1				
Race	-0.12	0.1	1			
STB	1.13	0.15	0.05	1		
FRS	-0.26**	-0.08	0.04	-0.37***	1	
ACEs	-0.17*	0.05	0.03	0.13	-0.36***	1
<i>Descriptive Statistics for each item:</i>						
Mean	16.25	1.70	1.90	1.98	642.78	1.29
Standard Deviation	3.25	0.57	2.42	2.96	206.44	1.46

Note. STB = Suicidal Thoughts and Behaviors; FRS = Family Relationship Strength; ACEs = Adverse Childhood Experiences

Note. * $p < .05$, ** $p < .01$, *** $p < 0.001$

Figure 1.

Results of parallel analysis for Conceptual Suicide Scale 3

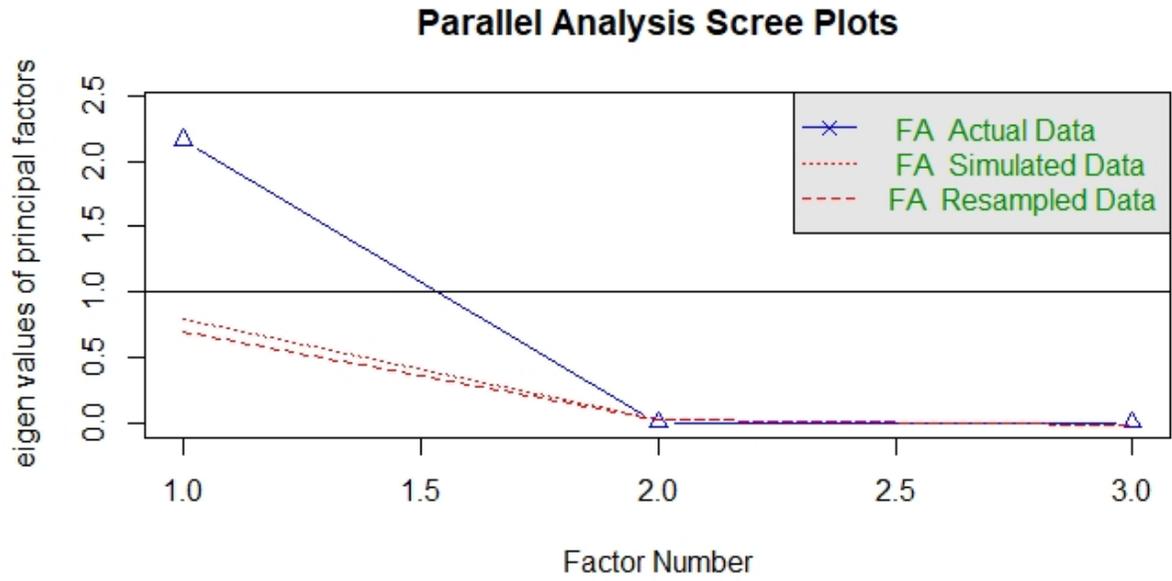


Figure 2.

Exploration of the interaction between ACEs and FRS in predicting STBs

