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Alcohol Behaviors across Perceived Parental Security Profiles in Adolescents

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Abstract

Background: Previous research has suggested a bivariate or correlational relationship between attachment scores and alcohol use behaviors among adolescents.

Methods: The present study is a person-oriented analysis of the association between perceived parental security and alcohol behaviors in Northern Irish adolescents ($N=1,126$, 61% male, school grades 8 to 12; aged 12 to 16 years).

Results: Model-based clustering of Inventory of Parent and Peer Attachment-Revised (IPPA-R) scores yielded five profiles: (a) High Security ($n=146$, 13%), (b) Moderately High Security ($n=371$, 33%), (c) Ambivalent Security ($n=344$, 31%), (d) Moderately Low Security ($n=198$, 18%), and (e) Low Security ($n=67$, 6%). High Security adolescents perceived high levels of communication and trust with, and low levels of alienation from, parents. Alcohol use ranked from least to highest in the order provided above.

Conclusions: When compared to peers with High Security profiles, adolescents with Low Security profiles were almost 8 times more likely to be moderate drinkers and 55 times more likely to be problematic drinkers than abstainers.

Keywords: Parent attachment; Perceived parental security; Drinking behaviors; Addictive behaviors; Person-oriented analysis; Model-based clustering

Introduction

Alcohol behaviors across perceived parental security profiles in adolescents

The Inventory of Parent and Peer Attachment [1] is an index of three perceived parental security dimensions in late adolescents and young adults. The IPPA is intended to assess the extent to which youth perceive both *trust* and open lines of *communication* in their relationships with parents. IPPA items are also used to examine feelings of *alienation* from parents. Gullone and Robinson [2] revised the wording of IPPA items with the aim to simplify the language for use in children and younger adolescents, while retaining a theoretically consistent scale (i.e., IPPA-Revised). Many scholars have used the IPPA and the IPPA-R to examine the association between perceived parental security and alcohol behaviors [3].

One limitation in this literature has been an almost exclusive focus on correlations between IPPA/IPPA-R scores and scores on assessments of alcohol use. Correlations are quantifications of the average association between scores on two variables in a population or sample. However, it is not likely that individuals hold each dimension of perceived parental security to the same degree, which is an assumption that must be made while interpreting a correlation table that includes both multiple perceived parental security factors and outcomes. Instead, it is more likely that individuals hold each dimension of perceived parental security to varying degrees.

In person-oriented analysis, individuals are grouped together based on similarities in scores across a set of target variables prior to the examination of outcomes [4]. Theoretically, the process of grouping is intended to reveal latent classes. Therefore, the variables being

used to group individuals must each contribute to, or account for, a psychological construct. For example, cluster analysis has been applied to scores on six subscales that account for positive and negative attitudes toward the past, present, and future, which has yielded *time attitude profiles* in adolescents [5]. Cluster analysis has also been applied to scores on six subscales intended to assess racial identity attitudes, which has yielded *racial identity profiles* in adolescents [6]. Both time attitude profiles and racial identity profiles have been shown to have meaningful relationships with other variables of consequence in adolescents.

Andretta et al. [7] recently used model-based clustering of IPPA scores to examine perceived parental security profiles in African Americans involved in the juvenile justice system. Model-based clustering is a method of applying finite mixture modeling to the identification of clusters that are homogenous within groups and heterogeneous between groups with regard to a set of variables [8]. In total, Andretta et al. [7] identified four profiles: (a) Low Security ($n=36$, 17%), (b) Moderately Low Security ($n=62$, 29%), (c) Moderately High Security ($n=71$, 33%), and (d) High Security ($n=44$, 21%). When compared to peers, adolescents with High Security profiles were identified by high levels of communication and trust ($\approx +1SD$) alongside low levels of alienation ($\approx -1SD$). Low Security adolescents reported IPPA score profiles that were opposite to those reported by

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High Security peers, with the two moderate groups falling between the poles. The largest differences in outcomes were observed between High Security and Low Security adolescents. Specifically, adolescents with High Security profiles reported substantially higher levels of prosocial behavior (*Cohen's d*=1.37), and meaningfully lower levels of depression (*Cohen's d*=-1.02), anxiety (*Cohen's d*=-0.97), and oppositional defiance (*Cohen's d*=-1.41) when compared to peers with Low Security profiles.

Perceived parental security and alcohol behaviors

Many studies have focused on the effect parents have on adolescent drinking behaviors. Yet, few studies have focused on how parent attachment contributes to drinking behaviors specifically, and where the topic has been researched results have been mixed. Some cross-sectional research has demonstrated a link between a higher risk of substance use (including alcohol use) and less secure parental attachment [9,10]. Meanwhile other research has shown no association between alcohol use behaviors and parental attachment [11] including in longitudinal studies on the subject. For example, van der Vorst, Engels, Meeus, and Dekovic [12] studied IPPA scores in a large sample of adolescents (*N*=1,012) and found that across a year, parent attachment did not have an effect on drinking behaviors. On the other hand, poor parent attachment was associated with the onset of drinking at a young age.

The complexity of the inter-play between attachment and parenting variables was further demonstrated in a recent UK study that included the IPPA-R. McKay [3] reported that when comparing abstainers and moderate drinkers, and accounting for school grade and gender, less strict parental rules, but not parental or peer attachment was significantly associated with drinking behavior. However, when comparing moderate and more problematic drinkers, more problematic drinking was associated with reduced parental attachment, higher peer attachment and less strict parental rules on drinking. In a similar study, Nash et al. [13] reported that greater parental disapproval of drinking was negatively associated with drinking in adolescents. Henry, Oetting, and Slater [14] assessed family attachment in adolescents with three items: "My family cares about me," "I care about my family," and "My family cares about what I do." Using a latent growth model to assess development across a two-year period, these authors showed that adolescents who reported a strong attachment with family also reported less drinking behaviors than peers who reported weaker family attachments.

The present study

The first goal of the previous research has shown that attachment security is a protective factor, and that attachment insecurity is a risk factor, for drinking behaviors. Therefore, if identified, we hypothesized that the highest percentage of abstainers from alcohol consumption would be observed in adolescents with a High Security profile, and the highest percentage of problematic drinkers would be observed in adolescents with a Low Security profile. Moderately High and Moderately Low Security adolescents were hypothesized to fall between the two poles regarding alcohol behaviors. Given the results of the Nash et al. (2005) and McKay (2015) studies, we further posited that higher levels of parent rules about drinking would be associated with lower levels of drinking in adolescents. Due to the exploratory nature of the third research question, no specific hypotheses were generated regarding the association between parent rules about drinking and perceived parental security profiles. The present study was to employ model-based clustering to IPPA-R scores, and to identify perceived parental security profiles in a large sample of Northern Irish (NI) adolescents (*N*=1126). Based on the IPPA groups reported by Andretta

et al. (2015), we hypothesized to observe at least four profiles: (a) High Security, (b) Low Security, (c) Moderately High Security, and (d) Moderately Low Security. The second goal of the present study was to examine the association between perceived parental security cluster membership and drinking behaviors.

Method

Participants and procedure

Data included 1,126 Northern Irish, high school students (61% male, grades 8 to 12, aged 12-16 years). Participants were from 12 high schools in the greater Belfast area. Each participating school was asked to provide around 20-25 pupils from each of grades 8 (age 12) through 12 (age 16). Schools were purposively chosen to reflect the overall demographics of the area (Catholic versus State schools; academically-focused Grammar schools versus more vocational Secondary schools). All schools approached agreed to participate.

Parents of participants were provided with information about the study, and given an opportunity to exclude their child from participation. No parents withheld consent for their children to participate. The University Ethics Committee at the second author's institution approved the consent form, which was completed by youth on the day of data collection following an explanation of the study. The setting for data collection was similar to test-taking conditions, and collection took approximately 40 minutes. Researchers and field workers assisted participants where necessary with any issues of comprehensibility in order to ensure no missing data.

As the data were clustered at the school level (i.e. pupils within schools), a set of dummy variables was fitted to take account of the non-independence of study respondents at the school level. Given the relatively small number of schools (clusters), multi-level modeling analyses were not viable. For such analyses, it has been suggested that a sample of 50 clusters (schools) or less leads to biased estimates of the second-level standard errors [15]. A total of 23 questionnaires were discarded because of their having been spoiled (multiple answers for all items). However, there were no additional problems with data collection (e.g., missing data).

Measures

The parent focused items of a revised version [2] of the Inventory of Parent and Peer Attachment was used (IPPA; [1]). The IPPA-R includes 28 items used to assess perceived parental security. Youth endorse the degree to which they agree with each item on a 5-point Likert scale ranging from *almost never true or never true* to *almost always true or always true*. The IPPA-R includes three factors: (a) communication (α parent=.83), (b) trust (α parent=.88), and (c) alienation (α parent/peer=.80). The structural validity, internal consistency, and validity of IPPA-R scores have been substantiated in studies that have included adolescents [2,12].

Drinking behaviors were assessed using the Adolescent Alcohol Involvement Scale (AAIS; [16]). The AAIS includes 14-items, and scores between 0 and 79 are used to classify respondents into 5 categories namely: abstainers=0; 'normal' (those who rarely drink) adolescents=1-19; alcohol misusers=42-57 and 'alcoholic-like' drinkers=58-79. Mayer and Filstead [16] reported internally consistent AAIS scores, and adequate test-retest reliability of AAIS scores. Further, Mayer and Filstead [16] reported that the average internal consistency of AAIS was shown to be .86 in meta-analyses of studies to include

the index (α present study=0.78). In a recent study in NI, McKay and Dempster, [3] provided evidence for the psychometric validity and internal consistency ($\alpha=0.84$) of the AAIS in a large adolescent sample ($n=4600$).

Parent rules about drinking were assessed using the - The Rules about Alcohol Questionnaire (RAQ; [17,18]). The RAQ includes 10 items, and for each item respondents endorse the degree to which their parents set rules around drinking (1=*completely acceptable* to 5=*completely unacceptable*; α present study=0.88). Internal consistency of RAQ scores has been shown in adolescents (e.g., $.83 \geq \alpha \leq 0.89$; [18]).

Results

IPPA-R scores were not skewed or kurtotic with the exception that trust scores were consolidated around the mean (i.e., kurtosis=4.84). Other descriptive statistics and intercorrelations of IPPA-R scores are shown in Table 1. Correlations among IPPA-R scores were moderate, and in keeping with theory. That is, a positive association between communication and trust was observed, and negative correlations were observed between alienation and the other IPPA-R subscale scores. Correlations between parent rules about drinking and IPPA-R scores were small, the largest being positive and between parent rules and communication.

Model-based clustering of IPPA-R scores

The *mclust* package in R statistics was used to develop model-based clustering of IPPA-R scores ($N=1,126$; [19,20]). Model-based clustering uses finite mixture modeling to determine a set of probability distributions, each probability distribution being a latent class or cluster [21]. *Mclust* applies 10 parameterizations across one to nine possible cluster solutions.

Results yielded three optimal solutions as assessed by three fit-statistics (Table 2), which pointed to a four or five cluster solution. Average posterior probabilities (*APP*) were calculated for the cluster solutions, and higher probabilities were observed across the five-cluster solution (Figure 1) than the more optimal of the two four-cluster solutions (0.86, 0.79, 0.82, 0.76). Third, *T*-scores for each IPPA-R

Measure	M	SD	1	2	3	4
1. Communication	36.73	7.45	--			
2. Trust	42.41	6.68	0.78	--		
3. Alienation	18.37	6.08	-0.67	-0.72	--	
4. Parent Alcohol Rules	41.73	8.32	0.2	0.18	-0.11	--

Note: M: mean; SD: standard deviation; p -value ≤ 0.001 where $r \geq 0.11$. Power analyses using the *pwr* package in R statistics showed that an r coefficient of 0.10 was the cutoff for a minimally interpretable correlation (italics). Power was set to the recommended level of 0.80 [41], and significance level was determined using Bonferroni's adjustment (i.e., $p=0.01$).

Table 1: Descriptive statistics for inventory of parent and peer attachment-revised scores and parent alcohol rules.

Number of Components	df	Parameterization	BIC	ICL	I
4	39	VVV	-20052.7	-20540.5	-9889.35
4	33	VEV	-20052.4	-20620.7	-9910.27
5	33	VVV	-20049.3	-20459.3	-9905.22

Note: The *mclust* package in R-statistics returns the three most optimal models for the data. VEV: ellipsoidal, equal shape; VVV: diagonal, varying in volume and shape. BIC: Bayesian Information Criterion, ICL: Integrated Completed Likelihood, I: Log-likelihood. The optimal solution is highlighted in italics.

Table 2: Gaussian Finite Mixture Models Fitted by Expectation-Maximization Using IPPA-R Parent Scores (Northern Ireland Data; $N=1126$).

subscale were plotted, and results showed five distinct profiles (Figure 1). To further validate the five-cluster solution as recommended by Mun, von Eye, Bates, and Vaschillo [22], model-based clustering was run a second time using a randomly selected 75% of the sample. Using the *mclust* package in R statistics, an *Adjusted Rand Index* (*ARI*) showed substantial overlap in cluster assignments when including the entire and randomly selected samples ($ARI=0.90$; [23]).

The first profile was characterized by extremely low levels of communication and trust with parents (≥ -2 SD) alongside elevated feelings of alienation ($\approx +2$ SD), and was therefore labeled Low Security (See Figure 1). The second profile included adolescents with communication and trust scores slightly above the mean ($\approx +0.5$ SD), and scores for alienation (≈ -0.5 SD) that fell just below the mean: Moderately High Security. The third profile was labeled High Security due to comparatively elevated levels of communication and trust with parents ($\approx +1$ SD) coupled with low scores for alienation (≈ -1 SD). Adolescents with an Ambivalent Security profile reported average scores across all three IPPA-R subscales. The fifth profile was characteristic of adolescents with moderately depressed scores for communication and trust (≈ -1 SD), and moderately elevated alienation scores ($\approx +1$ SD): Moderately Low Security.

Perceived parental security profiles and drinking behaviors

Preliminary analyses showed that perceived parental security profiles were not contingent upon gender, $\chi^2(4)=9.51$, $p=0.05$, *Cramer's V*=0.09 or grade level, $\chi^2(16)=43.57$, $p<0.001$, *Cramer's V*=0.10. Previously, as herein, we found 'Normal' ($n=51$, 4.5%) and 'Alcoholic-like' ($n=6$, 0.53%) groups in the AAIS to have relatively few members. As previously done, three revised AAIS categories were formed [24]: (a) *abstainers*=0 ($n=355$, 32%), (b) *moderate drinkers*=1-41 ($n=569$, 50.53%), and *problematic drinkers*=42-79 ($n=202$, 17.94%). Therefore, a problematic drinker was defined as anyone scoring ≥ 42 on the AAIS. Results of a multinomial logistic regression are shown in Table 3.

In keeping with our hypotheses, it appears that adolescents with High Security profiles were the most likely to be abstainers, and adolescents with Low Security profiles were the most likely to be problematic drinkers with the other profiles falling between the two poles. When compared to adolescents with a High Security profile, Low Security adolescents were almost 8 times more likely to be a moderate drinker and 55 times more likely to be a problematic drinker than an abstainer. Youth with Moderately Low Security profiles were also far more likely to be moderate (2 times) or problematic (7 times) drinkers than abstainers when compared to High Security peers. Lower levels of risk for moderate and problematic drinking were observed among Moderately High Security and Ambivalent adolescents, though risk remained substantial when compared to High Security adolescents.

Results of Analyses of Covariance (ANCOVA) controlling for gender, grade, and school showed that AAIS alcohol behavior categories were associated with parent rules about drinking, and the association was both statistically and practically significant (Table 4). Abstainers reported the highest levels of parent rules about drinking, followed by moderate and problematic drinkers. ANCOVA results also pointed to a statistically and practically significant association between parent rules about drinking and perceived parental security profiles (Table 4). Parent rules about drinking were highest among adolescents with High Security profiles, followed in order, by adolescents with Moderately High Security, Ambivalent Security, Moderately Low Security, and Low Security profiles.

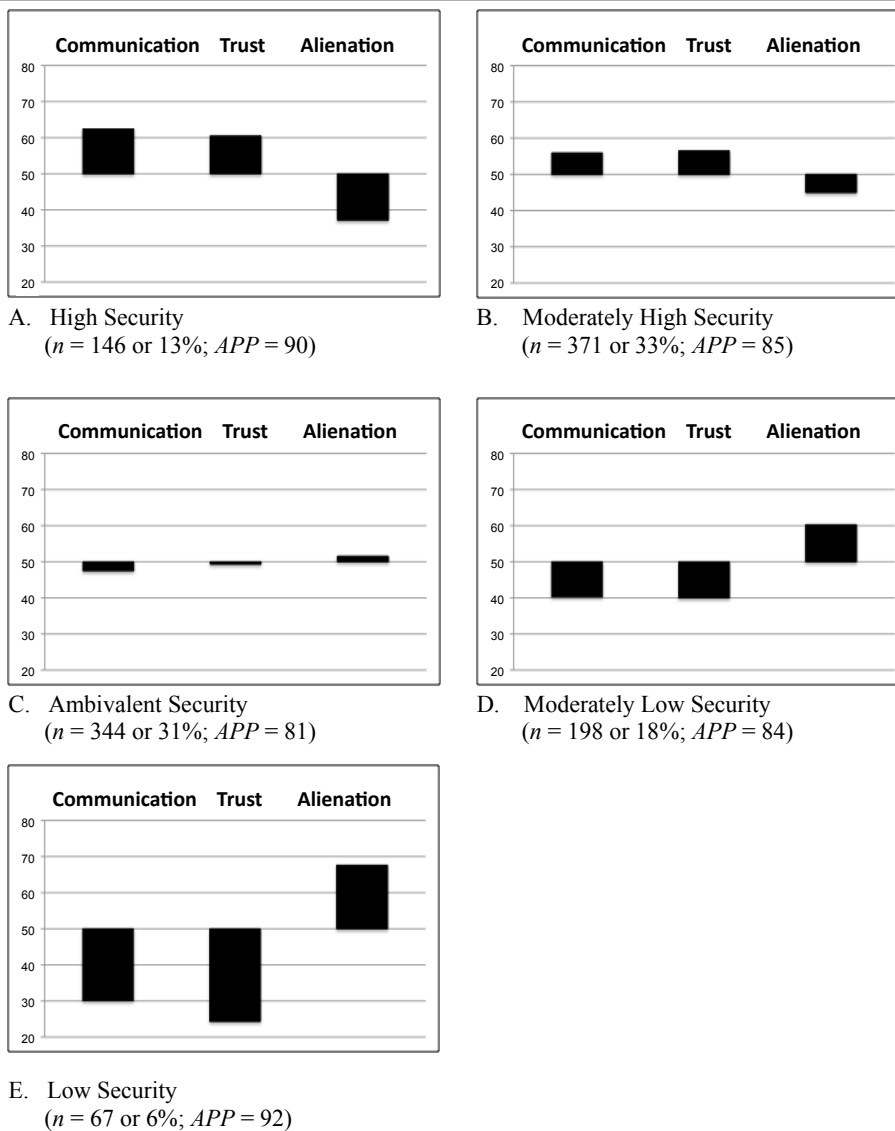


Figure 1: Profiles are shown using *T*-scores, where 50 is the mean with a standard deviation of 10.

Discussion

The present study sought to investigate the viability of model-based clustering using IPPA-R scores, and the extent (if at all) to which clusters or profiles that would emerge would significantly and meaningfully relate to alcohol use behaviors. Five perceived parental security profiles were identified, and drinking behavior classifications were shown to be contingent upon these IPPA-R profiles. Previous research on the association between parent attachment and drinking behaviors have been mixed, with some studies showing an association [25] and some reporting little or no effect [12].

In developmental terms, van der Vorst et al. asserted that parent attachment does not affect the acquisition of drinking behaviors during adolescence, and these authors used a linear model to examine IPPA scores. By contrast, Caspers et al. [26] used a person-oriented analysis by employing the Adult Attachment Interview to identify attachment classifications (AAI; [27]), and these authors reported more illicit substance use among Insecure-Dismissing than Secure young adults. The discrepancies in findings might be explained by method. That is,

the studies to show no effect of parent attachment on drinking have been variable-oriented (i.e., linear models). In contrast, the person-oriented studies (e.g., attachment classification and IPPA-R profiles) have shown an effect, and may have therefore better accounted for the total effect of parent attachment on alcohol behaviors.

In keeping with previous research [3,13], parent rules about drinking were shown to have a negative, and substantial relationship with drinking classifications. That is, the more restrictive parents' rules about drinking were, the less likely the adolescent was to be a moderate or problematic drinker. Parent rules about drinking were also associated with perceived parental security profiles. Specifically, the more strict adolescents perceived rules about drinking, the more likely they perceived a high level of security in their relationships with parents. The implication is that parents can set limits around drinking without worrying about potential damage to their attachments with adolescents, and that more strict parental rules on drinking are protective against more problematic consumption.

Results of the present study have a few implications for

Demographics/ Profiles	Reference category is abstainers Moderate drinkers			Problematic drinkers			Reference category is moderate Problematic drinkers		
	B (SE B)	RRR (95% CI)	p-value	B (SE B)	RRR (95% CI)	p-value	B (SE B)	RRR (95% CI)	p-value
Gender									
Female	--	--	--	--	--	--	--	--	--
Male	-0.42	0.66	0.06	-0.48	0.61	0.22	-0.06	0.93	0.81
	-0.22	(.43, 1.02)		-0.32	(.32, 1.16)		-0.27	(.55, 1.58)	
School Grade									
Grade 8	--	--	--	--	--	--	--	--	--
Grade 9	0.62	1.86	0.004	1.08	2.96	0.02	0.46	1.59	0.3
	-0.21	(1.22, 2.82)		-0.46	(1.19, 7.34)		-0.45	(.66, 3.82)	
Grade 10	0.66	1.93	0.003	1	2.73	0.03	0.35	1.42	0.43
	-0.22	(1.25, 2.98)		-0.46	(1.11, 6.75)		-0.44	(.60, 3.34)	
Grade 11	0.77	2.16	0.001	2.44	11.57	<0.001	1.68	5.37	<0.001
	-0.23	(1.36, 3.41)		-0.44	(4.92, 27.17)		-0.41	(2.40, 11.97)	
Grade 12	1.44	4.22	<.001	2.98	19.75	<0.001	1.54	4.68	<0.001
	-0.3	(2.34, 7.63)		-0.48	(7.76, 50.27)		-0.42	(2.07, 10.55)	
Perceived Parental Security Profiles									
Secure	--	--	--	--	--	--	--	--	--
Moderately High Security	0.47	1.59	0.04	0.54	1.71	0.2	0.07	1.08	0.85
	-0.23	(1.01, 2.51)		-0.42	(.75, 3.93)		-0.4	(.49, 2.33)	
Ambivalent Security	0.81	2.25	0.001	1.14	3.13	0.007	0.32	1.39	0.4
	-0.24	(1.40, 3.62)		-0.42	(1.37, 7.16)		-0.39	(.65, 2.98)	
Moderately Low Security	1	2.72	<.001	1.69	5.42	<0.001	0.69	1.99	0.09
	-0.28	(1.56, 4.75)		-0.45	(2.24, 13.14)		-0.4	(.91, 4.37)	
Low Security	2.07	7.91	0.002	4.01	55.31	<0.001	1.94	7	<.001
	-0.65	(2.19, 28.44)		-0.73	(13.09, 233.75)		-0.45	(2.87, 17.03)	

Note: B: Beta; SE: Standard Error of Beta; RRR: Relative Risk Ratio; CI: Confidence Interval. Clustering at school level controlled for using dummy variables. Analyses included Parent Alcohol Rules as a control variable. Model Fit $\chi^2(40)$, $p < 0.001$, Pseudo $R^2 = 0.16$.

Table 3: Perceived Parental Security Profiles and Predictors Associated with revised AAIS Group Membership: MLR (shown are RRR +95% CI, N=1,126).

	Mean	Standard Deviation
Alcohol Behaviors		
Abstainers	46.23	5.94
Moderate Drinkers	41.07	7.49
Problematic Drinkers	35.66	9.62
F (2, 1105), p <.001	71.74	
partial η^2	0.11	
PPS Profiles		
High Security	44.48	7.65
Moderately High Security	42.66	7.86
Ambivalent Security	41.21	8.36

Note: ANCOVAs were developed controlling for grade, gender, and school. Power analysis was developed using the pwr [42] package in R-statistics [20]. Statistical significance was set to 0.01, and power was set to 0.80 [41]. Results indicated that 0.003 and 0.004 were the cutoffs for minimally interpretable eta-squared coefficients for alcohol behaviors and PPS profiles, respectively.

Table 4: Analyses of covariance for the effect of parent rules on perceived parental security profiles and alcohol behaviors.

interventions focused on alcohol behaviors in adolescents. First, efforts might benefit from utilizing characteristics of parent attachment where relationships are strong. Specifically, communication with, and trust of parents could be used to employ parental rules on drinking, especially given that parent rules have been shown to be effective in reducing

such behavior [3]. Longitudinal studies have shown that problematic behaviors degrade relationships with parents' overtime, so this strategy might be more effective earlier rather than later in the development of drinking behaviors. For example, van der Vorst et al. [12] showed that engagement in drinking behaviors caused perceived attachment with parents to decrease during adolescence.

These data also suggest that family therapy focused on aspects of parent attachment might be beneficial in alcohol related interventions. Diamond and Siqueland [28] introduced Attachment-Based Family Therapy (ABFT), and results of studies on ABFT in adolescents were promising. The focus of ABFT is on expanding lines of communication and feelings of trust between adolescents and their parents, thereby diminishing feelings of alienation. Studies to include ABFT in adolescents have shown reductions in anxiety, depression, family conflict, and suicidal ideation [29,30]. It would be important to know if ABFT was also an effective intervention for problematic drinkers, and, or, an effective preventative effort among abstainers and moderate drinkers. For one, ABFT might prove a useful method for establishing parent rules about drinking.

It is also possible that bolstering perceived parental security in therapeutic settings might deflect peer pressure susceptibility through self-efficacy. Parental attachment has been shown to be indicative of self-efficacy [31], and self-efficacy has been shown to be protective against

peer pressure susceptibility [32]. In fact, psychosocial maturation is one reason why adolescents appear better able to resist peer pressure late in adolescence [33]. Future inquiry should include a longitudinal study on the pathway between IPPA-R profiles and peer pressure susceptibility through self-efficacy.

The results of the present study in respect of the relationship between alcohol use behaviors and perceived parental security profiles are strengthened by some additional findings which are fully consistent with an emerging literature. Firstly, the results of the regression models displayed in Table 3 suggest that girls are as likely to drink problematically as boys. Historically this was not the case in NI, where boys appeared more at risk of problematic drinking than girls [34]. However, a growing body of research has begun to suggest that a convergence has taken place so that girls are as likely as boys to drink problematically [35,36]. The results of the present study support this suggested convergence. Secondly, the results for school grade (a proxy measure of age) are in line with much other literature [35-37], which has suggested that between ages 10 and 18, the prevalence of alcohol consumption increases with each increasing year band, so that while adolescent consumption may begin in early adolescence it works towards a peak in later adolescence.

Limitations

The present study included survey research on parent attachment patterns, and researchers have shown that structured interviews are a strong alternative [38]. Observations of adolescent attachment behavior might also be possible, though this method has not been advised in adolescence [39]. Further, data in the present study were cross-sectional. It would be important to know the stability, and effect of perceived parental security profiles on alcohol involvement over time. Replications in diverse populations are needed to determine the generalizability of IPPA-R profiles. Perhaps the influence of perceived parental profiles on drinking behaviors will be found to differ across cultures. It was noted that four of the five identified in the present study were also shown in African Americans with juvenile court contact in the United States. Another limitation was that data were solely self-reports provided by adolescents. This method of data collection has been criticized by some for yielding results that are shaped by mono-informant bias, and not the intended constructs [40-44]. Finally, no data were available for socioeconomic status, and future studies might include such data as it is possible that socioeconomic status is meaningfully related to both parental security and alcohol use behaviors.

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