Published in final edited form as:
Addict Behav. 2018 December ; 87: 251–259. doi:10.1016/j.addbeh.2018.07.022.

Method effects of the relation between family history of alcoholism and parent reports of offspring impulsive behavior

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Abstract

There is an extensive, albeit inconsistent, literature on the relation between parental alcoholism and offspring impulsive behavior. The reasons for this inconsistency are likely multiple but it seems probable that method effects due to different methodological approaches might explain some of the inconsistencies. Offspring behavior is typically assessed based on informant reports. However, no specific method has been demonstrated as optimal for analyzing informant reports, and conclusions may differ depending on the method used. The present study compared findings derived from a multi-informant method proposed by Bauer et al. (2013) to other structural equation models. Participants came from Wave 7 of the Alcohol, Health and Behavior study and included mother and father reports of offspring impulsive behavior on the Health and Behavior Questionnaire (Armstrong, Goldstein, & the MacArthur Working Group on Outcome Assessment, 2003). There were 368 offspring (50% female, age range 3–17 years, $mean_{age}$ = 6.78, SD_{age} = 3.07) from 205 families. The multi-informant model and the single-reporter models each provided a good fit of the data; however, findings differed based on the approach employed. Specifically, the mother-only report model found that offspring with a family history of alcoholism (FHA) were more impulsive compared to offspring without a FHA; no effect of FHA was found in the other single-reporter models. Ratings of offspring impulsive behavior were higher on the father perspective factor suggesting alcoholic fathers were biased in their reports. These findings highlight the relation between FHA and impulsive behavior varies depending on the analytic method used.

Keywords

Multi-informant data; Offspring impulsive behavior; Family history of alcoholism

1. Introduction

Having a positive family history of alcoholism (FHA) is one of the strongest risk factors for developing alcohol use disorder (AUD) (e.g., Chartier, Hesselbrock, & Hesselbrock, 2010;

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Chassin et al., 2016; Connor, Haber, & Hall, 2016; Hägele, Friedel, Kienast, & Kiefer, 2014; Jung, Goldstein, & Grant, 2016; Kendler et al., 2015; Sher, Grekin, & Williams, 2005; Verhulst, Neale, & Kendler, 2015). An extensive literature documents impulsivity is also associated with increased risk for alcohol use and problems especially among adolescents (e.g., Athamneh, Stein, Quisenberry, Pope, & Bickel, 2017; Ernst, Romeo, & Andersen, 2009; MacPherson, Magidson, Reynolds, Kahler, & Lejuez, 2010; Sanchez-Roige, Stephens, & Duka, 2016; Stautz & Cooper, 2013). Similarly, evidence suggests behavioral undercontrol (reflecting deficits in self-control; Littlefield & Sher, 2016) contributes a substantial proportion of the variation in the genetic risk for AUD (Dick et al., 2010;Slutske et al., 2002: Verhulst et al., 2015). Often risk factors in off-spring, like impulsive behavior, are assessed using informant reports.

Although informant reports have the potential to supply information not otherwise captured by a self-report, they may be inaccurate for a variety of reasons (e.g., lack of opportunity to witness certain behaviors, bias due to informant psychopathology [e.g., Achenbach, Krukowski, Dumenci, & Ivanova, 2005; De Los Reyes & Kazdin, 2005; Duhig, Renk, Epstein, & Phares, 2000; Earls, 1980; Schmidt & Hunter, 1996). Another issue inherent in multi-informant reports is how best to analyze the data. Various methods have been used to analyze informant reports, such as selecting an “optimal” informant (notably, there are no set criteria for selecting an optimal reporter; see Kraemer et al., 2003 for more detail) or the more severe observation (e.g., Achenbach & Edelbrock, 1978; Horton & Fitzmaurice, 2004; Kraemer et al., 2003; van Dulmen & Egeland, 2011). Although a meta-analysis of cross-informant correspondence indicated mother and father reports of off-spring externalizing behavior were highly correlated (r = 0.58; De Los Reyes et al., 2015), it is not uncommon for informant reports to yield inconsistent results (e.g., Achenbach, 2006; De Los Reyes & Kazdin, 2004, 2005, 2006; Goodman, De Los Reyes, & Bradshaw, 2010). Inconsistencies across informant reports may motivate researchers to use a single reporter model to analyze their data. However, utilizing multi-informant analytic approaches may be optimal because they combine approaches seeking consensus in ratings and avoid complications incurred by disagreements among raters by assessing both common (across raters) and unique (to a given rater) sources of variance. Thus, efforts have been made to increase options for analyzing multi-informant data (e.g., Martel, Markon, & Smith, 2017).

One such approach for analyzing multi-informant data is a trifactor model developed by Bauer et al. (2013). The tri-factor measurement model is a useful approach for analyzing data from multiple informants because it decomposes variance into the overall trait, reporter bias, and unique aspects of the scale (Bauer et al., 2013). The tri-factor model is more psychometrically advantageous than single reporter models because it provides a method for integrating scores and information on the unique perspectives of informants. Single reporter models do not consider informant idiosyncrasies, so it is possible conclusions may differ depending on the method used to analyze informant-reports. The goal of the present study was to investigate how the conclusions might differ when the data are analyzed using a multi-informant report model based on the tri-factor model versus single-reporter models, which have been commonly used to understand offspring behavior. It was hypothesized offspring with FHA will be rated as more behaviorally impulsive than those without FHA.

2. Methods

2.1. Participants

The data were drawn from a cohort of first-time college students (N = 489; 53% female $mean_{age}$ = 18.52 years, SD = 0.97; 94% White) ascertained based on having a family history of paternal alcoholism (52% at baseline; Sher, Walitzer, Wood, & Brent, 1991). Assessments were conducted at seven occasions over a 16-year period. At the seventh measurement occasion (mean age ≈ 34 years old), the probands(i.e., original participants) and their spouses were invited to participate in the study and completed a range of assessments on themselves and their offspring. Data were gathered on 368 offspring (50% female, $range_{age}$ 3–17 years, $mean_{age}$ = 6.78, SD = 3.07) from 205 families ($range_{offspring}$ = 1–5; $mean_{offspring}$ = 1.79, SD = 0.90). Four hundred and thirty-nine parents reported on their offspring's behavior.

2.2. Measures

Parent reports of offspring impulsive behavior were measured using the nine-item subscale of the Health and Behavior Questionnaire (HBQ; Armstrong et al., 2003[1]; Table 1). Fifty-five percent of parents (25% of moms and 43% of dads) met criteria for a lifetime AUD based on the Diagnostic Interview Schedule, version IV (DIS-IV; Robins, Cottler, Bucholz, & Compton, 1997) for the fourth edition of the Diagnostic and Statistical Manual of Psychiatric Disorders (DSM-IV; American Psychiatric Association [APA], 1994). Offspring were identified as having a FHA if at least one biological parent met criteria for lifetime AUD. Fewer offspring came from families with at least one parent with lifetime AUD (i.e., 97 FHA families with 165 offspring vs. 108 without FHA families with 203 offspring). Tetrachoric correlations between variables are provided in Table 2.

2.3. Data analysis

Mplus version 7 (Muthén & Muthén, 2015) statistical software was used to analyze the data. Offspring impulsive behavior was investigated using 1) mother, 2) father, 3) severe, and 4) multi-informant report models (based on the tri-factor model). The cluster option was used to account for nesting of offspring within families. One hundred and seventeen offspring (from 60 families) had only a single reporter, most typically mother only (n = 71 offspring). Missing data was handled using full information maximum likelihood.

The single reporter models were based on mother, father, and the more severe of the two reports only (based on the more severe rating for each item). When two ratings were provided, 20.98% fathers provided a more severe rating, 13.98% mothers provided a more severe rating, and the 65.04% of the ratings were equivalent. The manifest variables were the nine HBQ impulsive behavior items. Covariates tested in each model included: family history of alcoholism (FHA), sex and age of the offspring, and all possible two and three-way interactions. Age was markedly skewed so two dummy variables were created to

[1]The HBQ was made available free of charge by the John D. and Cathrine T. MacArthur Foundation Research network on psychopathology and Development (David J. Kupfer, Network Chair).

represent three age groups: 3–5 years (n = 156, the reference group for the dummy variables), 6–9 years (n = 147), and 10+ years (n = 65).

The Bauer et al. (2013) trifactor model (Fig. 1) is a bifactor model comprised of two parts: the unconditional and the conditional models. The unconditional model includes observed ratings of offspring behavior and three latent variables: P, C, and S. P represents the perspective of the informant (P_m = mother reports) and P_f = father reports) and variance specific to informant ratings of the trait with higher factor loadings indicating informant disagreement (and potentially informant bias). *C* represents common variance across the two perspective factors with higher factor loadings indicating agreement between informant reports. *S* represents the specific factors and variance explained by unique aspects of the nine impulsivity items on the HBQ, with higher factor loadings indicating more variance is explained by the scale.

In the unconditional model, the loadings for the P_m and P_f factors were constrained to be equal to test the assumption of interchangeability of reporters (i.e., were observed ratings of the construct the same regardless of reporter). Each factor was scaled to have a mean of zero, the variance was free, the highest factor loading was constrained to one, and the intercepts were also constrained to be equal for mother and father reports.

Initial attempts to fit the unconditional trifactor model with the common, perspective, and specific factors outlined by Bauer et al. (2013) were unsuccessful, as the estimated solution was rank deficient, suggesting the single factor Bauer et al. model may be over-dimensionalized in these data (Savalei & Kolenikov, 2008). Attempts to fit an identified model by dropping item-level factors resulted in identified, but poorly fitting models. As a result, exploratory factor analysis was conducted indicating three factors fit the data best (χ^2 (102) = 184.41, $p < .001$; RMSEA = 0.05 [90% CI: 0.04–0.06]; CFI = 0.96; TLI = 0.95): a general impulsive behavior factor (C_g), a verbal impulsive behavior factor (C_v), and a perspective factor. The impulsivity factors were significantly correlated (0.37). Based on this solution, a multi-informant model was fit including a general impulsive behavior factor, a verbal impulsive behavior factor, a mother perspective factor, and a father perspective factor (χ^2 (111) = 149.87;RMSEA = 0.03 [90% CI: 0.02–0.04]; CFI = 0.98; TLI = 0.97; see Fig. 1). The latent variables in each single reporter model included the general and verbal impulsivity factors for consistency.

The conditional model is an extension of the unconditional model with the *C* and *P* factors regressed on the covariates of age, sex, and FHA status. Regressing the *P* factors on the covariates determines whether parents are more likely to report differences in impulsive behavior based on age and sex of the offspring, and whether parents with a lifetime AUD are more likely to be biased in their reports of offspring impulsive behavior. The multi-informant model can differentiate trait variance from variance due to reporter bias, which is what distinguishes this model from single-reporter models.

3. Results

3.1. Mother report model

Table 3 displays the findings from the single reporter models. The mother report model of offspring impulsive behavior fit the data (χ^2 (52) = 105.20; RMSEA = 0.06 [90% CI: < 0.04–0.07]; CFI = 0.95; TLI = 0.92). Offspring with FHA, boys and those ages 3–5 years were rated higher on the general impulsive behavior factor compared to offspring without FHA, girls, and those ages 6–9 and 10+ years, respectively. Offspring ages 6–9 years showed higher levels of verbal impulsive behavior compared to younger offspring.

3.2. Father report model

The father report model of offspring impulsive behavior fit the data (χ^2 (52) = 117; RMSEA = 0.07 [90% CI: < 0.05–0.08]; CFI = 0.95; TLI = 0.93). No effect of FHA was found. Offspring ages 3–5 years were rated higher on the general impulsive behavior factor compared to offspring ages 6–9 and offspring age 10+ years. Further, girls and offspring ages 6–9 years were rated as more verbally impulsive compared to boys and offspring ages 3–5 years, respectively.

3.3. Severe report model

The model using the more severe of mother and father reports of offspring impulsive behavior fit the data well (χ^2 (52) = 95.04; RMSEA = 0.05 [90% CI: 0.03–0.06]; CFI = 0.96; TLI = 0.95). A marginally significant (p = .06) FHA effect was found on the general impulsive behavior factor. Additionally, boys and offspring ages 3–5 years were higher on impulsive behavior compared to girls and offspring ages 6+ years, respectively. Offspring ages 6–9 years were rated as more verbally impulsive compared to younger offspring.

3.4. Multi-informant model

The chi-square difference test was not significant (χ^2 (8) = 7.56, p = .48) indicating mothers and fathers function as interchangeable reporters in multi-informant model (χ^2 (119) = 152.30; RMSEA = 0.03 [90% CI: 0.01–0.04]; CFI = 0.98; TLI = 0.98). Thus, the respective loadings of the mother and father perspective factors were fixed to equality (Table 4). The conditional model involved regressing the C_g, C_v, P_m and P_f factors on FHA, sex of the offspring, age of the offspring, and all two-way interactions (Table 5). Sensitivity analyses were conducted by excluding offspring without both parent reports.

The model including missing reporters indicated an effect of FHA on offspring impulsive behavior on the father and marginally (p = .06) on the mother perspective factors, suggesting parents with a lifetime AUD are biased in their reports of offspring impulsivity. The data also suggest parents tend to consistently report their female offspring as higher on verbal impulsive behavior compared to their male offspring, and offspring ages 3–5 years as higher in general impulsive behavior than offspring ages 6–9 and 10+ years. Additionally, the findings suggest bias in mothers' reports of male offspring impulsive behavior and bias in fathers' reports of impulsive behavior in offspring ages 10+ years. The sensitivity analyses provided similar findings with the exception that fathers we biased in their report of offspring impulsive behavior among those age 3–5 years compared to 10+ only in the model including missing reporters (Table 5).

4. Discussion

The goals of the present paper were to compare methods of analyzing parent reports while examining the effect of FHA on offspring impulsive behavior. The findings varied as a function of analytic approach. Consistent with the larger literature (based mostly on mother's reports), the mother-only report model indicated offspring with FHA were higher on general impulsive behavior than those without FHA. Although there is no defined "optimal reporter," often mother reports are used when investigating offspring behavior based on informant report presumably because it is assumed mothers have the most contact with their offspring and, thus, may be more aware of their offspring's behaviors. In contrast, there was no effect of FHA in the father-report model and a marginal effect of FHA in the severe-report model. Given the possibility of bias toward minimization, utilizing the more severe report model may reduce social desirability biases. It is unclear why the findings differed across single-reporter models, and unfortunately, there is no gold standard to determine which informant is correct.

De Los Reyes (2013) purports using multi-informant reports are important because each informant provides a unique and valid perspective on the target. The multi-informant model provides more information than the single-reporter models because it distinguishes variance due to idiosyncrasies of the reporter versus the consensus-observed trait. If mother's report is used as the gold standard, we find having a FHA is associated with increased impulsive behavior in off-spring. Notably, the multi-informant model indicated alcoholic parents are biased in their reports of offspring impulsive behavior. These findings suggest offspring with a FHA may not exhibit more impulsive behavior, but alcoholic parents perceive their offspring as behaving more impulsively. A potential repercussion of this bias is offspring with FHA seeking an Attention Deficit Hyperactivity Disorder (ADHD) evaluation, for example, are at increased risk of being diagnosed because their affected parent is more likely to rate them as behaviorally impulsive. Clinicians may request an unaffected family member complete the rating forms for the ADHD evaluation.

The tri-factor model (Bauer et al., 2013) is a special case of multi-trait multi-method models which estimates a single trait across multiple observers. This model is useful for determining the proportion of variance shared across raters, systematic rater effects idiosyncratic to a type of rater and unique shared variance across individual items. In this data set, which is, as discussed below, a somewhat small sample, the model appeared significantly improved by considering the possibility that more than one common trait is present in the data. Researchers interested in applying the tri-factor model in future research may wish to consider this multidimensional possibility.

The conceptual status of the trait factors deserves some additional comment. Although large proportions of shared variability across raters is often taken to suggest convergent validity (De Los Reyes, et al., 2013; see Garner, Hake, & Eriksen, 1956 for more information on converging operations), such shared variation could imply merely a consistent rater bias or "halo" effect. This point was mentioned in Bauer et al. (2013) by indicating their goal was to obtain an integrated, multi-informant assessment excluding potential rater bias, and they acknowledged in some situations the idiosyncratic views of the informant may be of conceptual interest (e.g., De Los Reyes, 2011; Lance, Hoffman, Gentry, & Baranik, 2008).

Parent's observations, for example, may not be independent from one another potentially because they discuss and witness their off-spring's behavior in similar settings. Therefore, consistency in reports from multiple raters who witness the offspring's behavior in different contexts (e.g., home vs. school) may increase the likelihood of measuring the true construct of interest, especially when applying the tri-factor model. Other researchers have suggested choosing informants who witness the offspring in the same context, but have different perspectives (e.g., a parent and a sibling who live in the same home as the offspring or a teacher and a counselor who work at the same school as the offspring) as well as selecting informants who share the same perspective but witness the offspring in different contexts (e.g., self-reports vs. other-reports or family-reports vs. nonfamily-reports; Kraemer et al., 2003). In addition, Martel et al. (2017) suggest using theory to identify optimal multi-informants (e.g., parent and teacher reports of ADHD). Thus, utilizing theory to identify informants who witness the offspring in multiple contexts may increase precision in measuring the construct of interest.

This study is not without limitations. The age variable was skewed because fewer participants had older offspring, which resulted in grouping offspring ages 10–17 years together, representing considerable developmental heterogeneity. Future research should replicate this work with more systematic ascertainment of older youth. The sample size associated with the models is modest given the design complexity and may be underpowered to detect item-level covariation across raters (suggested in the tri-factor model) and reporter-level factors. Further, it should be recalled the two-factor trait model proposed here was arrived at only after the initial tri-factor model was inestimable and additional constraints yielded poor fitting models. Future research should explore whether a two-factor solution replicates across other data. Because the data came from a study that oversampled for a paternal family history of alcoholism, these findings may not generalize to other populations. Also, the current study was unable to consider the impact of impulsivity in the parents on their reports of offspring impulsive behavior. Given prior research indicating single assessments of AUD tend to be underestimated, it is likely there were false negatives for FHA in this study (Haeny, Littlefield, & Sher, 2014a, 2014b, 2016).

Some may question the reliability of parent reports of offspring impulsivity. Prior research suggests lower agreement between parent and offspring reports of offspring internalizing psychopathology (e.g. Achenbach, McConaughy, & Howell, 1987; Tackett, 2011; Youngstrom, Loeber, & Stouthamer-Loeber, 2000), and higher agreement between parent and offspring reports of offspring externalizing behaviors (Jensen, Traylor, Xenakis, & Davis, 1988; March, Parker, Sullivan, & Stallings, 1997). The current study focuses on parent reports of off-spring externalizing behaviors (e.g., difficulty staying seated when required, talking excessively) that are presumed indicators of an internal state related to manifest impulsive behavior. Some authors imply impulsivity-related characteristics may not be accurately reported by either offspring or their parents (Karver, 2006). Other researchers provide evidence of modest convergent validity between parent and offspring reports of offspring impulsivity (Zapolski & Smith, 2013). Thus, the current study is limited because it does not include offspring reports of impulsivity, at least among those offspring old enough to report on themselves reliably.

Extensive research suggests impulsivity-related traits mediate the relation between family history of alcoholism and AUD (e.g., Capone & Wood, 2008; Chassin, Flora, & King, 2004; Ohannessian & Hesselbrock, 2007; Sher et al., 1991). However, the focus of impulsive behavior as assessed by the HBQ in the present study does not address the underlying personality traits contributing to both impulsiveness and problematic alcohol use among offspring. Given there are multiple pathways leading to the development of AUD, it would be worthwhile for future studies to apply multi-facet models of impulsivity (e.g., Lynam, Smith, Whiteside, & Cyders, 2006) to multi-informant assessment.

Other methods for analyzing informant reports (e.g., average report) were not included in this study due to the nature of the data (e.g., averaged report of a binary outcome was not sensible). The data did not include three (or more) informants so it was not feasible to utilize the triangulation method (Kraemer et al., 2003), which partitions variance into the trait of interest, the informant’s perspective, and the context of the observed behavior. Future research comparing the tri-factor model to these and other methods of analyzing informant reports would be useful.

This study highlights the differences in the conclusions drawn depending on the method used to analyze informant reports on offspring psychopathology. Further, additional support was provided for the trifactor model that, unlike other models, distinguishes informant bias (i.e., unique variance associated with a given informant) from the true trait of interest (i.e., consensus-observed behavior). Consistent with prior literature, FHA offspring were higher on impulsive behavior when based on mother’s report; however, the multi-informant model indicated parents were biased in their reports of offspring impulsive behavior. Extensions of the tri-factor model to other multi-trait multi-method models is underexplored and may be a productive avenue for assessment of construct validity. Although the current model was informed by exploratory factor analysis, other models (e.g., random intercept factor model; Maydieu-Olivares & Coffman, 2006) could be considered in other settings. Future research should aim to recruit large samples to utilize structural equation models for integrating multi-informant reports to understand risk factors for AUD in high-risk family studies.

Acknowledgements

The present study was supported by NIAAA grants T32AA13526 and K05AA017242 to Kenneth J. Sher and F31AA023443 to Angela M. Haeny.

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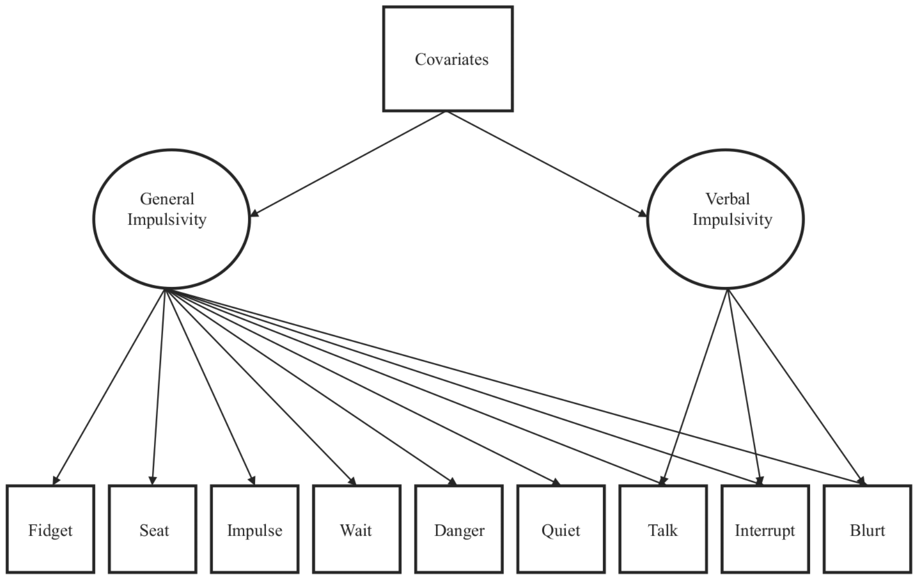
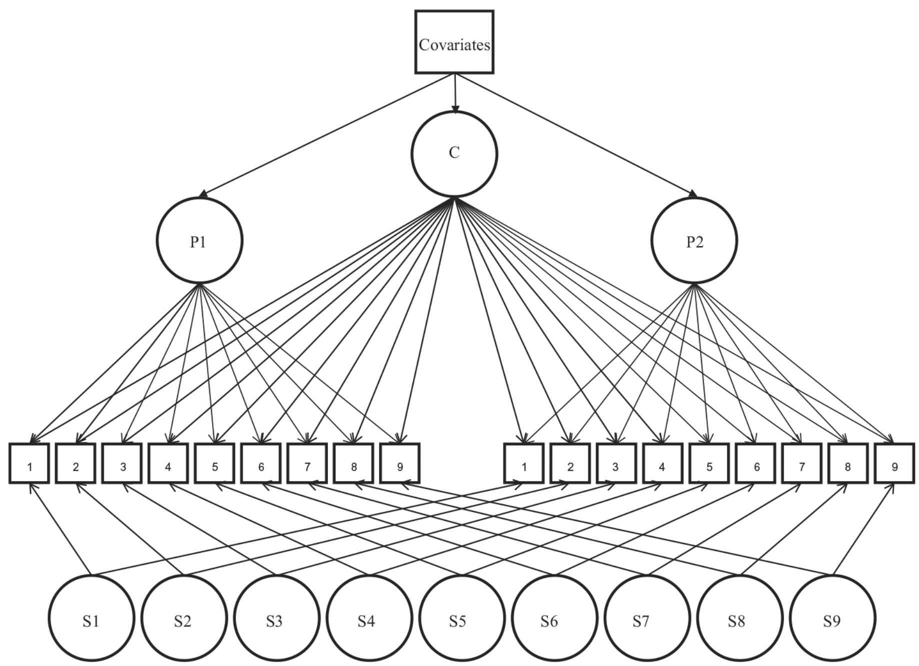
HIGHLIGHTS

- The relation of parental alcoholism and offspring impulsive behavior was tested.
- Offspring impulsive behavior is often assessed using multi-informant reports.
- Single- and multi-informant report models based on parent reports were compared.
- Alcoholic fathers were biased in their reports of offspring impulsive behavior.
- Multi-informant models use all available data and isolate rater bias.


Covariates
General Impulsivity
Verbal Impulsivity
Fidget
Seat
Impulse
Wait
Danger
Quiet
Talk
Interrupt
Blurt


Covariates
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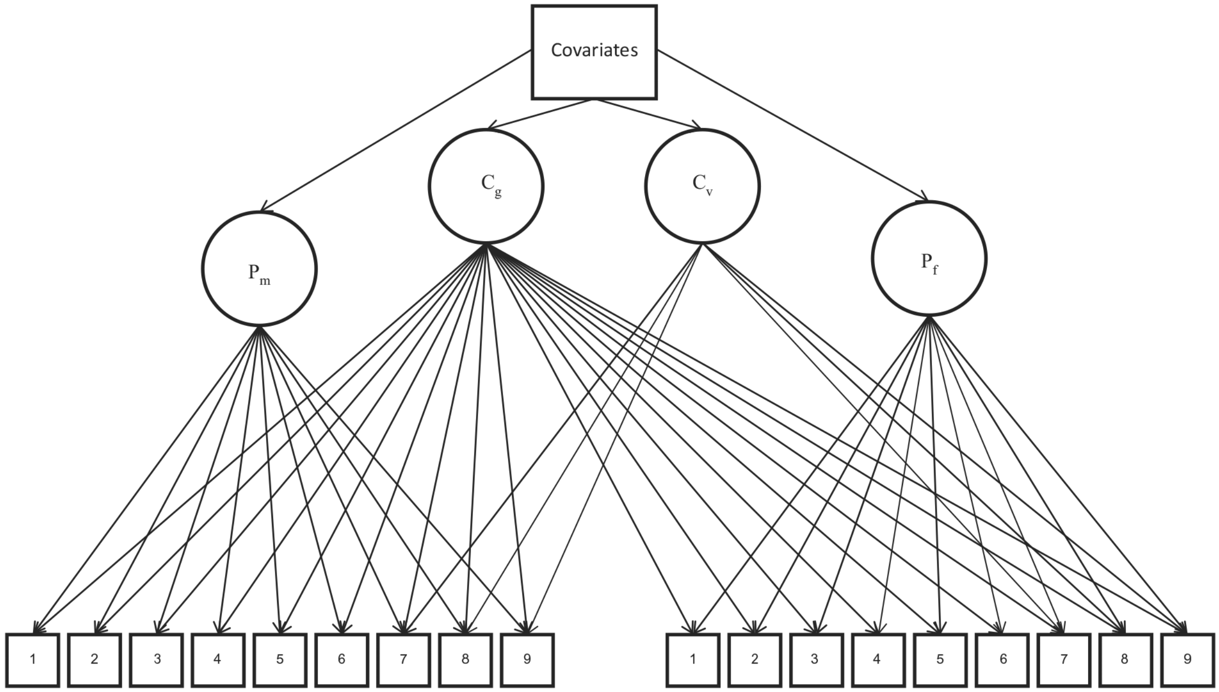

Fig. 1.

Schematic figures of the single reporter, trifactor, and multi-informant models. A. Mother/Father/Severe Report Model.

Table 1

Rates of endorsement of offspring impulsive behavior for mother report, father report, and most severe report.

	Mother (*Ns* = 322–324)	**Father (*Ns* = 296)**	**Severe (*Ns* = 367)**
1. Fidgets	57%	59%	71%
2. Can’t stay seated when required to do so	46%	49%	58%
3. Impulsive acts without thinking	57%	60%	74%
4. Difficulty awaiting turn in games or groups	49%	58%	65%
5. Interrupts, blurts out answers to questions too soon	68%	70%	80%
6. Difficulty playing quietly	26%	42%	45%
7. Talks excessively	52%	62%	67%
8. Interrupts or butts in on others	76%	72%	83%
9. Does dangerous things without thinking	18%	27%	34%

Note. The impulsive behavior items came from the externalizing scale of the MacArthur Health and Behavior Questionnaire (HBQ; Armstrong et al., 2003). Fathers provided slightly higher endorsement rates of impulsive behavior than mothers.

Table 2

Tetrachoric coralations.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	sex	1.00																													
2.	Agel	−0.01	1.00																												
3.	Age2	−0.11	.	1.00																											
4.	M1	0.25	−0.08	−0.08	1.00																										
5.	M2	0.27	−0.12	−0.43	0.56	1.00																									
6.	M3	0.22	−0.14	0.02	0.52	0.47	1.00																								
7.	M4	0.04	−0.12	−0.44	0.29	0.58	0.47	1.00																							
8.	M5	0.41	−0.11	0.04	0.39	0.44	0.64	0.29	1.00																						
9.	M6	0.19	−0.20	−0.27	0.46	0.67	0.49	0.50	0.32	1.00																					
10.	M7	−0.07	0.00	−0.02	0.31	0.31	0.25	0.12	0.13	0.37	1.00																				
11.	M8	0.16	0.08	−0.22	0.44	0.32	0.48	0.33	0.29	0.49	−0.06	1.00																			
12.	M9	0.15	0.03	−0.25	0.33	0.44	0.56	0.54	0.42	0.50	0.51	0.86	1.00																		
13.	Fl	0.16	−0.14	−0.02	0.34	0.39	0.17	0.33	0.06	0.21	0.24	0.17	0.23	1.00																	
14.	F2	0.10	−0.17	−0.36	0.29	0.49	0.38	0.42	0.13	0.44	0.17	0.21	0.27	0.65	1.00																
15.	F3	0.09	−0.04	0.03	0.27	0.21	0.67	0.19	0.18	0.17	0.37	0.27	0.22	0.48	0.52	1.00															
16.	F4	0.14	−0.14	−0.49	0.18	0.47	0.28	0.46	0.21	0.46	0.18	0.24	0.31	0.41	0.71	0.46	1.00														
17.	F5	0.20	−0.20	−0.15	0.02	0.31	0.11	0.30	0.13	0.26	−0.06	−0.05	0.13	0.48	0.49	0.65	0.42	1.00													
18.	F6	0.08	−0.13	−0.06	0.09	0.32	0.31	0.27	0.04	0.41	0.16	0.18	0.20	0.27	0.59	0.41	0.55	0.04	1.00												
19.	F7	−0.15	−0.07	−0.14	0.26	0.26	0.29	0.24	−0.16	0.22	0.51	0.39	0.41	0.43	0.39	0.45	0.38	−0.16	0.65	1.00											
20.	F8	−0.16	−0.11	−0.11	0.28	0.34	0.15	0.22	0.06	0.34	0.23	0.41	0.30	0.36	0.41	0.63	0.52	0.51	0.52	0.67	1.00										
21.	F9	−0.11	0.08	−0.11	0.18	0.24	0.06	0.18	−0.08	0.26	0.28	0.19	0.28	0.39	0.44	0.56	0.49	0.28	0.44	0.59	0.83	1.00									
22.	S1	0.18	−0.20	−0.08	1.00	0.61	0.42	0.34	0.31	0.48	0.35	0.25	0.37	1.00	0.55	0.44	0.38	0.42	0.23	0.44	0.35	0.33	1.00								
23.	S2	0.20	−0.18	−0.44	0.51	1.00	0.36	0.53	0.45	0.67	0.32	0.47	0.39	0.50	1.00	0.35	0.72	0.40	0.55	0.39	0.40	0.41	0.65	1.00							
24.	S3	0.23	−0.15	−0.07	0.42	0.36	.	0.46	0.24	0.46	0.24	0.37	0.47	0.53	0.58	1.00	0.49	0.58	0.46	0.51	0.48	0.46	0.60	0.49	1.00						
25.	S4	0.11	−0.06	−0.53	0.25	0.62	0.38	1.00	0.24	0.50	0.19	0.66	0.49	0.44	0.67	0.41	1.00	0.41	0.48	0.39	0.45	0.49	0.44	0.73	0.55	1.00					
26.	S5	0.36	−0.15	−0.11	0.24	0.44	0.37	0.24	1.00	0.35	0.11	0.13	0.30	0.42	0.43	0.57	0.40	1.00	0.30	0.20	0.41	0.24	0.47	0.46	0.61	0.42	1.00				
27.	S6	0.15	−0.17	−0.22	0.28	0.56	0.37	0.36	0.15	.	0.23	0.54	0.31	0.30	0.65	0.43	0.57	0.35	1.00	0.53	0.49	0.40	0.41	0.69	0.50	0.53	0.36	1.00			
28.	S7	−0.10	−0.06	−0.11	0.27	0.32	0.19	0.19	−0.04	0.29	1.00	1.00	0.50	0.42	0.35	0.38	0.32	0.16	0.62	1.00	0.60	0.57	0.43	0.42	0.38	0.33	0.21	0.52	1.00		
29.	S8	0.13	−0.03	−0.23	0.32	0.28	0.32	0.33	0.14	0.41	0.56	0.13	0.75	0.36	0.30	0.46	0.45	0.27	0.43	0.61	1.00	0.66	0.45	0.32	0.52	0.48	0.31	0.48	0.69	1.00	
30.	S9	0.14	0.07	−0.26	0.27	0.27	0.37	0.35	0.14	0.34	0.48	0.34	0.14	0.41	0.42	0.43	0.52	0.20	0.42	0.60	0.68	1.00	0.45	0.45	0.58	0.56	0.35	0.44	0.65	0.83	1.00

Note. .=correlation could not be estimated due to overlapping information. Both age variables were created such that 3–5 years (n=156) was the reference group and 6–9 years (n=147) represented Age1 and 10 years and older (n=65) represented Age2. M1–M9=mother's report of HBQ items 1–9. F1–F9=father's report of HBQ items 1–9. S1–S9=the more severe of mother and father's report of HBQ items 1–9.

Table 3

Effects of regressing the single reporter factors on familial alcoholism, sex of the offspring, age of the offspring, and the interaction terms.

Model	Latent factor	Path coefficients (standard errors)			
		FHA	**Sex of offspring**	**Age1 of offspring**	**Age2 of offspring**
Mother report	Verbal impulsive behavior	−0.11 (0.19)	−0.21 (0.19)	**0.41 (0.18)**	0.17 (0.27)
	General impulsive behavior	**0.28 (0.14)**	**0.44 (0.12)**	**−0.49 (0.13)**	**−0.72 (0.16)**
Father report	Verbal impulsive behavior	0.23 (0.21)	**−0.67 (0.19)**	**0.40 (0.19)**	0.35 (0.28)
	General impulsive behavior	−0.08 (0.15)	0.23 (0.13)	**−0.47 (0.14)**	**−0.70 (0.19)**
Severe report	Verbal impulsive behavior	−0.03 (0.20)	−0.24(0.17)	**0.36 (0.18)**	0.20 (0.28)
	General impulsive behavior	0.25 (0.13)[a]	**0.35 (0.11)**	**−0.56 (0.12)**	**−0.89 (0.16)**

Note. Mother report: (χ^2 (52) = 105.20; RMSEA = 0.06 [90% CI: < 0.04–0.07]; CFI = 0.95; TLI = 0.92. Father report χ^2 (52) = 117; RMSEA = 0.07 [90% CI: < 0.05–0.08]; CFI = 0.95; TLI = 0.93. Severe report: χ^2 (52) = 95.04; RMSEA = 0.05 [90% CI: 0.03–0.06]; CFI = 0.96; TLI = 0.95. Bold indicates $p < .05$.

[a]indicates marginally significant $p = .06$. No interactions were significant and thus are not shown. Sex: 0 = female, 1 = male. Both age variables were created such that 3–5 years (n = 156) was the reference group and 6–9 years ($n = 147$) represented Age1 and 10 years and older ($n = 65$) represented Age2. A family history effect was found in the mother-report model only.

Table 4

Factor loading estimates and standard errors for the unconditional multi-informant model.

Item	Factor loadings (standard errors)					
	Verbal impulsive behavior		General impulsive behavior		Perspectives	
	Mother	Father	Mother	Father	Mother	Father
Unstandardized solution						
1. Fidgets	-	-	**0.53 (0.13)**	**0.63 (0.10)**	**0.70 (0.09)**	**0.70 (0.09)**
2. Seated	-	-	**0.91 (0.12)**	**1***	**0.57 (0.09)**	**0.57 (0.09)**
3. Impulsive	-	-	**0.53 (0.14)**	**0.58 (0.13)**	**1***	**1***
4. Difficulty awaiting turn	-	-	**0.78 (0.12)**	**0.99 (0.13)**	**0.45 (0.09)**	**0.45 (0.09)**
5. Blurts out answers	**0.79 (0.14)**	**0.73 (0.16)**	**0.50 (0.12)**	**0.51 (0.13)**	**0.92 (0.11)**	**0.92 (0.11)**
6. Difficulty playing quietly	-	-	**0.86 (0.12)**	**0.75 (0.10)**	**0.63 (0.10)**	**0.63 (0.10)**
7. Talks excessively	**0.79 (0.16)**	**0.79 (0.16)**	**0.34 (0.12)**	**0.66 (0.12)**	**0.53 (0.09)**	**0.53 (0.09)**
8. Interrupts	1*	**0.79 (0.15)**	**0.39 (0.13)**	**0.63 (0.13)**	**0.92 (0.12)**	**0.92 (0.12)**
9. Danger	-	-	**0.28 (0.15)**	**0.42 (0.13)**	**0.83 (0.10)**	**0.83 (0.10)**
Standardized solution						
1. Fidgets	-	-	**0.54 (0.09)**	**0.54 (0.09)**	**0.52 (0.07)**	**0.51 (0.07)**
2. Seated	-	-	**0.82 (0.06)**	**0.82 (0.06)**	**0.41 (0.07)**	**0.40 (0.07)**
3. Impulsive	-	-	**0.51 (0.12)**	**0.51 (0.12)**	**0.73 (0.06)**	**0.74 (0.07)**
4. Difficulty awaiting turn	-	-	**0.81 (0.06)**	**0.81 (0.06)**	**0.33 (0.07)**	**0.31 (0.07)**
5. Blurts out answers	**0.53 (0.08)**	**0.49 (0.09)**	**0.44 (0.12)**	**0.44 (0.12)**	**0.70 (0.07)**	**0.69 (0.07)**
6. Difficulty playing quietly	-	-	**0.64 (0.08)**	**0.64 (0.08)**	**0.45 (0.07)**	**0.46 (0.07)**
7. Talks excessively	**0.53 (0.07)**	**0.52 (0.08)**	**0.56 (0.10)**	**0.56 (0.10)**	**0.41 (0.06)**	**0.39 (0.06)**
8. Interrupts	**0.67 (0.09)**	**0.53 (0.08)**	**0.54 (0.11)**	**0.54 (0.11)**	**0.70 (0.08)**	**0.68 (0.08)**
9. Danger	-	-	**0.37 (0.12)**	**0.37 (0.12)**	**0.62 (0.06)**	**0.62 (0.07)**

Note. Bold indicates $p < .05$. The highest loading on each factor was fixed to 1 as indicated by the *.

Table 5

The conditional model: effects of regressing the common and perspective factors on familial alcoholism, sex of the offspring, age of the offspring.

Path coefficients (standard errors)				
Latent factor	**FHA**	**Sex of offspring**	**Age1 of offspring**	**Age2 of offspring**
Including missing reporters				
Verbal impulsive behavior	0.23 (0.45)	**−0.64 (0.18)**	0.29 (0.19)	−0.11 (0.34)
General impulsive behavior	−0.32 (0.14)	−0.03 (0.14)	**−0.65 (0.15)**	**−1.49(0.23)**
P1: mother report	0.53 (0.28) [a]	**0.74 (0.16)**	0.06 (0.21)	0.50 (0.32)
P2: father report	**0.75 (0.37)**	0.29 (0.18)	0.15 (0.21)	**0.88 (0.35)**
Excluding missing reporters				
Verbal impulsive behavior	0.31 (0.47)	**−0.71 (0.22)**	0.37 (0.21)	−0.21 (0.33)
General impulsive behavior	−0.42 (0.29)	−0.05 (0.18)	**−0.75 (0.17)**	**−1.37 (0.22)**
P1: mother report	0.53 (0.28) [a]	**0.78 (0.18)**	0.21 (0.23)	0.49 (0.15)
P2: father report	**0.75 (0.36)**	0.16 (0.20)	0.03 (0.23)	0.53 (0.34)

Note. Including missing reporters (368 offspring): χ^2 (211) = 248.92; RMSEA = 0.02 [90% CI: 0.01–0.04]; CFI = 0.98; TLI = 0.98. Excluding missing reporters: χ^2 (211) = 245.01; RMSEA = 0.03 [90% CI: < 0.01–0.04];CFI = 0.98; TLI = 0.97. Bold indicates p < .05.

[a] indicates a marginal effect $p = .06$. Sex: 0 = female, 1 = male. Both age variables were created such that 3–5 years (n = 156) was the reference group and 6–9 years (n = 147) represented Age1 and 10 years and older (n = 65) represented Age2. Interaction effects were included but were trimmed and not reported given non-significance. A family history effect was found on the father perspective factor.