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## Parental socialization and adolescents' alcohol use behaviors: Predictive disparities in parents' versus adolescents' perceptions of the parenting environment

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### Abstract

Among adolescents, many parenting practices have been associated with the initiation and development of drinking behaviors. However, recent studies suggest discrepancies in parents' and adolescents' perceptions of parenting and their links with adolescent use. In this study, we derive two independent sets of underlying parenting profiles (based on parent and adolescent reported behaviors at age 11–12 years), which were then examined in relation to adolescents' drinking behaviors at ages 14 and 17½. Results indicated that the two sets of profiles accounted for little shared variance, with those based on adolescents' reports being stronger predictors of adolescent drinking. Moreover, comparisons of drinking levels across profiles pointed to multiple parenting strategies that may effectively reduce adolescent alcohol experimentation, including simply sustaining a moderate level of awareness of adolescents' whereabouts and activities, and avoiding excessive conflict and strictness.

### INTRODUCTION

Within the literature on human development, a large body of evidence suggests that the adolescent years are particularly important in terms of the initiation and development of alcohol use behaviors (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000; Kuehn, 2006). Moreover, parents' socialization efforts are thought to exert some level of influence on the decisions that offspring make about drinking during this period of development (Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005; Fujioka & Austin, 2003), as a number of parenting behaviors have been shown to serve robust risk and/or protective functions in relation to adolescent alcohol use. The degree of warmth that parents convey to their children (Hops, Davis, & Lewin, 1999; Nash, McQueen, & Bray, 2005; White, Johnson, & Buyske, 2000), parents' willingness to grant children the autonomy they need to develop independently (Herman, Dornbusch, Herron, & Herting, 1997), and parents' knowledge of their children's behaviors and whereabouts (Barnes & Farrell, 1992; Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003; Simons-Morton & Chen, 2005) are among those behaviors frequently associated with decreased risk. Alternately, perceived tension in the relationship between parents and adolescents has been associated with increased risk (Ary et

al., 1999). Other socialization behaviors, such as parental discipline, are believed to have more equivocal influences on adolescents' outcomes (Baumrind, 1996), though moderate levels are generally found to be associated with reduced risk for substance use (Fletcher & Jefferies, 1999).

On the basis of these, and other findings, many applied researchers have developed programs specifically targeting parenting for its role as a potential modifier of adolescent drug and alcohol use (e.g., Dishion, Kavanagh, Schneiger, Nelson, & Kaufman, 2002; Kosterman, Hawkins, Haggerty, Spoth, & Redmond, 2001; Rohrbach et al., 1994). As such, it is imperative for effective prevention science that we understand the antecedents to risk to the fullest extent possible. Toward this end, two important parenting-related caveats must be addressed. First, the influence that "parenting" has on a specific adolescent outcome is likely to depend upon the *source* of the report (e.g., parental self-report versus adolescent reported parenting). Second, the *scope* of parental influence in relation to an outcome is apt to vary as a function of the extent to which parenting behavior is being examined. That is, even when considering reports from a single source, individual parenting practices and complex, multidimensional patterns of parenting behavior may reflect unique causes of variability in adolescent behavior.

With regard to the source of reported behaviors, children and their parents have demonstrated overlapping, but discrete perceptions of the parent-child relationship, as well as each other's behaviors (Cashmore & Goodnow, 1985; Fisher et al., 2006; Noller & Callan, 1988). When specifically considering dimensions of parenting, large differences have been shown to exist when comparing parents' and adolescents' perceptions of the same socialization practices, with parents generally reporting higher levels of positive parenting and lower levels of negative parenting behaviors (Tein, Roosa, & Michaels, 1994). It is likely, therefore, that the magnitude of associations between parenting and adolescents' behaviors will depend, to some extent, on the source of the reports on parenting. This hypothesis has found much support, for example, in research examining the antecedents of adolescents' achievement related outcomes. In such studies, independent parent and adolescent reports of parenting have produced low levels of inter-rater reliability, with adolescents' perceptions being more highly associated with academic performance (e.g., see Paulson, 1994; Pelegrina, García-Linares, & Casanova, 2003). Similarly, two small cross-sectional studies examining discrepancies in parent and adolescent perceptions of discrete parenting characteristics with U.S. samples both support the notion that adolescents' reports of parenting have much greater predictive ability in relation to whether or not they use alcohol (Cohen & Rice, 1997; Cottrell et al., 2003).

Although many studies of adolescent drinking have examined influences of individual parenting behaviors, a large body of research has attempted to summarize the important features of child-rearing using typologies derived from prominent dimensions of parenting behavior (Baumrind, 1971; Maccoby & Martin, 1983). Although this literature makes clear the importance of including disparate dimensions of parenting in order to study the interactive effects of various characteristics, it also illuminates a potential methodological weakness, wherein median values are imposed as arbitrary cutoffs to discriminate between "high" and "low" levels of specific parenting dimensions. In recognition, developmental scientists have increasingly called for even more holistic, yet empirically-based, "person-oriented" analytic approaches, particularly where theory indicates distinct patterns of association between several operating factors (Bergman, 2001; Bergman & Magnusson, 1997; Cairns & Rodkin, 1998). Although parental socialization theory is one such area (Grusec & Davidov, 2007; Maccoby & Martin, 1983), research on parenting has largely failed to take these methods into consideration. Of importance, in one of the only known exceptions, Metsäpelto and Pulkkinen (2003) were able to use cluster analysis to empirically

extract parenting profiles that could be differentiated with respect to nurturance, restrictiveness, and knowledge of children's interests, friends, and whereabouts. In addition, extant evidence within the alcohol literature suggests that such an approach may yield information that compliments findings from traditional methods (Horn, 2000; von Eye, Bogat, & Rhodes, 2006). Thus, complex characterizations of the parent-child relationship (e.g., data driven multidimensional profiles of parenting) may provide unique insight into the etiology of adolescent alcohol use not previously evidenced.

Our study, therefore, seeks to contribute to our understanding of associations between parenting and adolescent drinking, and thus to inform future prevention and intervention efforts, in the following important ways: by identifying profiles of parenting behavior; by examining predictive disparities in adolescent- and parent-reported parenting; and by using data from a longitudinal, nationally representative epidemiological sample of Finnish adolescents and their parents. More specifically, given the demonstrated utility of person-oriented analyses for identifying underlying patterns of association that account for variability in behavior (Bergman, 2001; Bergman & Magnusson, 1997; Cairns & Rodkin, 1998), and an extensive literature which reflects the complex and multidimensional nature of parenting (Baumrind, 1971; Maccoby & Martin, 1983), we expect latent profile analyses to yield meaningful (i.e., they will be able to differentiate between levels of adolescent drinking behaviors), prototypical patterns of parenting from both adolescent- and parent-reported behaviors. In addition, considering prior evidence of predictive disparity between parents' and adolescents' reports of individual parenting characteristics (Cohen & Rice, 1997; Cottrell et al., 2003), adolescent-derived profiles are likely to explain a larger proportion of the variance in adolescent alcohol use behaviors than are those based on self-reported parenting behaviors.

## METHODS

### Sample and Procedure

FinnTwin 12 (FT12) is a population-based, developmental twin study of health-related behaviors and correlated risk factors (Kaprio, Pulkkinen, & Rose, 2002). The sample consists of five consecutive birth cohorts (1983–87) of twins identified through Finland's central population registry, assuring exhaustive and unbiased ascertainment, with equal proportions of girls (49.6%) and boys. While the majority of these adolescents had biological parents residing in the same household (~78%), a small, but substantial proportion had parents living apart (~22%). The educational attainment of the parents is broken down into three categories: no formal post-secondary academic or vocational training (25% mothers, 30% fathers), some formal post-secondary academic or vocational training (60% mothers, 56% fathers), and receipt of a university degree (15% mothers, 14% fathers). In addition, as the Finnish population is ethnically and culturally homogeneous, ethnicity of origin was not assessed in this study.

Families were contact by mail and asked to voluntarily participate in a longitudinal study examining the health and development of children. Parents assented to participate through the completion of a baseline questionnaire and agreed to their children's participation via active consent procedures. Both parents and children were assured confidentiality with regard to their personal information and informed that they were free to withdraw from participation at any stage of the study. Moreover, the FT12 study protocol has undergone full review (as it involved children at baseline) by the Institutional Review Board at Indiana University and the Ethics Committee of the University of Helsinki annually, since 1994.

Self-report questionnaires were mailed to co-twins and their parents late in the year in which their birth cohort reached 11 years of age, with a small minority (~10%) returning the

questionnaires very early in the year in which the cohorts turned 12 (mean age of 11.7 years). Parents were sent a second questionnaire about parenting practices and a behavioral assessment of their twins approximately 6 months after receiving the questionnaire regarding their own health. With regard to self-reported parenting, ~61% of questionnaires were completed by mothers, ~3% were completed by fathers, while the remainder were jointly completed by both parents. In addition, all participating twins were sent follow-up questionnaires at 14 and 17½ years of age (mean ages were 14.1 and 17.6 years, respectively). Initial response rates were high, with ~82% of eligible families choosing to participate (N = 2651; thus, 5302 adolescents). Among those families, approximately 98% (i.e., 5186 adolescents and their parents) completed baseline questionnaires, with retention of ~92% at each subsequent stage of assessment. The analyses presented here are based only on the individuals for whom complete parenting data were available (i.e., 5183 adolescent-reports and 4813 parent-reports). Furthermore, parents with and without complete parenting data were not shown to differ in relation to the data that they did provide or on adolescent reported parenting behaviors in preliminary analyses. In addition, though the sampling strategy of FT12 was to ascertain twin pairs, the present study is interested in this epidemiological sample exclusively for its representative nature, thus all analyses adjust for the complex structure of the data (i.e., the nesting of adolescents within families), rather than examining differences and similarities between monozygotic and dizygotic twin pairs.

## Measures

**Parenting practices**—Adolescents' perceptions of several *parenting practices* were assessed at ages 11–12 within baseline questionnaires, and self-ratings on the same parenting dimensions were assessed by their parents approximately six months later; this lapse in time was due, in part, to the fact that these data were collected as part of a larger longitudinal investigation, in which parents were already being asked to complete extensive questionnaires on their own health-related behaviors at baseline. First, three items, rated on a 4-point scale from “almost always” to “almost never”, were used to assess perceived knowledge of whereabouts (know daily program, know interests/activities/whereabouts, know where and with whom when not home; Chassin, Pillow, Curran, Molina, & Barrera, 1993). Cronbach's alphas for parental knowledge were .73 and .61, for adolescents' and parents' reports, respectively. Four additional items, rated on a 4-point scale from “not at all” to “very much”, were taken from a larger measure of parents' child-rearing ideals and practices (Metsäpelto & Pulkkinen, 2003) to assess the degree to which parents encouraged the development of their adolescents' autonomy (listen to opinions, thank and encourage, encourage independence, try to sort out and discuss bad behavior). Alpha coefficients were .67 for adolescents' assessments, and .69 for those of their parents. Finally, factor analyses were run on an 8-item measure of perceived home atmosphere (with all items were rated on a 5-point scale, ranging from “does not hold true” to “holds completely true”; Pulkkinen & Narusk, 1987), with results yielding three factors accounting for 66.5% and 65.4% of the variance in adolescent- and parent-reports of those items, respectively: a 4-item subscale of perceived warmth (“warm, caring”, “encouraging, supportive”, “trusting, understanding”, “open”), and a 3-item subscale of perceived relational tension (“unjust”, “argumentative”, “indifferent”), and a single item reflecting perceived strictness (i.e., “strict”). The resulting reliability coefficients for parental warmth were .79 for adolescents, and .80 for their parents. Likewise, reliability coefficients for measured perceptions of relational tension were .68 and .59, among adolescents and their parents, respectively. Of note, parents' ratings of the home atmosphere were the same for both offspring. Accordingly, the present study reflects a relatively comprehensive, multiple-perspective approach to the assessment of parenting, with particularly rich data for a population-based epidemiological sample.

**Adolescent alcohol use**—Adolescent alcohol use was assessed via self-reported frequencies of present drinking and intoxication at ages 14 and 17½. Age 14 frequencies were assessed on a 4-point scale (“never”, “less than monthly”, “1–2 times per month”, “weekly”), while age 17½ frequencies were measured on a 9-point scale (“I don’t drink”, “once per year or less”, “2–4 times per year”, “once every two months”, “once per month”, “two or more times per month”, “once per week”, “two or more times per week”, “daily”). Prior to analysis, adolescents’ age 17½ alcohol use responses were collapsed to create categories parallel to those at age 14 (i.e., modified from 9 categories to 4 categories). Although intoxication was assessed via self-reported frequency, as opposed to quantity consumed, data from a distinct cohort of Finnish adolescents (described in Rose, Kaprio, Winter, Koskenvuo, & Viken, 1999) shows a strong association between the same frequency of intoxication scale used here and the Rutgers Alcohol Problem Index (White & Labouvie, 1989) at age 18, as well as relative risk for alcohol dependence, using *Diagnostic and Statistical Manual of Mental Disorder* (3<sup>rd</sup> ed. Rev.) criteria, at age 25.

## Data Analyses

Latent profile analysis (LPA) classifies individuals within groups, based on their probability of sharing discrete homogeneous profiles of responses across several distinct continuous variables (Clogg, 1995; Clogg & Goodman, 1984, 1985). In the present study, LPAs with five continuous parenting variables (i.e., four composite scales and one individual variable) were conducted to determine the number of underlying patterns of parenting perceived by adolescents, and by parents, within the FT12 sample. These analyses were carried out using Mplus version 4.1 (Muthén & Muthén, 1998–2006), where means and variances were computed while accounting for non-independence of observations due to complex sampling (i.e., adolescents nested within families). In addition, missing data are handled in Mplus with a robust maximum likelihood estimator which takes advantage of all available data, rather than deleting cases with partially missing data in a listwise manner.

LPA calls for the testing of a series of models, starting with  $k$ -profiles (e.g., two), and adding an additional profile in each of the subsequent models (i.e.,  $k+1$ ,  $k+2$ ...) until the fit no longer improves. Thus, we ran two independent series of models (i.e., for both adolescent- and parent-reported parenting behaviors), each positing between two and seven underlying profiles. As is common in investigations of parenting typologies, our analyses were carried out across sex (Baumrind, 1967, 1972; Baumrind & Black, 1967; Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994). Moreover, as no gold standard yet exists with respect to the identification of a “best” number of classes, multiple empirical criteria were used to evaluate model fit, in addition to weighing the theoretical meaningfulness and interpretability of the resulting classes (for an overview of classification decisions in the latent class framework, see Nylund, Asparouhov, & Muthén, 2007; Jung & Wickrama, 2007).

Contingency analyses were used to assess the degree of association between adolescent- and parent-derived profiles. To identify mean parenting differences between distinct adolescent- and parent-derived profiles, analyses of variance (ANOVAs) with post-hoc pairwise comparisons were conducted with each of the parenting variables. In addition, multiple regression analyses with dummy-coded predictors for profile membership were employed to determine the overall predictive ability of perceived parenting in relation to adolescent alcohol use behaviors. Finally, to assess differences in frequencies of use and intoxication between adolescents in disparate profiles, ANOVAs with post-hoc pairwise comparisons were again conducted in relation to each of the adolescent drinking behaviors. Dunnett’s T3, a statistical method used to determine the significance of group differences when multiple

comparisons are being made between groups with unequal  $n$ 's and variances, was applied to assess all pairwise profile comparisons.

## RESULTS

### Profiles of Parenting

Table 1 shows results for each of the model fit statistics for the adolescent-derived and parent-derived LPAs. Following the strategy outlined by Nylund and colleagues (Nylund, Asparouhov, & Muthén, 2007), we first used Bayesian information criteria (BIC; Kass & Raftery, 1995; Kerbin, 1997; Schwarz, 1978) as an indicator of improved fit (with lower values denoting evidence of improvement) in models with increasing numbers of classes. Where BIC did show improvement, we looked at additional indicators of fit, such as significant likelihood ratio tests of models with  $k$  versus  $k-1$  classes, and accuracy of profile assignment. With respect to BIC, estimates continued to decrease across both sets of successive models, which is a typical consequence of conducting LPA with large samples. Of note, a modified version of BIC, which takes sample size into account (i.e., ABIC; Sclove, 1987), yielded the same pattern of results. Before stabilizing, entropy coefficients (an indicator of how well a model predicts profile membership, on a scale ranging from 0 to 1), which are best used to compare the classification utility of different models (Pastor, Barron, Miller, & Davis, 2006), increased up to a value of .84 in a six-profile model reflecting adolescents' perceptions. Likewise,  $p$ -values associated with the likelihood ratio test of five versus six profiles (LMR; Lo, Mendell, & Rubin, 2001; Vuong, 1989) supported this increase ( $p = .01$ ), whereas the increase from six to seven profiles was not supported ( $p = .68$ ). Furthermore, a seven-profile model did not appear to extract a seventh profile that was theoretically distinct from any of those in the six-profile model, as only minor differences in the magnitude of the parenting parameters was observed. Alternately, although there were non-significant  $p$ -values for LMR tests of 3 versus 4 ( $p = .24$ ) and 4 versus 5 ( $p = .18$ ) classes, entropy coefficients for these models were lower than the six-profile model, which achieved significance, and the additional profiles that emerged showed novel patterns of parenting relative to those models with fewer profiles.

To determine whether the six-profile model explained additional variability in alcohol use behaviors (i.e., over and above the three-profile model) we conducted a set of multiple regression analyses where dummy-coded predictors of profile membership from a six-profile solution were entered in a block subsequent to a block with those from a three-class solution. Findings indicated that the addition of three theoretically novel profiles was also statistically significant, with the proportion of variance accounted for increasing roughly two- to three-fold across the four outcome variables (i.e.,  $p < .001$  for the  $R^2\Delta$  in each model). Based on these criteria, the six-class model seemed to yield a set of profiles that are both theoretically distinct and statistically significant relative to a three-class model.

In relation to parents' self-reported parenting, entropy coefficients were stable near .98 from two- to three-profile models, but decreased to .85 in a four-profile model. Similarly, the  $p$ -value associated with a test of two versus three profiles confirmed a distinction ( $p = .05$ ), but a four-profile model was not found to significantly improve classification ( $p = .43$ ). In addition, all models hypothesizing more than four profiles of parents' perceptions of parenting failed to converge on global maxima; thus, parameter estimates (e.g., posterior probabilities of profile membership) in these models could not be trusted. Finally, though bootstrap likelihood ratio tests have been suggested as a final step in model selection (Nylund, Asparouhov, & Muthén, 2007) the nested structure of our data precluded this analysis. Therefore, a six-profile model of adolescent-perceived parenting, and a three-profile model of parent-perceived parenting were selected for use in subsequent analyses. Importantly, a series of univariate analyses of variance showed no significant associations

between zygosity, sibling type (i.e., same versus opposite sex pairs), or number of additional siblings, and either adolescent- ( $F_{zygosity\ 1, 3869} = 1.87, p = .17$ ;  $F_{sibling\ type\ 1, 3869} = .05, p = .83$ ;  $F_{number\ of\ siblings\ 10, 3869} = 1.48, p = .14$ ) or parent-derived ( $F_{zygosity\ 1, 3883} = 1.68, p = .20$ ;  $F_{sibling\ type\ 1, 3883} = .64, p = .42$ ;  $F_{number\ of\ siblings\ 10, 3883} = 1.56, p = .11$ ) profile memberships. In addition, profile membership did not differ on the basis of input from one versus two parents ( $F_{1, 3883} = .09, p = .77$ ). Within profiles, mean posterior probabilities of profile membership (i.e., the probabilities that individuals belong to their assigned profiles) ranged from .76 to .94 in adolescent based models, and were all greater than .99 in parent-based models, intimating a relatively high degree of confidence in the process of partitioning youth according to perceived parenting.

ANOVAs with post-hoc pairwise comparisons were conducted with all parenting variables to identify significant mean differences in individual parenting behaviors between profiles. Results are presented in Table 2. Moreover, parenting profiles derived from adolescent and parent perceptions are graphically depicted in Figures 1 and 2, respectively, with profile-specific values on each of the five parenting indices displayed in terms of mean within-profile deviations from the sample mean, in standardized units. In all cases, profiles are arranged from left to right, in order of descending size, and are from this point forward referred to as adolescent profiles 1 through 6 (AP1 – AP6), and parent profiles 1 through 3 (PP1 – PP3).

**Adolescent-derived profiles**—Slightly more than half of the adolescents (50.5%) were members of AP1. On average, these youth perceive moderately high levels of warmth, autonomy granting, and knowledge of whereabouts, moderately low levels of relational tension, and average levels of strictness. Roughly one quarter of the sample (26.3%) was probabilistically assigned to AP2, for which the only distinguishing feature was low levels of parental knowledge (all other parenting variables were close to sample means). AP3 was comprised of 11.3% of the sample, and was characterized by low levels of warmth and autonomy granting, average levels of strictness, and moderately high levels of parental knowledge and relational tension. Approximately 6% of the adolescents were assigned to AP4, which was marked by low levels of perceived warmth, autonomy granting, and knowledge of whereabouts, moderately high levels of strictness, and high levels of relational tension. AP5 includes 3.6% of the sample, and is comparable to AP4 in terms of levels of strictness and relational tension, but has closer to average levels of warmth, autonomy granting, and parental knowledge. Finally, AP6 is comprised of 2.4% of the adolescents, and has characteristics similar to AP3, with the exception of extremely low levels of parental knowledge of their children's whereabouts, and somewhat average levels of relational tension.

**Parent-derived profiles**—Approximately 70% of the sample was parsed into PP1, in which parents perceived values near the sample mean on all parenting characteristics except for parental knowledge of whereabouts, for which they reported moderately high levels. Alternately, low levels of parental knowledge exemplified membership in PP2 (25.2%). Finally, a small proportion of parents (4.2%) reported low levels of warmth in the home, moderately low autonomy granting, and extremely low parental knowledge, as well as moderately high levels of relational tension. Though parent-derived profiles could not be visually distinguished by levels of strictness, table 2 denotes significant differences between the two smaller profiles.

### Between Informant (Parent versus Adolescent) Profile Comparisons

A pair of preliminary three-way ANOVAs indicated that sex, zygosity, and sibling type were not significant determinants of adolescent- ( $F_{sex\ 1, 4800} = 3.13, p = .08$ ;  $F_{zygosity\ 1, 4800}$



$= 1.05, p = .31; F_{\text{sibling type 1, 4800}} = .33, p = .72$ ) or parent-derived ( $F_{\text{sex 1, 4456}} = 1.98, p = .16; F_{\text{zygosity 1, 4456}} = 2.43, p = .12; F_{\text{sibling type 1, 4456}} = .42, p = .66$ ) profile memberships. Results of multiple regression analyses with dummy-coded predictors of profile membership demonstrated, however, that parenting profiles were differentially associated with all four adolescent drinking behaviors. In independent tests, profiles derived from adolescents' perceptions of parenting were shown to be somewhat stronger predictors of adolescent drinking, as indicated by a higher model  $R^2$ , than were those derived from parents' self-perceived parenting, even after controlling for the potential effects of sex, zygosity, and sibling type (see steps 2a and 2b in Table 3).

Correspondence between the two profile membership variables was assessed using contingency analysis; the resulting contingency coefficient ( $cc = .28, p < .001$ : a chi-square based measure of the association between two nominal variables, ranging from 0 to 1) indicated a small, but statistically significant, amount of overlap. To determine the level of predictive interdependence in discrete parenting profiles in relation to specific adolescent drinking behaviors, additional analyses were performed wherein dummy-codes for adolescent- and parent-derived profiles were entered in separate blocks, within the same model. Results indicated that, across drinking behaviors, adolescent and parent profiles shared only 14–26% of the total variance accounted for. Thus, with respect to the 3.2% of the total variation in age 14 use accounted for, adolescent-derived profiles were solely responsible for the majority of that variance (72%, versus 9% for parent-derived profiles). Similarly, adolescent-derived profiles uniquely accounted for the majority of the parenting-related variance in frequency of intoxication at age 14 (54%, versus 20% for parent-derived profiles), frequency of use at age 17½ (67%, versus 17% for parent-derived profiles), and frequency of intoxication at age 17½ (65%, versus 10% for parent-derived profiles). Despite the minor contributions uniquely attributed to parent-derived profiles, inclusion of these dummy-coded predictors proved significant [(age 14 use)  $R^2\Delta = .003, p = .003$ ; (age 14 intoxication)  $R^2\Delta = .007, p = .001$ ; (age 17½ use)  $R^2\Delta = .002, p = .051$ ; (age 17½ intoxication)  $R^2\Delta = .003, p = .006$ ], though likely because of the large sample size.

### Within Informant Profile Comparisons

To further test for relative differences in alcohol use between adolescents in disparate parenting profiles, ANOVAs with post-hoc pairwise comparisons were conducted with both adolescent drinking behaviors. Results of these analyses are presented in Table 4. In relation to adolescent-derived profiles, adolescents in AP1 had the lowest risk for alcohol use behaviors at age 14, followed by those in AP3 and AP5, all of whom averaged less frequent alcohol use and intoxication than adolescents in AP6. To illustrate, adolescents in profile 6 were shown to be, on average, two times more likely to use alcohol (~30%) and three times more likely to become intoxicated (~19%) on a monthly basis, than were those in profiles 1, 3, and 5 (with ranges of ~12–16% and ~5–7%, respectively). Youth in AP1 and AP3 also averaged less frequent use and intoxication at age 14 than those in AP2 and AP4, though only AP4 was indistinguishable from the high-risk AP6. At age 17½, AP1 and AP3 were still the least likely to drink and to become intoxicated on a regular basis, differing significantly from those in both AP2 and AP4. For example, approximately three out of five adolescents in profiles 1 and 3 used alcohol at least once per month (61% and 62%, respectively), and one in three were intoxicated on a monthly basis (32% and 36%, respectively). In contrast, three out of every four adolescents in profiles 2 and 4 (70% and 73%, respectively) were monthly drinkers, and nearly half of those youth were intoxicated with the same frequency (45% and 48%, respectively). Likewise, AP1 adolescents became intoxicated significantly less frequently than those in AP5 (~32% versus ~47% reported monthly intoxication). Interestingly, at age 17½, adolescents in AP6 did not significantly differ from those in any other profile on drinking frequencies. This, however, was likely due

to a more than 25% reduction in the number of individuals in this already small class who reported on age 17½ drinking behaviors.

When comparing adolescents whose parents perceived differential styles of parenting, those in PP1 were consistently less frequent in their alcohol use and intoxication than those in the other profiles, regardless of age. Moreover, differences were significant in all cases except when comparing PP1 frequencies of use at age 17½ with adolescents in PP3, despite PP1 having a much lower group mean. Adolescents in PP3 consistently had the highest mean frequencies, but differed from those in PP2 only on frequency of intoxication at age 14.

## DISCUSSION

In our study, latent profile analyses were able to distinguish between six patterns of parenting based on adolescents' perceptions, whereas only three patterns could be articulated in relation to parents' perceptions of their relationships with their children. Despite some similarities, and the temptation to interpret these profiles within the context of the existing parenting literature (i.e., authoritative, authoritarian, permissive, neglectful), we choose not to equate groups empirically derived on the basis of five nuanced dimensions with those previously based on two qualitatively derived and relatively general dimensions, for as Kagan (2004; 2005) has suggested, such comparisons may actually compromise the integrity of the findings, rather than simplifying them.

Two patterns of parenting were somewhat consistent across informants: (a) a profile characterized by low levels of parental knowledge of whereabouts relative to the mean, but near average levels of warmth, autonomy granting, strictness, and relational tension (AP2 and PP2); and (b) a profile characterized by extremely low levels of parental knowledge, low levels of warmth and autonomy granting, near average levels of strictness, and above average levels of relational tension (AP6 and PP3). Moreover, these two patterns of parenting combined to represent roughly thirty percent of parent-adolescent relationships within the sample, regardless of informant. Thus, whereas the vast majority of parents (~70%) reported near average levels on all parenting behaviors, with the exception of moderate knowledge of whereabouts (which may reflect some degree of self-report bias, whereby parents generally report a more restricted range of what they perceive to be "positive parenting"), the largest group of adolescents (~50%) reported parenting exemplified by moderate levels of warmth, autonomy granting, and knowledge of whereabouts, and somewhat lower levels of relational tension.

### Between informant profile comparisons

In addition to these descriptive differences, the present work appears to offer some measure of validation for prior findings (Cashmore & Goodnow, 1985; Fisher et al., 2006; Noller & Callan, 1988), in that comparisons of adolescents' and parents' reports of parenting behaviors showed marked differences in predictive utility, with adolescents' perceptions resulting in far stronger links with their own alcohol-related behavioral outcomes (Cohen & Rice, 1997; Cottrell et al., 2003). However, in contrast to earlier investigations, the present work uniquely identified predictive discrepancies in relation to perceived interactive systems, or constellations of parenting behaviors. Though limited in the relative magnitude of their effects, parents' ratings of their socialization practices did provide some compliment to those of their adolescents', in terms of being able to explain additional variation in subsequent adolescent drinking behaviors. The nature of LPA, however, makes it challenging to disentangle these novel influences from those shared with adolescents' perceptions. Making this task more difficult is the fact that while adolescents reported on the individual parenting that they received, some of their parents' reports reflected their parenting more generally (i.e., across twin children). Thus, findings illustrate an important

methodological issue that warrants further consideration by socialization researchers; that we should avoid collapsing across individual raters (e.g., creating composite variables), at least in relation to measures of parental socialization, as parents and their children seem to be tapping into somewhat different aspects of parents' behaviors (Tein et al., 1994). As such, researchers should aim to incorporate both perspectives whenever their models have the flexibility to accommodate the inclusion of additional parameters. Moreover, it may be of greater relevance to have parents report on their practices in relation to specific individuals. Of interest, although both adolescent- and parent-derived profiles provided significant differentiation in mean levels of alcohol use and intoxication at 14 and 17½ years of age, complimentary analyses demonstrated that neither prospectively predicted the change in use or intoxication over this 3½-year period.

**Within informant profile comparisons**—With regard to *profiles of parenting distinctly underlying adolescents' perceptions*, a number of interesting differences appeared. At age 14, the lowest frequencies of alcohol use and intoxication were among adolescents who, at ages 11–12, perceived a configuration of parenting that combined the highest levels of warmth, autonomy granting, and parental knowledge (AP1). These adolescents did not, however, differ significantly from a group perceiving moderately low levels of warmth and autonomy granting combined with above average tension (AP3), or from a group that perceived significantly lower levels of warmth, in addition to the highest levels of strictness and relational tension from their parents (AP5). Thus, there appear to be a range of effective parenting strategies for reducing alcohol experimentation in adolescents. However, it is noteworthy that the single commonality between these three groups was the perception that their parents kept a relatively close eye on their activities and whereabouts (i.e., in comparison to the sample mean). Thus, even a moderate level of parental knowledge of children's whereabouts may serve a protective function in relation to adolescents' subsequent risk for drinking. That the highest frequencies of use and intoxication existed in a group whose only measurable difference from AP3 (low warmth and autonomy granting, and moderate relational tension) was in the form of extremely low levels of perceived parental knowledge (AP6) offers further support for this argument. Also interesting was the fact that adolescents, who at age 11–12 perceived extremely low levels of warmth, autonomy granting, and parental knowledge (AP4), did not differ in their age 14 alcohol use behaviors from adolescents who perceived closer to average levels of warmth and autonomy granting and slightly above average knowledge of their whereabouts, but who shared the perception of above average strictness and relational tension (AP5). In this case, it may be that perceptions of high parental strictness and relational tension moderate the protective effect expected to accompany parental knowledge within the latter group.

A somewhat similar pattern emerged at age 17½, where adolescents in configurations combining heightened levels of perceived strictness and relational tension (i.e., AP4 & AP5) averaged among the highest frequencies of intoxication and alcohol use, though not significantly greater than roughly one quarter of the sample who perceived “average” parenting in all areas except for knowledge of whereabouts (AP2). Again, it seems that early parental knowledge was protective, even later in adolescence, but only in the absence of tense and strict parenting environments.

Taken together, evidence linking adolescents' perceptions of parenting at ages 11–12 to their own alcohol use behaviors at 14 and 17½ suggests that effective prevention and intervention programming might aim to incorporate a combination of parenting strategies, pairing the promotion of active awareness with efforts to limit excessive strictness and conflict. Alternately, to the extent that parents' self-reported behavior reflects what they actually do, parents' action may not matter nearly as much as adolescents' perceptions of those actions. Thus, the processes involved in interpreting interpersonal environments may prove to be an

equally, if not more important target. In either case, it is important to note that interpretations regarding links between adolescents' outcomes and actual or perceived individual parenting characteristics should be made with caution, as person-oriented procedures are meant to reflect on the dynamic relationship between a set of characteristics. Yet, our results do appear to compliment extant findings on the roles of parental knowledge (e.g., Chassin, Pillow, Curran, Molina, & Barrera, 1993; Kerr & Stattin, 2000), strictness (Gray & Steinberg, 1999), and relational tension (Pulkkinen & Narusk, 1987) in relation to measures of adolescent adjustment.

Alcohol use behaviors among *adolescents whose parents had perceived different forms of parenting* 2½ and 5 years earlier also varied significantly. Though relatively near to the mean on all aspects of parenting, the majority of adolescents were classified into a group (PP1) characterized by an environment with significantly more parent-reported warmth, autonomy granting, and knowledge of whereabouts, and significantly lower levels of strictness and relational tension than the two smaller configurations (PP2 & PP3). At age 14 these adolescents used alcohol and became intoxicated much less frequently. The two smaller configurations displayed similar patterns of perceived parenting – low levels of warmth, autonomy granting, and knowledge of whereabouts, and above average strictness and relational tension – though the smaller of the two (PP3; 4.2%) was more extreme on all dimensions except for strictness. The relative increase in risky parenting behaviors among the minority profile was related to significant increases in adolescents' age 14 frequencies of intoxication. At age 17½, the most "positive" of the three profiles (i.e., PP1) derived at ages 11–12 remained less likely to participate in risky drinking behaviors.

### Limitations and Future directions

Our findings also point to areas that might be improved and/or addressed in future work. First, given the low reliability of some of our parenting measures, refinement and/or the inclusion of additional measures (e.g., alcohol-specific rule enforcement and shared parent-adolescent activities; Van Zundert, Van Der Vorst, Vermulst, & Engels, 2006 and Cookston & Finlay, 2006, respectively) might enhance the predictive utility of the holistic parenting environment, thus providing further insight into important distinctions in complex behavioral influences. It is also important to note that even if adolescents are a better source of information on parenting behaviors, as we have suggested, combining their perceptions with self-reported drinking data may have inadvertently inflated the associations reported here. However, while common method variance is certainly an issue that warrants attention, it does not necessarily invalidate our findings (Doty & Glick, 1998); though future efforts to obtain more objective reports of adolescents' drinking behaviors would help to alleviate this concern. Another potential limitation arises from the fact that while each of the twins provided a unique assessment of the parenting that they received, parents were asked to reflect on some dimensions of their parenting with respect to individual offspring (i.e., *knowledge of whereabouts* and *autonomy granting*), and some, more general dimensions of the home environment (i.e., *warmth, relational tension, and strictness*). However, while parents could exercise differential amounts of these characteristics with respect to twins, it is also likely that some aspects of parenting are shared among offspring. In fact, parents they tend to report much more similar treatment than do the twins themselves (Plomin et al., 1994). While it has been suggested that the consistency in parents' reports across twins may be related to social desirability and/or the inclination to recall global rather than specific parenting strategies (Morsbach & Prinz, 2006; Wade & Kendler, 2000), it has also been shown that parents' assessments of their parenting reflect, to some extent, aspects of their personality (Metsäpelto & Pulkkinen, 2003), which we would not expect to vary in relation to individual offspring. Moreover, as personality appears to be somewhat stable across adulthood (Costa & McCrae, 1986), one could assume that any self-assessed parenting

behavior reflecting these personality traits would also be stable, making it less likely for a six month gap between adolescents' and parents' reports to contribute to differential perceptions of parenting. It is also important to consider that reports of parenting behaviors might be related to child-specific characteristics (Tein et al., 1994), such as emotionality and/or personality, which may be related to the differences in alcohol use behaviors among the adolescents. Finally, attempts to identify mechanisms underlying the associations between adolescent alcohol use behaviors and the specific shared and unique components of parent and adolescent perceptions may lead to a more comprehensive understanding of their differential effects.

### Implications for Research, Policy, and Practice

In summary, this study used data from a nationally representative, epidemiological sample of Finnish adolescents and their parents to extend our understanding of the degree to which adolescents and their parents perceive disparate systems of parental socialization. It illuminates the distinct, though modest, predictive utility of these largely independent perspectives in relation to adolescents' frequencies of alcohol use and intoxication. Moreover, the present findings have helped to identify unique and interactive sources of variation in alcohol use behaviors among adolescents with differing patterns of self- and parent-perceived parenting.

Overall, the resulting variation in adolescents' alcohol use behaviors across parenting profiles allowed us to identify how specific differences between profiles related to functional differences in parental influences, particularly among those derived from adolescents' perceptions. That is, while both sets of profiles differentiated frequencies of adolescents' alcohol use behaviors, differentiation resulting from adolescent-derived profiles could be traced back to specific aspects of parenting (e.g., knowledge of whereabouts, strictness, and relational tension), whereas differentiation resulting from parent-derived profiles appeared to be a function of the whole system differing. This point underscores the utility of a holistic perspective of parenting and parent-based prevention programming, in that behaviors appear to be acting in concert.

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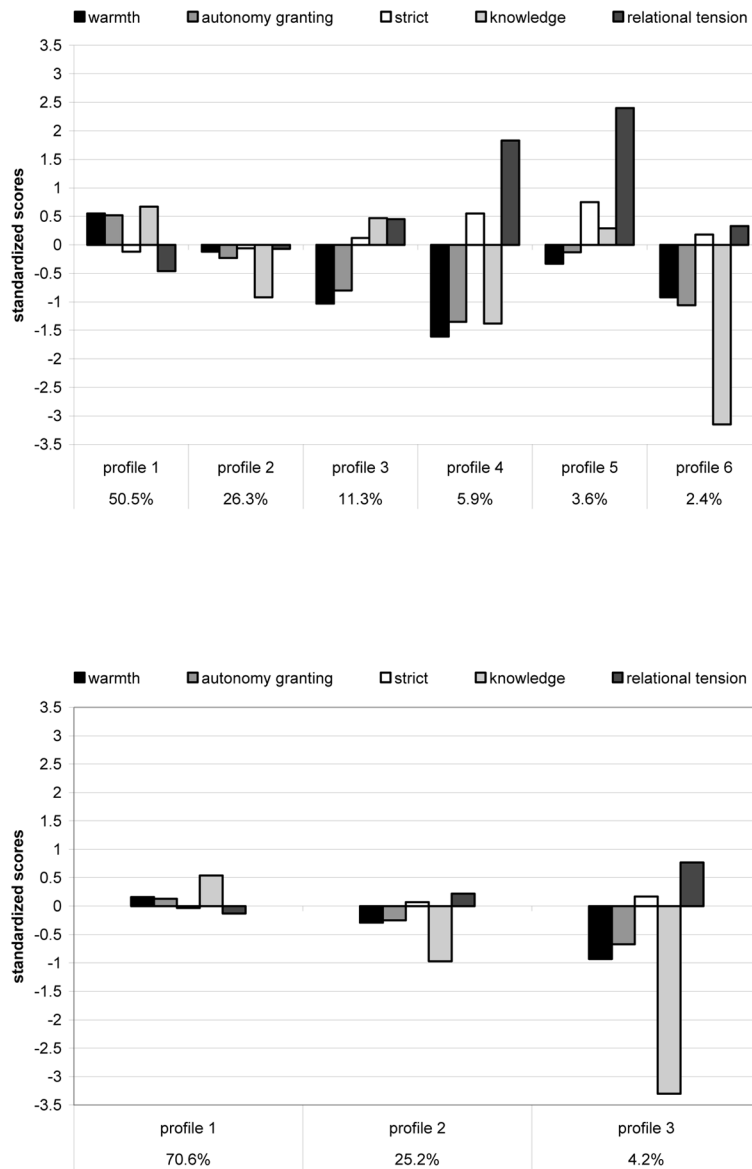
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**Figure 1.** Figure 1a. Parenting profiles derived from adolescents' perceptions of the parenting that they receive, with representative sample proportions. Figure 1b. Parenting profiles derived from parents' perceptions of their own parenting behaviors, with representative sample proportions.

**Table 1**

Model selection criterion for latent profile analyses on measures of perceived parenting

Adolescent-derived	Number of Profiles						
	2	3	4	5	6	7	
BIC	69594.55	68753.51	68072.46	67681.60	<b>67091.54</b>	66760.14	
Entropy	.767	.760	.778	.783	<b>.840</b>	.830	
Likelihood ratio <i>p</i> -value ( <i>k</i> vs. <i>k</i> -1)	.000	.015	.241	.177	<b>.007</b>	.683	
Parent-derived	Number of Profiles						
	2	3	4	5	6	7	
BIC	61947.07	<b>60162.61</b>	59831.57	---	---	---	
Entropy	.978	<b>.992</b>	0.852	---	---	---	
Likelihood ratio <i>p</i> -value ( <i>k</i> vs. <i>k</i> -1)	.000	<b>.018</b>	0.429	---	---	---	

Notes: models with parent-reported parenting failed to converge on global maxima beyond four profiles.

BIC = Bayesian information criteria.

*p*-values are derived from Vuong-Lo-Mendell-Rubin likelihood ratio test.

Boldface type denotes criterion values for selected models.

**Table 2**

Percentages, means, and standard deviations for parenting characteristics by profile

	n (%N)	% by sex (girls, boys)		Warmth		Autonomy Granting		Strict		Parental Knowledge		Relational Tension	
		mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
<b>Adolescent-derived</b>													
Profile 1	2615 (50.5)	(56.0, 45.0)	18.77	1.31	14.52	1.49	2.36	1.00	11.71	.48	4.16	1.20	
Profile 2	1364 (26.3)	(23.7, 28.9)	17.26	1.84	12.96 <sup>5</sup>	1.80	2.47 <sup>6</sup>	.96	9.42	.65	4.95	1.47	
Profile 3	588 (11.3)	(11.4, 11.3)	15.23 <sup>6</sup>	1.77	11.76 <sup>6</sup>	1.65	2.70 <sup>6</sup>	.94	11.42	.56	6.02 <sup>6</sup>	1.45	
Profile 4	304 (5.9)	(4.1, 7.6)	13.92	2.28	10.62 <sup>6</sup>	2.06	3.23 <sup>5</sup>	1.03	8.75 <sup>6</sup>	.89	8.83	1.99	
Profile 5	186 (3.6)	(3.3, 3.9)	16.80	1.94	13.18 <sup>2</sup>	1.92	3.40 <sup>4</sup>	.88	11.17	.77	10.00	1.48	
Profile 6	126 (2.4)	(1.6, 3.3)	15.48 <sup>3</sup>	2.87	11.23 <sup>3,4</sup>	2.53	2.70 <sup>2,3</sup>	1.17	6.21 <sup>4</sup>	1.07	5.77 <sup>3</sup>	1.99	
<b>Parent-derived</b>													
Profile 1	3397 (70.6)	(73.5, 67.7)	17.45	1.89	13.20	1.75	2.41	.94	12.00	.00	4.11	1.29	
Profile 2	1212 (25.2)	(22.8, 27.5)	16.53	2.05	12.51	1.84	2.49 <sup>3</sup>	.92	10.70	.46	4.61	1.54	
Profile 3	204 (4.2)	(3.6, 4.8)	15.23	2.45	11.70	1.95	2.58 <sup>2</sup>	.96	8.71	.68	5.40	2.01	

Notes: Means and standard deviations are presented with respect to the following ranges: warmth (4–20), autonomy granting (4–16), strict (1–5), parental knowledge (3–12), relational tension. (3–15). Numbers in superscript denote profiles from which means do not significantly differ ( $p > .05$ ) under conditions of multiple testing and unequal variances using Dunnett's T3.

**Table 3**

Regression analyses predicting adolescent alcohol use behaviors with stepwise entry of adolescent- and parent-derived profile memberships

Step	Predictors	Age 14 Alcohol Use			Age 14 Intoxication			Age 17½ Alcohol Use			Age 17½ Intoxication		
		$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$
1	<b>Demographics</b>	.003	.003	4.04**	.010	.010	12.98***	.006	.006	6.93***	.007	.007	7.59***
	Sex	.046			.094			-.033			-.050		
	Zygosity	.027			.039			.039			.034		
	Sibling type	.023			.014			.034			.027		
2a	<b>APs</b>	.029	.029	23.98***	.028	.028	22.85***	.010	.010	7.11***	.018	.018	12.42***
	Dummy 1	-.177			-.169			-.085			-.047		
	Dummy 2	-.169			-.150			-.026			.058		
	Dummy 3	-.093			-.106			.000			.020		
	Dummy 4	-.348			-.333			-.129			-.073		
	Dummy 5	-.071			-.078			-.019			.030		
3a	<b>PPs</b>	.003	.003	5.72**	.007	.007	15.18***	.002	.002	2.97	.003	.003	5.11**
	Dummy 1	-.060			-.143			-.033			-.075		
	Dummy 2	-.006			-.065			.011			-.022		
	<b>Total</b>		.035		.045			.018			.027		
Step	Predictors	Age 14 Alcohol Use			Age 14 Intoxication			Age 17½ Alcohol Use			Age 17½ Intoxication		
		$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$
1	<b>Demographics</b>	.003	.003	4.04**	.010	.010	12.98***	.006	.006	6.93***	.007	.007	7.59***
	Sex	.046			.094			-.033			-.050		
	Zygosity	.027			.039			.039			.034		
	Sibling type	.023			.014			.034			.027		
2b	<b>PPs</b>	.009	.009	18.98***	.016	.016	33.16***	.004	.004	6.62***	.007	.007	11.48***
	Dummy 1	-.131			-.205			-.064			-.113		
	Dummy 2	-.040			-.094			-.002			-.036		
3b	<b>APs</b>	.022	.022	18.57***	.019	.019	15.57***	.008	.008	5.64***	.014	.014	9.84***
	Dummy 1	-.164			-.144			-.076			-.033		

Step	Predictors	Age 14 Alcohol Use			Age 14 Intoxication			Age 17½ Alcohol Use			Age 17½ Intoxication		
		$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$	$\beta$	$\Delta R^2$	$\Delta F$
	Dummy 2	-.152			-.118			-.016			.075		
	Dummy 3	-.084			-.090			.006			.030		
	Dummy 4	-.317			-.275			-.107			-.039		
	Dummy 5	-.065			-.066			-.015			.036		
	<b>Total</b>		.035			.045			.018			.027	

Note: APs = adolescent-derived profile membership; PPs = parent-derived profile membership. The significance of standardized coefficients for dummy-coded profile membership is not presented, as the interpretation of individual dummy-codes is meaningless. Demographic variables are coded 1 (boy, monozygotic, and same sex) and 2 (girl, dizygotic, and opposite sex).

\*\*  $p$  .01.

\*\*\*  $p$  .001.

**Table 4**  
Means and standard deviations for profiles derived from adolescent- and parent-reported parenting

Adolescent-report	Profile 1 n's = 2001-2363 1.43 (.74) <sup>2,4,6</sup>	Profile 2 n's = 1007-1204 1.65 (.86) <sup>1,3,6</sup>	Profile 3 n's = 456-519 1.50 (.79) <sup>2,4,6</sup>	Profile 4 n's = 210-264 1.72 (.92) <sup>1,3</sup>	Profile 5 n's = 128-167 1.59 (.84) <sup>6</sup>	Profile 6 n's = 72-97 1.98 (1.00) <sup>1,2,3,5</sup>
Age 14 use	1.43 (.74) <sup>2,4,6</sup>	1.65 (.86) <sup>1,3,6</sup>	1.50 (.79) <sup>2,4,6</sup>	1.72 (.92) <sup>1,3</sup>	1.59 (.84) <sup>6</sup>	1.98 (1.00) <sup>1,2,3,5</sup>
Age 14 intoxication	1.24 (.55) <sup>2,4,6</sup>	1.40 (.67) <sup>1,3,6</sup>	1.29 (.63) <sup>2,4,6</sup>	1.42 (.72) <sup>1,3</sup>	1.30 (.58) <sup>6</sup>	1.63 (.83) <sup>1,2,3,5</sup>
Age 17½ use	2.71 (.94) <sup>2,4</sup>	2.88 (.94) <sup>1,3</sup>	2.70 (1.01) <sup>2,4</sup>	2.93 (.94) <sup>1,3</sup>	2.95 (.87)	2.97 (.96)
Age 17½ intoxication	2.15 (.83) <sup>2,4,5</sup>	2.37 (.86) <sup>1,3</sup>	2.20 (.90) <sup>2,4</sup>	2.42 (.86) <sup>1,3</sup>	2.43 (.82) <sup>1</sup>	2.32 (.80)
Parent-report	Profile 1 n's = 2607-3097 1.48 (.77) <sup>8,9</sup>	Profile 2 n's = 893-1084 1.61 (.88) <sup>7</sup>	Profile 3 n's = 147-175 1.69 (.88) <sup>7</sup>			
Age 14 use	1.48 (.77) <sup>8,9</sup>	1.61 (.88) <sup>7</sup>	1.69 (.88) <sup>7</sup>			
Age 14 intoxication	1.26 (.56) <sup>8,9</sup>	1.38 (.68) <sup>7,9</sup>	1.52 (.78) <sup>7,8</sup>			
Age 17½ use	2.73 (.93) <sup>8</sup>	2.86 (.98) <sup>7</sup>	2.88 (1.01)			
Age 17½ intoxication	2.19 (.83) <sup>8,9</sup>	2.33 (.89) <sup>7</sup>	2.42 (.90) <sup>7</sup>			

Note: Means and standard deviations are presented with respect to a range of 1-4 for use and intoxication at ages 14 and 17½. Numbers in superscript denote profiles from which means significantly differ (*p* .05) under conditions of multiple testing and unequal variances using Dunnett's T3.

- <sup>1</sup> n's=2,001-2,363.
- <sup>2</sup> n's=1,007-1,204.
- <sup>3</sup> n's=456-519.
- <sup>4</sup> n's=210-264.
- <sup>5</sup> n's=128-167.
- <sup>6</sup> n's=72-97.
- <sup>7</sup> n's=2,607-3,097.
- <sup>8</sup> n's=893-1,084.
- <sup>9</sup> n's=147-175.