

Alcohol-Specific Parenting, Adolescents' Self-Control, and Alcohol Use: A Moderated Mediation Model

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ABSTRACT. Objective: There is convincing evidence that parental rules about alcohol are important in curbing adolescents' alcohol use. However, little is known about the mechanisms through which the direct link between alcohol-specific parenting and alcohol use is obtained. In this study, we investigated the mediating effect of adolescent self-control on the relationship between alcohol-specific rules and adolescents' drinking behavior and whether this mediation effect depends on the level of quality of communication. **Method:** A total of 883 adolescents participated in this longitudinal study at ages 13, 14, and 15 years. **Results:** Strict rules predicted lower rates of drinking, but no direct effect of the quality of communication on adolescents' alcohol use was found. A

higher level of self-control was related to lower rates of drinking in adolescents. The indirect effect of rules about alcohol through adolescents' self-control was statistically significant, yet only in adolescents with high qualitative parent-child communication about alcohol. In adolescents with low quality of parent-child communication, self-control was not related to drinking. **Conclusions:** These findings imply that strict rule setting in combination with qualitative parent-child communication is an important target for prevention. In addition, findings point at the importance of high qualitative parent-child communication for adolescents' motivation to engage in self-control to avoid drinking. (*J. Stud. Alcohol Drugs*, 75, 16–23, 2014)

DRINKING ALCOHOL IS RATHER COMMON and highly prevalent among adolescents. By the age of 15 years, most Dutch adolescents (83%) have started drinking alcohol, and 52% drink on a weekly basis (Verdurmen et al., 2012). Because early alcohol users are at an increased risk for social, behavioral, and health problems (Behrendt et al., 2009; Brown and Tapert, 2004; Verdurmen et al., 2005), it is imperative to examine factors that are relevant for the understanding of early drinking among adolescents.

Parents exert significant influence on their offspring's drinking behavior by the way they raise them with respect to the use of alcohol—a phenomena called *alcohol-specific parenting*. By parents not only setting strict rules (Abar et al., 2009; Habib et al., 2010; Järvinen and Östergaard, 2009; Koning et al., 2010a; van der Vorst et al., 2006; Yu, 2003), but also by the way they communicate with their children about alcohol (Abar et al., 2011; Ennett et al., 2001; Patterson et al., 1992), (i.e., the quality of communication [e.g., Spijkerman et al., 2008; van den Eijnden et al., 2011]), parents are able to curb their children's alcohol use from early to late adolescence. However, it is unknown what mechanisms underlie this relationship (i.e., how do parents' strict rules and high quality of communication about alcohol change adolescents' drinking behavior). Research suggests that involved parents who provide structure foster better

child adaptation as a result of higher self-regulatory skills of their offspring (cf. self-determination theory; Joussemet et al., 2008; Ryan and Deci, 2000). Moreover, recent research suggests that personality constructs, such as self-control, are influenced by environmental contexts such as parenting (e.g., Littlefield et al., 2010; Patock-Peckham et al., 2001, 2011). It is unknown whether this also holds true for the effects of alcohol-specific parenting on adolescent alcohol use (i.e., whether this effect is also mediated by the level of self-regulatory skills). In the current study, we therefore investigated whether adolescents' ability to control their behavior mediates the influence of alcohol-specific parenting on adolescent alcohol use.

In recent years, several studies have focused on the role of alcohol-specific parenting on adolescents' alcohol use (e.g., Ryan et al., 2010). Studies have consistently shown that parents remain influential throughout adolescence (e.g., Koning et al., 2012; Turrisi and Ray, 2010). In fact, strict rule setting is the strongest predictor of particularly early (Habib et al., 2010; Koning et al., 2010a; van der Vorst et al., 2006) and also later (Abar and Turrisi, 2008) alcohol use. Several alcohol intervention studies targeting parental rule setting have indeed revealed significant effects on adolescents' drinking behavior (e.g., Koning et al., 2009, 2011a, 2013; Turrisi et al., 2009; Wood et al., 2010). These rules have to be conveyed to the adolescent through communication. The way parents talk about alcohol issues with their children and the level of mutual understanding and respect between them are collectively referred to as the *quality of communication about alcohol*. This type of communication about alcohol is conceptually different from parental monitoring, which reflects parents' general knowledge about the whereabouts of their child (Stattin and Kerr, 2000).

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Longitudinal research on the perceived quality of parent–child communication about alcohol and adolescent drinking is relatively scarce. One cross-sectional study revealed that a higher quality of communication is related to a lower level of drinking (Spijkerman et al., 2008), but no evidence has been provided for a longitudinal association (van den Eijnden et al., 2011). Koning et al. (2012) showed in a longitudinal design that when high-quality communication was combined with strict rules about alcohol, adolescents drank less.

In addition to parental factors, adolescents' self-control is a strong and consistent predictor of a variety of risk behaviors (de Kemp et al., 2009; Griffin et al., 2012; Kam et al., 2009; Pratt and Cullen, 2000). The inability to control one's own behavioral impulses increases the risk of getting involved in risk behaviors such as crime, delinquency, and substance use. It is well accepted that it is important for adolescents to have the ability to refrain from alcohol involvement when confronted with a pro-alcohol situation (Cheung and Cheung, 2008; Conner et al., 2009; Koning et al., 2011b).

In support of several empirical studies (e.g., Littlefield et al., 2010; Patock-Peckham et al., 2001, 2011), the self-determination theory suggests that the development of internal control is strongly influenced by the social context, whereby parents play an important role (Joussemet et al., 2008; Ryan and Deci, 2000). An autonomy-supportive parenting style, providing high levels of parental involvement and structure attuned to the developmental level of the child, relates to higher self-regulation in adolescents (Patock-Peckham et al., 2001). Self-regulation has been shown to be enhanced in social contexts that provide structure (external control) and are accompanied by a sense of autonomy (Ryan and Deci, 2000). More specifically, restrictive alcohol-specific parental rules conveyed within a high qualitative context are likely to enable adolescents to develop self-constraining skills to resist alcohol-related temptations. In fact, external control in terms of parental socialization is considered the most important contributor to the development of self-control (Beaver, 2008; Boutwell and Beaver, 2010; Brody et al., 2005; Cochran et al., 1998; Feldman and Weinberger, 1994; Gibbs et al., 1998; Gibson et al., 2010; Gottfredson and Hirschi, 1990).

It is generally accepted that strict parenting is more effective when combined with a supportive environment (i.e., authoritative parenting; Baumrind, 1978; Darling and Steinberg, 1993; Koning et al., 2012). That is, adolescents with responsive and demanding parents perceive parental authority as more legitimate and therefore have lower resistance to parental influence (Jackson, 2002). In addition, an authoritative way of parenting matches individual needs and abilities, which results in higher levels of adaptation because it facilitates the intrinsic motivation to assimilate external control (Ryan and Deci, 2000). According to the social learning theory, parental modeling of positive control

(control combined with warmth) is associated with more positive control among offspring, most likely via an increase in parental monitoring (Patock-Peckham et al., 2011). It is very likely that more positive alcohol-specific parenting in terms of setting rules and having constructive conversations increases the level of self-control in adolescents.

The current study is the first to examine the influence of alcohol-specific parenting practices on the development of adolescent self-control in relation to alcohol use. The impact of parental socialization on adolescents' self-control contributes to potential insights into developing risk behaviors. To the best of our knowledge, only three previous studies have looked into the effect of parents on adolescents' self-control and their subsequent drinking behavior (Kam et al., 2009; Mares et al., 2013; Patock-Peckham et al., 2001). In line with several studies on delinquent behavior (e.g., Boisvert et al., 2012; Perrone et al., 2004), Kam et al. (2009) confirmed a mediation effect of parental norms on alcohol use via self-control. However, in this study, adolescents reported their parents' attitudes about the use of multiple drugs, not only alcohol. Patock-Peckham et al. (2001) examined general parenting styles in a cross-sectional design and demonstrated that authoritativeness was positively related with self-regulation. In turn, self-regulation related to more drinking control and less subsequent drinking. Mares et al. (2013) showed in a cross-sectional design that the associations between rules and communication about alcohol and adolescents' alcohol use were mediated by alcohol-specific self-control.

Overall, supported by the self-determination theory, empirical studies have demonstrated the importance of strict parental rules set in a supportive environment. In line with previous studies, it is expected that the influence of strict alcohol-specific parenting on adolescents' alcohol use is, at least partially, mediated by strengthening self-control in adolescents. In addition, it is hypothesized that strict rules about alcohol more strongly increase adolescents' self-control and adolescents' subsequent drinking when these rules are conveyed in a setting of high-quality parent–offspring communication.

Current study

This contribution aims to shed light on the mechanisms that may underlie the relationship between alcohol-specific parenting and adolescent drinking behavior. More specifically, we investigated the mediating effect of adolescent self-control with regard to the relationship between alcohol-specific parenting and adolescents' drinking behavior. To this end, the following four research questions will be addressed. First, what is the effect of alcohol-specific parenting on adolescents' self-control and alcohol use? Second, what is the influence of adolescents' self-control on their drinking behavior? Third, does self-control in adolescents mediate the effect of alcohol-specific rules on alcohol use? Fourth, is the

effect of rules about alcohol on adolescents' alcohol use dependent on the level of quality of communication? To study these research questions, a longitudinal sample, including 883 adolescents who participated in annual measurements at ages 13, 14, and 15, was used.

Method

Procedure

The data used in the current study are part of a longitudinal alcohol intervention study (Koning et al., 2009) in which 19 randomly selected schools were assigned to one of three experimental conditions or the control condition. We included only adolescents who were assigned to the control condition so that the outcomes would not be contaminated by the intervention. Participating high schools represent all different educational levels in the Netherlands, from pre-vocational education to pre-university secondary education.

High school students participated in the study at the end of school Year 2 (2007), reflecting Time 1 (T1); Year 3 (2008), reflecting Time 2 (T2); and Year 4 (2009), reflecting Time 3 (T3). Data were collected by means of digital questionnaires administered in the classroom by trained research assistants. Before the start of the study, parents were sent a letter of consent and a letter that informed them about the participation of the school in the project, and they were given the opportunity to refuse participation of their child (0.01% refusal).

Participants

Four schools including 935 adolescents were selected to participate in the study. Because of initial nonresponse among adolescents at a previous measurement ($n = 29$) and again at T1 ($n = 9$), as well as unreliable data on the alcohol measure (i.e., outliers defined as $4 \times SD$ above mean; $n = 23$), 874 adolescents were eligible for analysis.

The adolescent sample had a mean age of 12.9 years at the start of the study ($SD = 0.59$). Approximately half of the adolescents were male (51.5%) and were enrolled in lower levels of education (lower secondary vocational education: 59.5%). At T3, adolescents drank on average 5.0 glasses ($SD = 9.5$) per week.

Loss to follow-up

A total of 783 adolescents (89.5%) at T2 and 764 adolescents (87.4%) at T3 stayed in the program and completed the follow-up assessments after 12 and 24 months, respectively. Attrition analyses on demographic variables and alcohol use indicated that responding adolescents at T2 and T3 were more likely to be younger, T2: $t(904) = 2.87, p = .01$; T3: $t(904) = 2.92, p = .01$, tended to be enrolled in lower educa-

tion programs, T2: $\chi^2(1) = 17.18, p < .00$; T3: $\chi^2(1) = 17.50, p < .001$, and drank a lower average number of alcoholic beverages per week at T1, T2: $t(753) = 3.70, p < .00$; T3: $t(753) = 2.92, p = .01$. No significant differences were found for gender, self-control, rules, or quality of communication about alcohol use.

Measures

Alcohol-specific parenting practices

(A) *RULES ABOUT ALCOHOL USE*: Rules about alcohol use measured at T1 reflect the degree of parental rule-setting behavior experienced by the adolescents (van der Vorst et al., 2005). Items included, "I am allowed to have one glass of alcohol when my parents are at home," "I am allowed to drink several glasses of alcohol when my parents are not home," and "I am allowed to drink alcohol at a party with my friends." The means of 10 items ($\alpha = .94$) were rated on a 5-point scale from 1 (*never*) to 5 (*always*) reversely scored (i.e., higher scores indicated more rule-setting behavior).

(B) *QUALITY OF COMMUNICATION ABOUT ALCOHOL*: At T1, adolescents were asked their perceptions of the quality of communication about alcohol with their parents (Koning et al., 2012; Spijkerman et al., 2008). Items included, "My parents and I are interested in each other's opinion regarding alcohol use" and "If my parents and I talk about alcohol, I feel understood." The means for six items were rated on a 5-point scale ranging from 1 (*not at all*) to 5 (*very much*). Higher scores indicated a higher quality of communication (Cronbach's $\alpha = .82$).

Self-control. Self-control was measured at T1 (control variable) and T2. Self-control reflects the ability to control responses, interrupt undesired behavioral tendencies, and refrain from acting on them. The measure was the shorter version of the original measure developed and tested by Tangney et al. (2004). It consisted of 13 items (Cronbach's $\alpha = .74$) that were rated on a 5-point scale, ranging from 1 (*not at all like me*) to 5 (*very much like me*). Sample items were "I have trouble saying no" and "I do certain things that are bad for me if they are fun." Items were reversely scored; higher scores indicated higher self-control.

Adolescents' alcohol use. Drinking behavior was assessed using the Quantity-Frequency measure (at T2 and T3), which represents average weekly alcohol use. Frequency was measured by asking the number of days the adolescent usually drank on weekdays (Monday to Thursday) and weekend days (Friday to Sunday) (Engels and Knibbe, 2000). Quantity was measured by asking how many glasses of alcohol the adolescent usually drank on weekdays and weekend days (Engels et al., 1999). Quantity-Frequency was computed by calculating the products of the number of days and the number of glasses, then summing the two products for weekdays and weekend days. Self-report measures of adolescents on alcohol use have been shown to be reliable and valid meth-

ods to measure alcohol use (Del Boca and Darkes, 2003; Koning et al., 2010b).

Strategy for analyses

Descriptive data were provided for participating adolescents at baseline. Missing data on the dependent variables were handled by using full information maximum likelihood (FIML; Muthén and Muthén, 2010). FIML has been recommended as a state-of-the-art technique for analyzing data sets that include missing data (Schafer and Graham, 2002). All analyses were carried out in Mplus 6 (Muthén and Muthén, 2010).

Using path analysis, we examined the direct effects of rules and quality of communication about alcohol use at T1 on adolescents' alcohol use at T3. The main research question, the mediating effect of adolescents' self-control on the relationship between alcohol-specific rules and alcohol use, was tested according to the steps suggested by MacKinnon et al. (2002). First, we tested whether rules about alcohol use have an effect on the mediating variable of self-control. Second, the effect of the mediating variable on alcohol use was analyzed while controlling for the effects of alcohol-specific rules. Third, we tested whether the size of the mediated effects was statistically significant (MacKinnon et al., 2002) by using the model indirect command in Mplus. Calculating bootstrap confidence limits of the mediated effects, as computed in Mplus, was preferable, because this resampling method provided a test of significance and did not require as many assumptions as other tests (MacKinnon et al., 2007). However, as adolescents were nested within classes, we took

into account the cluster effect while calculating bootstrap confidence limits. Applying bootstrap analyses without considering the multilevel data yielded similar findings.

Alcohol-specific rules were measured at T1, the mediator at T2, and the outcome measure at T3, so that actual change over time and mediation could be assessed. Baseline score for the putative mediator was included in the model as a control variable so that follow-up scores resulted in a residual change variable (Cole and Maxwell, 2003). Last, we performed a moderation analysis of the mediation model with rules about alcohol via self-control on alcohol use for adolescents reporting low and high quality of communication (multigroup analysis based on median split).

Results

Direct effects of alcohol-specific parenting on alcohol use

Before the mediation analyses, we analyzed the direct effects of alcohol-specific parenting on adolescents' drinking behavior while controlling for previous alcohol use. Strict rules about alcohol predicted less drinking 2 years later ($b = -3.05$, $SE = 0.56$, $CI [-4.14, -1.95]$). No main effect of quality of communication on adolescents' alcohol use was found ($b = -0.62$, $SE = 0.41$, $CI [-1.42, 0.18]$).

Mediation analyses

The model testing the effect of alcohol-specific rules on self-control as well as on alcohol use, while we controlled for these measures at the previous time points, showed a

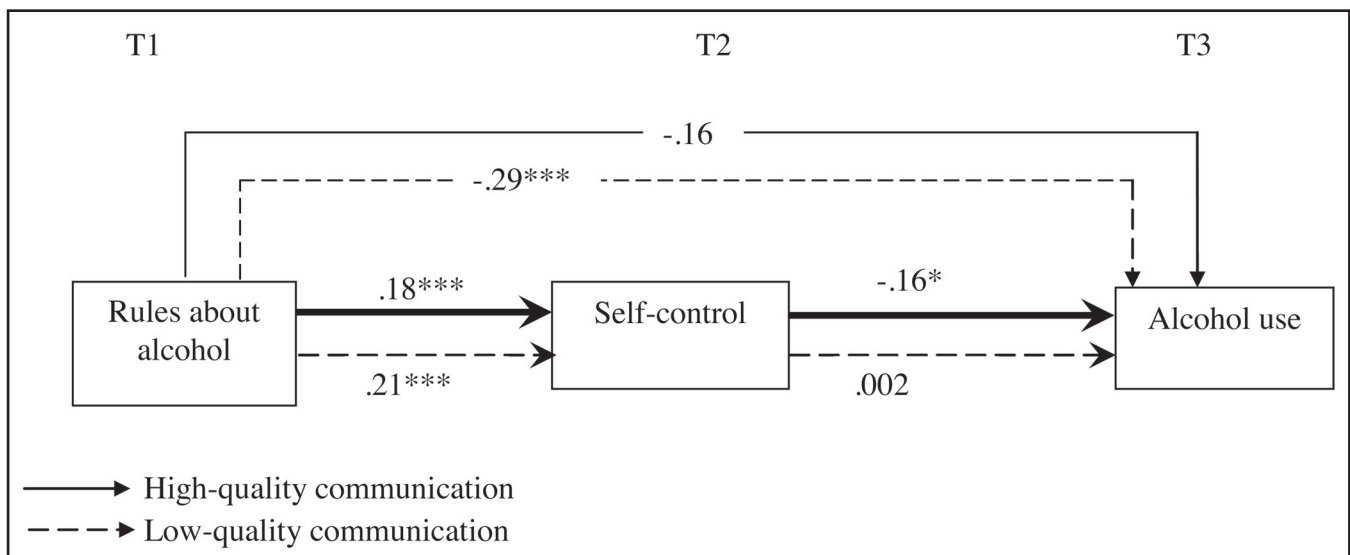


FIGURE 1. Results of the mediation analyses of the effect of alcohol-specific rules on alcohol use via self-control (β , p value) for high-quality and low-quality parent-child communication. T = time. Model fit: $\chi^2(2) = 7.1$, $p = .03$; comparative fit index = .99, root mean square error of approximation = .08. Note: **Bold arrows** indicate significant mediation. Each of the measures at the previous time point was controlled for.

* $p < .05$; *** $p < .001$.

good model fit: $\chi^2(1) = 17, p = .19$; comparative fit index [CFI] = .99; root mean square error of approximation [RMSEA] = .03, 90% CI [.00, .10].

Rules about alcohol significantly predicted changes in self-control at T2 ($\beta = .25, SE = .03, p < .00$); that is, adolescents who perceived their parents as more strict reported having a higher level of self-control. Strict rules about alcohol remained directly predictive of less drinking at T3 ($b = -.23, SE = .06, p < .00$).

Self-control reported at T2 significantly predicted the amount of drinking 1 year later ($b = -0.09, SE = 0.03, p < .01$). Thirty-seven percent of the variance in adolescents' alcohol use was explained by alcohol-specific rules (T1), self-control (T1 and T2), and previous alcohol use at T2.

The indirect effect of rules about alcohol on adolescents' alcohol use was statistically significant (indirect effect = $-.31, SE = .12, p < .01$). The observed direct effect of rules about alcohol on alcohol use therefore indicates a partial mediation via self-control.

Moderated mediation

Figure 1 depicts the results of the moderation of the relation between rules about alcohol and alcohol use via self-control for adolescents reporting low and high quality of communication, model fit: $\chi^2(2) = 7.1, p = .03, CFI = .99, RMSEA = .08, 90\% CI [.02, .15]$. This analysis showed an indirect effect of strict rules about alcohol on adolescent alcohol use via a growth in self-control only in those adolescents who reported having high-quality communication with their parents about alcohol (indirect effect = $-.03, SE = .01, p < .01$). Among these adolescents, the influence of rules about alcohol is fully mediated by their increased self-control. No significant indirect effect was found in adolescents with low-quality communication (indirect effect = $.00, SE = .01, p = .97$). Although strict rules about alcohol predicted a higher level of self-control, no effect of self-control on alcohol use was found in adolescents with low-quality communication.

Discussion

The direct relationship between stricter rules about alcohol and more self-control on the one hand and lower rates of drinking on the other is in line with previous studies (e.g., Kam et al., 2009; van der Vorst et al., 2006). However, no direct relationship was found between quality of communication and alcohol use. The latter contradicts results from a previous cross-sectional study that showed a positive link between quality of communication and alcohol use (Spijkerman et al., 2008), but longitudinal results from van den Eijnden et al. (2011) corroborated our finding. The relatively ambiguous role of quality of communication about alcohol in understanding adolescents' drinking behavior warrants further investigation of this alcohol-specific parenting prac-

tice—for example, its role as a moderator variable—based on previous research.

An autonomy-supportive environment (i.e., strict rules combined with high-quality conversations about alcohol) was expected to result in higher levels of self-control in adolescents (Patock-Peckham et al., 2011; Ryan and Deci, 2000). This expectation was validated in the sense that this effective alcohol-specific parenting style indeed predicted lower rates of drinking because of an increase in adolescents' self-control. Moreover, only in families that reported high-quality communication about alcohol, strict rule setting effectively increased self-control and subsequent drinking behavior. This supports previous research on general and alcohol-specific parenting that suggests that parenting is most effective when a form of external control is combined with parental warmth (e.g., Darling and Steinberg, 1993; Koning et al., 2012; Patock-Peckham et al., 2011).

It is interesting that strict rules enhanced adolescents' ability to control their behavior, irrespective of the quality of parent-child communication. However, more self-control resulted in less alcohol use only among adolescents with high-quality communication, whereas in adolescents with low-quality parent-child communication, no such relationship was found. Previous research has shown that in addition to ability, the willingness to control one's own behavior also plays a role in the decision to engage in drinking behavior (Gladwin et al., 2011). In families with poor parent-child communication where parents set strict rules, adolescents may be less motivated to adhere to parents' rules, because they perceive parental authority as less legitimate (Jackson, 2002) and therefore feel less inhibited to abstain from drinking (Telzer et al., 2013). This, in fact, underlines recent developments concerning the study of risk behavior in adolescence.

It seems not as much the inability to control one's own behavior (less cognitive control skills) that underlies the increase in risk-taking behavior in adolescence, but rather the flexibility of engagement in cognitive functioning depending on the motivational salience of the context (Crone and Dahl, 2012; Telzer et al., 2013). More specifically, the degree to which adolescents engage in self-control to refrain from drinking depends on their motivation. Telzer et al. (2013) demonstrated that adolescents who value family obligations (such as feelings of value, meaningfulness, and intrinsic reward) are more motivated to engage in self-control skills to avoid risk-taking behavior. Parental support in itself did not predict higher engagement in self-controlling skills, which point at the need for intrinsic motivation to use self-controlling skills. How parents' (alcohol-specific) child-rearing practices can augment the development of intrinsic motivation in adolescents to avoid (heavy) drinking warrants further investigation.

The current study revealed that a combination of strictness and high-quality conversations is of importance for

adolescents' drinking, as was found in previous research (Koning et al., 2012), and, more important, that this relationship can be explained by the development of self-constraining skills. The current findings therefore are in support of the self-determination theory and indicate that this theory can also be applied to alcohol-specific parenting. In addition, these results give reason to further investigate the role of motivation in the relationship between parenting and adolescents' alcohol use.

Limitations

The current findings should be considered in light of some limitations. First, the results are based on self-reported data by adolescents. Although multiple-informant data are preferred, self-reported measures have been found to be a reliable method to assess alcohol use (DelBoca and Darkes, 2003; Koning et al., 2010b) and are often used in studies with large sample sizes.

Second, self-control partially mediated the indirect effect of rules regarding alcohol on alcohol use. In fact, the mediation effect of rules about alcohol via adolescents' self-control is relatively small. This indicates that adolescents' self-control is not the only factor that mediates the impact of alcohol-specific parenting on drinking behavior. Other contributing factors to consider include the availability of alcohol at home (van den Eijnden et al., 2011), peer influences (Kiesner et al., 2010), and individual factors such as impulsivity and motivations to drink (Patock-Peckham et al., 2011; Pieters et al., 2012).

Third, no distinction was made between mothers and fathers regarding their influence on adolescents' drinking. However, previous studies have demonstrated differential impact of parenting based on parents' gender (e.g., Chassin and Handley, 2006; Patock-Peckham et al., 2011). Therefore, future studies should assess maternal and paternal parenting separately in relation to adolescents' alcohol use.

Fourth, a general measure of self-control was used. Previous research indicates that an alcohol intervention program targeting parenting practices and adolescents' self-control indeed increased this general self-control measure in adolescents (Koning et al., 2011b, 2013). Although this suggests the relevance of a general measure of self-control, it would be interesting to examine in a longitudinal study the role of alcohol-specific self-control via the construct of impaired control over drinking (see Heather et al., 1993; Leeman et al., 2012) in relation to alcohol-specific parenting and adolescents' alcohol use. This would be particularly pertinent, because Mares et al. (2013) demonstrated a cross-sectional mediation effect of alcohol-specific self-control in the relationship between alcohol-specific parenting and adolescents' alcohol use. In addition, in future research, it would be interesting to distinguish self-control from impulsivity and sensation seeking—both important

indicators of general self-control (Earleywine and Finn, 1991; Sher and Trull, 1994).

Implications

The current findings have theoretical and practical implications. Theoretically, the current findings are in support of the self-determination theory (Ryan and Deci, 2000)—that is, parents influence their child's self-control by setting strict rules about alcohol and by engaging in high-quality communication about it. In a practical sense, this implies that strict rule setting and good parent-child communication are important preventative targets for parents. In addition, interventions simultaneously targeting self-control in adolescents and alcohol-specific parenting may foster even better outcomes (Koning et al., 2009, 2011a, 2013). This study is the first to provide more insight into the mechanism of self-control underlying the relationship between alcohol-specific parenting and adolescents' alcohol use.

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References

- Abar, C., & Turrissi, R. (2008). How important are parents during the college years? A longitudinal perspective of indirect influences parents yield on their college teens' alcohol use. *Addictive Behaviors, 33*, 1360–1368.
- Abar, C., Abar, B., & Turrissi, R. (2009). The impact of parental modeling and permissibility on alcohol use and experienced negative drinking consequences in college. *Addictive Behaviors, 34*, 542–547.
- Abar, C. C., Fernandez, A. C., & Wood, M. D. (2011). Parent-teen communication and pre-college alcohol involvement: A latent class analysis. *Addictive Behaviors, 36*, 1357–1360.
- Baumrind, D. (1978). Parental disciplinary patterns and social competence in children. *Youth & Society, 9*, 239–267.
- Beaver, K. M. (2008). Nonshared environmental influences on adolescent delinquent involvement and adult criminal behavior. *Criminology, 46*, 341–369.
- Behrendt, S., Wittchen, H.-U., Höfler, M., Lieb, R., & Beesdo, K. (2009). Transitions from first substance use to substance use disorders in adolescence: Is early onset associated with a rapid escalation? *Drug and Alcohol Dependence, 99*, 68–78.
- Boisvert, D., Vaske, J., Taylor, J., & Wright, J. P. (2012). The effects of differential parenting on sibling differences in self-control and delinquency among brother-sister pairs. *Criminal Justice Review, 37*, 5–23.
- Boutwell, B. B., & Beaver, K. M. (2010). The intergenerational transmission of low self-control. *Journal of Research in Crime and Delinquency, 47*, 174–209.
- Brody, G. H., McBride Murry, V., McNair, L., Chen, Y.-F., Gibbons, F. X., Gerrard, M., & Ashby Wills, T. (2005). Linking changes in parenting to parent-child relationship quality and youth self-control: the Strong African American Families program. *Journal of Research on Adolescence, 15*, 47–69.
- Brown, S. A., & Tapert, S. F. (2004). Adolescence and the trajectory of alcohol use: Basic to clinical studies. *Annals of the New York Academy of Sciences, 1021*, 234–244.

- Chassin, L., & Handley, E. D. (2006). Parents and families as contexts for the development of substance use and substance use disorders. *Psychology of Addictive Behaviors, 20*, 135–137, discussion 140–142.
- Cheung, N. W. T., & Cheung, Y. W. (2008). Self-control, social factors, and delinquency: A test of the General Theory of Crime among adolescents in Hong Kong. *Journal of Youth and Adolescence, 37*, 412–430.
- Cochran, J. K., Wood, P. B., Sellers, C. S., Wilkerson, W., & Chamlin, M. B. (1998). Academic dishonesty and low self-control: An empirical test of a general theory of crime. *Deviant Behavior, 19*, 227–255.
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*, 558–577.
- Conner, B. T., Stein, J. A., & Longshore, D. (2009). Examining self-control as a multidimensional predictor of crime and drug use in adolescents with criminal histories. *The Journal of Behavioral Health Services & Research, 36*, 137–149.
- Crone, E. A., & Dahl, R. E. (2012). Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nature Reviews Neuroscience, 13*, 636–650.
- Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin, 113*, 487–496.
- Del Boca, F. K., & Darkes, J. (2003). The validity of self-reports of alcohol consumption: State of the science and challenges for research. *Addiction, 98*, Supplement 2, 1–12.
- Earleywine, M., & Finn, P. R. (1991). Sensation seeking explains the relation between behavioral disinhibition and alcohol consumption. *Addictive Behaviors, 16*, 123–128.
- Engels, R. C. M. E., & Knibbe, R. A. (2000). Alcohol use and intimate relationships in adolescence: When love comes to town. *Addictive Behaviors, 25*, 435–439.
- Engels, R. C. M. E., Knibbe, R. A., & Drop, M. J. (1999). Why do late adolescents drink at home? A study on psychological well-being, social integration and drinking context. *Addiction Research & Theory, 7*, 31–46.
- Ennett, S. T., Bauman, K. E., Foshee, V. A., Pemberton, M., & Hicks, K. A. (2001). Parent-child communication about adolescent tobacco and alcohol use: What do parents say and does it affect youth behavior? *Journal of Marriage and Family, 63*, 48–62.
- Feldman, S. S., & Weinberger, D. A. (1994). Self-restraint as a mediator of family influences on boys' delinquent behavior: A longitudinal study. *Child Development, 65*, 195–211.
- Gibbs, J. J., Giever, D., & Martin, J. S. (1998). Parental management and self-control: An empirical test of Gottfredson and Hirschi's general theory. *Journal of Research in Crime & Delinquency, 35*, 40–70.
- Gibson, C. L., Sullivan, C. J., Jones, S., & Piquero, A. R. (2010). "Does it take a village?" Assessing neighborhood influences on children's self-control. *Journal of Research in Crime and Delinquency, 47*, 31–62.
- Gladwin, T. E., Figner, B., Crone, E. A., & Wiers, R. W. (2011). Addiction, adolescence, and the integration of control and motivation. *Developmental Cognitive Neuroscience, 1*, 364–376.
- Gottfredson, M., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.
- Griffin, K. W., Scheier, L. M., Acevedo, B., Grenard, J. L., & Botvin, G. J. (2012). Long-term effects of self-control on alcohol use and sexual behavior among urban minority young women. *International Journal of Environmental Research and Public Health, 9*, 1–23.
- Habib, C., Santoro, J., Kremer, P., Toumbourou, J., Leslie, E., & Williams, J. (2010). The importance of family management, closeness with father and family structure in early adolescent alcohol use. *Addiction, 105*, 1750–1758.
- Heather, N., Tebbutt, J. S., Mattick, R. P., & Zamir, R. (1993). Development of a scale for measuring impaired control over alcohol consumption: A preliminary report. *Journal of Studies on Alcohol, 54*, 700–709.
- Jackson, C. (2002). Perceived legitimacy of parental authority and tobacco and alcohol use during early adolescence. *Journal of Adolescent Health, 31*, 425–432.
- Järvinen, M., & Östergaard, M. (2009). Governing adolescent drinking. *Youth and Society, 40*, 377–402.
- Joussemet, M., Landry, R., & Koestner, R. (2008). A self-determination theory perspective on parenting. *Canadian Psychology, 49*, 194–200.
- Kam, J. A., Matsunaga, M., Hecht, M. L., & Ndiaye, K. (2009). Extending the theory of planned behavior to predict alcohol, tobacco, and marijuana use among youth of Mexican heritage. *Prevention Science, 10*, 41–53.
- de Kemp, R. A. T., Vermulst, A. A., Finkenauer, C., Scholte, R. H. J., Overbeek, G., Rommes, E. W. M., & Engels, R. C. M. E. (2009). Self-control and early adolescent anti-social behavior: A longitudinal analysis. *The Journal of Early Adolescence, 29*, 497–517.
- Kiesner, J., Poulin, F., & Dishion, T. J. (2010). Adolescent substance use with friends: Moderating and mediating effects of parental monitoring and peer activity contexts. *Merrill-Palmer Quarterly, 56*, 529–556.
- Koning, I. M., Engels, R. C. M. E., Verdurmen, J. E. E., & Vollebergh, W. A. M. (2010a). Alcohol-specific socialization practices and alcohol use in Dutch early adolescents. *Journal of Adolescence, 33*, 93–100.
- Koning, I. M., Harakeh, Z., Engels, R. C. M. E., & Vollebergh, W. A. M. (2010b). A comparison of self-reported alcohol use measures by early adolescents: Questionnaires versus diary. *Journal of Substance Use, 15*, 166–173.
- Koning, I. M., van den Eijnden, R. J., Verdurmen, J. E., Engels, R. C., & Vollebergh, W. A. (2011a). Long-term effects of a parent and student intervention on alcohol use in adolescents: A cluster randomized controlled trial. *American Journal of Preventive Medicine, 40*, 541–547.
- Koning, I. M., van den Eijnden, R. J. J. M., Engels, R. C. M. E., Verdurmen, J. E. E., & Vollebergh, W. A. M. (2011b). Why target early adolescents and parents in alcohol prevention? The mediating effects of self-control, rules and attitudes about alcohol use. *Addiction, 106*, 538–546.
- Koning, I. M., van den Eijnden, R. J. J. M., Verdurmen, J. E. E., Engels, R. C. M. E., & Vollebergh, W. A. M. (2012). Developmental alcohol-specific parenting profiles in adolescence and their relationships with adolescents' alcohol use. *Journal of Youth and Adolescence, 41*, 1502–1511.
- Koning, I. M., van den Eijnden, R. J. J. M., Verdurmen, J. E. E., Engels, R. C. M. E., & Vollebergh, W. A. M. (2013). A cluster randomized trial on the effects of a parent and student intervention on alcohol use in adolescents four years after baseline: No evidence of catching-up behavior. *Addictive Behaviors, 38*, 2032–2039.
- Koning, I. M., Vollebergh, W. A. M., Smit, F., Verdurmen, J. E. E., van den Eijnden, R. J. J. M., ter Bogt, T. F. M., . . . Engels, R. C. M. E. (2009). Preventing heavy alcohol use in adolescents (PAS): Cluster randomized trial of a parent and student intervention offered separately and simultaneously. *Addiction, 104*, 1669–1678.
- Leeman, R. F., Patock-Peckham, J. A., & Potenza, M. N. (2012). Impaired control over alcohol use: An under-addressed risk factor for problem drinking in young adults? *Experimental and Clinical Psychopharmacology, 20*, 92–106.
- Littlefield, A. K., Sher, K. J., & Wood, P. K. (2010). Do changes in drinking motives mediate the relation between personality change and "maturing out" of problem drinking? *Journal of Abnormal Psychology, 119*, 93–105.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593–614.
- MacKinnon, D. P., Taborga, M. P., & Morgan-Lopez, A. A. (2002). Mediation designs for tobacco prevention research. *Drug and Alcohol Dependence, 68*, Supplement, 69–83.
- Mares, S. H. W., Lichtwarck-Aschoff, A., & Engels, R. C. M. E. (2013). Alcohol-specific parenting, adolescent alcohol use and the mediating effect of adolescent alcohol-related cognitions. *Psychology & Health, 28*, 833–848.

- Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Authors.
- Patock-Peckham, J. A., Cheong, J. W., Balhorn, M. E., & Nagoshi, C. T. (2001). A social learning perspective: A model of parenting styles, self-regulation, perceived drinking control, and alcohol use and problems. *Alcoholism: Clinical and Experimental Research*, *25*, 1284–1292.
- Patock-Peckham, J. A., King, K. M., Morgan-Lopez, A. A., Ulloa, E. C., & Moses, J. M. F. (2011). Gender-specific mediational links between parenting styles, parental monitoring, impulsiveness, drinking control, and alcohol-related problems. *Journal of Studies on Alcohol and Drugs*, *72*, 247–258.
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *A social learning approach for antisocial boys*. Eugene, OR: Castalia.
- Perrone, D., Sullivan, C. J., Pratt, T. C., & Margaryan, S. (2004). Parental efficacy, self-control, and delinquency: A test of a general theory of crime on a nationally representative sample of youth. *International Journal of Offender Therapy and Comparative Criminology*, *48*, 298–312.
- Pieters, S., Burk, W. J., Van der Vorst, H., Wiers, R. W., & Engels, R. C. M. E. (2012). The moderating role of working memory capacity and alcohol-specific rule-setting on the relation between approach tendencies and alcohol use in young adolescents. *Alcoholism: Clinical and Experimental Research*, *36*, 915–922.
- Pratt, T. C., & Cullen, F. T. (2000). The empirical status of Gottfredson and Hirschi's general theory of crime: A meta-analysis. *Criminology*, *38*, 931–964.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, *55*, 68–78.
- Ryan, S. M., Jorm, A. F., & Lubman, D. I. (2010). Parenting factors associated with reduced adolescent alcohol use: A systematic review of longitudinal studies. *The Australian and New Zealand Journal of Psychiatry*, *44*, 774–783.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147–177.
- Sher, K. J., & Trull, T. J. (1994). Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. *Journal of Abnormal Psychology*, *103*, 92–102.
- Spijkerman, R., van den Eijnden, R. J. J. M., & Huiberts, A. (2008). Socioeconomic differences in alcohol-specific parenting practices and adolescents' drinking patterns. *European Addiction Research*, *14*, 26–37.
- Stattin, H., & Kerr, M. (2000). Parental monitoring: A reinterpretation. *Child Development*, *71*, 1072–1085.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, *72*, 271–324.
- Telzer, E. H., Fuligni, A. J., Lieberman, M. D., & Galván, A. (2013). Meaningful family relationships: Neurocognitive buffers of adolescent risk taking. *Journal of Cognitive Neuroscience*, *25*, 374–387.
- Turrisi, R., Larimer, M. E., Mallett, K. A., Kilmer, J. R., Ray, A. E., Mastroleo, N. R., . . . Montoya, H. (2009). A randomized clinical trial evaluating a combined alcohol intervention for high-risk college students. *Journal of Studies on Alcohol and Drugs*, *70*, 555–567.
- Turrisi, R., & Ray, A. E. (2010). Sustained parenting and college drinking in first-year students. *Developmental Psychobiology*, *52*, 286–294.
- van den Eijnden, R., van de Mheen, D., Vet, R., & Vermulst, A. (2011). Alcohol-specific parenting and adolescents' alcohol-related problems: The interacting role of alcohol availability at home and parental rules. *Journal of Studies on Alcohol and Drugs*, *72*, 408–417.
- van der Vorst, H., Engels, R. C. M. E., Meeus, W., Deković, M., & Van Leeuwe, J. (2005). The role of alcohol-specific socialization in adolescents' drinking behaviour. *Addiction*, *100*, 1464–1476.
- van der Vorst, H., Engels, R. C. M. E., Meeus, W., & Deković, M. (2006). The impact of alcohol-specific rules, parental norms about early drinking and parental alcohol use on adolescents' drinking behavior. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *47*, 1299–1306.
- Verdurmen, J., Monshouwer, K., van Dorsselaer, S., Lokman, S., Vermeulen-Smit, E., & Vollebergh, W. (2012). *Jeugd en riskant gedrag 2011* [Adolescents and risk-taking behavior 2011]. Utrecht, The Netherlands: Trimbos-instituut.
- Verdurmen, J., Monshouwer, K., van Dorsselaer, S., ter Bogt, T., & Vollebergh, W. (2005). Alcohol use and mental health in adolescents: Interactions with age and gender—findings from the Dutch 2001 Health Behaviour in School-Aged Children survey. *Journal of Studies on Alcohol*, *66*, 605–609.
- Wood, M. D., Fairlie, A. M., Fernandez, A. C., Borsari, B., Capone, C., Laforge, R., & Carmona-Barros, R. (2010). Brief motivational and parent interventions for college students: A randomized factorial study. *Journal of Consulting and Clinical Psychology*, *78*, 349–361.
- Yu, J. (2003). The association between parental alcohol-related behaviors and children's drinking. *Drug and Alcohol Dependence*, *69*, 253–262.