



Research paper

Trends in alcohol-specific parenting practices and adolescent alcohol use between 2007 and 2011 in the Netherlands



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ABSTRACT

Background: Following increased research and policy attention on the harmful effects of alcohol use among adolescents and the implementation of prevention programs aimed at reducing adolescent alcohol use, this study examined whether alcohol-specific parenting practices have become stricter and whether adolescent alcohol use has declined between 2007 and 2011 in the Netherlands.

Methods: Data were derived from three nationally representative cross-sectional studies of 12 to 16-year old adolescents – the Dutch National School Survey on Substance Use (2007 and 2011) and the Health Behaviour in School-aged Children (2009). These data were obtained using self-report questionnaires in the classroom (adolescents, $M_{age} = 13.8$ years, $SD = .04$) and at home (parents).

Results: Between 2007 and 2011, Dutch parents increasingly adopted strict alcohol-specific practices, except for parents of 16-year old adolescents. Furthermore, adolescent reports of lifetime and last month alcohol use decreased, except for 16-year olds. The quantity of alcohol consumed by adolescents did not change between 2007 and 2011. Alcohol-specific parenting practices were associated with lower adolescent alcohol use. These associations were generally stable over time.

Conclusion: Our findings are consistent with the recent increased awareness in research, policy and the media about the harmful effects of alcohol on young people. Specifically, they are consistent with the focus of recent prevention efforts aimed at parents to postpone the alcohol use of their child at least until the age of 16. Future prevention programs should also target older age groups (i.e., age 16 years and older) and address the quantity of alcohol consumed by adolescents when they drink.

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Background

Adolescence is a peak period for the initiation and use of substances, and many adolescents experiment with or consume alcohol regularly. Although some experimentation is normative (Engels and ter Bogt, 2001), prevention of early and excessive alcohol use among adolescents is important, particularly because it is associated with adverse psychological, social and physical health consequences, including brain damage, academic failure, violence, injuries, and unprotected sexual intercourse (Gmel, Rehm, & Kuntsche, 2003; Perkins, 2002).

Parents are important socialization agents when it comes to whether and how adolescents start or develop their alcohol use. Besides general parenting practices, such as providing support and

control (for a review see Ryan, Jorm, & Lubman, 2010), alcohol-specific parenting practices have been shown to be important deterrents of adolescents' drinking behaviors. Specifically, parental attitudes (i.e., disapproval of alcohol use among adolescents) have been related to later initiation of adolescent alcohol use (Koning, Engels, Verdurmen, & Vollebergh, 2010) and lower levels of adolescent alcohol use (Bahr, Hoffmann & Yang, 2005; Koning et al., 2010; Koning, van den Eijnden, Verdurmen, Engels, & Vollebergh, 2012; Ryan et al., 2010). In addition, the quality of alcohol-specific communication (i.e., conversations about alcohol between parents and children in which parents can express their thoughts, rules and concerns about alcohol to their children) has been found to correlate with reduced prevalence and intensity of adolescent alcohol use (Miller-Day & Kam, 2010; Spijkerman, van den Eijnden, & Huiberts, 2008; Van Der Vorst, Burk & Engels, 2010). Finally, alcohol-specific rules, which entail parents imposing rules on their children regarding their alcohol use inside and outside the house, have been found to be one of the strongest parenting practices associated with later

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initiation (Van Der Vorst, Engels, Deković, Meeus, & Vermulst, 2007) and a lower intensity of adolescent alcohol use (Mares, Lichtwarck-Anschoff, Burk, van der Vorst, & Engels, 2012).

Until 2005/06, the Netherlands was among the European countries with the highest percentage of alcohol-using adolescents (Currie et al., 2008; Hibell et al., 2009). In the 1990s and early 2000s, adolescent alcohol use increased substantially, especially among younger age groups (12–14 years old) and girls (Geels et al., 2011; Monshouwer, 2008; Poelen, Scholte, Engels, Boomsma, & Willemsen, 2005). At that time, alcohol-specific parenting practices were, overall, lenient among many Dutch parents (Monshouwer, 2008). Partly, these attitudes have been explained by the fact that the generation of parents whose children were adolescents in the 1990s and early 2000s was among the first generations raised during a period of growing alcohol consumption and a relatively liberal (national) alcohol policy (Van Laar, Cruts, Verdurmen, & van Ooyen, 2005).

Since 2005/06, a socio-cultural change seems to have taken place with respect to adult attitudes towards adolescent alcohol use. As scientific knowledge of the potentially hazardous effects of early alcohol use has accumulated (i.e., early alcohol use has been found to be associated with abnormal brain functioning and development, and related learning, retention, and attention difficulties; Hiller-Sturmhöfel & Swartzwelder, 2004; Tapert, Granholm, Leedy, & Brown, 2002), concerns were raised about the high rates of alcohol use among Dutch adolescents. As a result, the reduction of adolescent alcohol use became a priority in Dutch social policy (Klink, Rouvoet, & Ter Horst, 2007). A number of mass media campaigns and prevention programs aimed at reducing alcohol use among adolescents were developed and implemented. Since the scientific literature showed a strong link between alcohol-specific parenting and adolescent alcohol use (Van der Vorst, 2007), and since family interventions were shown to be effective in delaying adolescent drinking (Koning, van den Eijnden, Engels, Verdurmen, & Vollebergh, 2011; Koutakis, Stattin, & Kerr, 2008; see review: Smit, Verdurmen, Monshouwer, & Smit, 2008), these campaigns and programs targeted parents, with the aim of influencing alcohol-specific parenting practices.

In the first few years (2006–2009), mass media campaigns focused on raising awareness among parents about the harms of early drinking and the importance of strict rule setting. In subsequent years (2009–2012), messages about more complex alcohol-specific parenting practices, including supportive parent–child communication skills around alcohol, were added to those on strict rule setting. Parents were advised to postpone the alcohol use of their child for as long as possible, at least until the age of 16 years, the legal age limit for the purchase of alcohol at that time. These prevention messages reached many parents, as they were disseminated via national and regional media, including television, radio, print media, and school prevention programs (Dienst Publiek en Communicatie, 2007–2009, 2010–2011). Since combined prevention efforts (in multiple settings) have been found to be effective in reducing adolescent substance use (Carson et al., 2011; Foxcroft & Tsertsvadze, 2011; Koning et al., 2011), it was expected that the campaigns and programs would be successful in increasing alcohol-specific parenting and in turn decreasing adolescent alcohol use.

In this study, we examined changes over time in alcohol-specific parenting practices and adolescent drinking behaviors between 2007 and 2011 in the Netherlands. Specifically, we investigated whether there were any changes in adolescent alcohol use and parenting practices as they relate to the contemporaneous mass media campaigns. We further tested whether these changes differed across demographic subgroups, such as gender, age, and educational track (vocational versus academic).

We aimed to answer the following research questions:

1. Have alcohol-specific parenting practices changed between 2007 and 2011 and are these changes similar for parents of adolescents from different socio-demographic groups (adolescent gender, age, educational track)?
2. Have adolescent drinking behaviors changed between 2007 and 2011 and are the changes similar for different socio-demographic groups?
3. Are alcohol-specific parenting practices associated with adolescent drinking behaviors and are the associations similar for different socio-demographic groups?
4. Are the associations between alcohol-specific parenting practices and adolescent alcohol use stable over time?

We expected that, compared to 2007, parents in 2009 and 2011 would be more likely to perceive alcohol use as harmful for adolescents, report high-quality alcohol-specific communication with their child, and set rules with respect to their child's alcohol use. We also expected a decrease in adolescent alcohol use during this period. Prevention programs after 2006 targeted parents of adolescents under the age of 16, so it was expected that parents of 12- to 15-year olds would become stricter and that alcohol use would decrease more in this age group, compared to 16-year olds. We did not have a hypothesis on the moderating effect of gender or educational track. With respect to the association between alcohol-specific parenting practices and adolescent drinking behaviors, we expected a negative association, which was equally strong across adolescent demographic groups and stable across survey years.

Method

Study procedures

Data were derived from the Dutch National School Survey on Substance Use in 2007 and 2011 and from the Health Behaviour in School-aged Children study in 2009. The sampling and survey procedures for these surveys were identical and the present examination had a repeated cross-sectional design. The study included data from adolescents aged 12 to 16 attending the first four classes of general secondary education and one of their parents.

The samples were obtained using a two-stage random sampling procedure. First, schools were stratified and drawn proportionally according to the level of urbanization. Second, within each school two to five classes (depending on school size) were selected randomly from a list of all classes provided by each participating school. Within the selected classes, all students were drawn as a single cluster. The response rate of schools was 57% (2007), 48% (2009) and 48% (2011). The reasons for non-response were mainly related to (being approached for) participation in other research.

Research assistants administered self-complete questionnaires in the classroom (lasting approximately 50 min) in October and November of the corresponding year. Anonymity of the respondents was explained when introducing the questionnaire. Collecting all questionnaires in one envelope and sealing the envelope in the presence of the respondents further emphasized anonymity. Adolescent non-response was rare (7%) and was mainly because of illness.

Parental data were also collected using paper questionnaires in October and November of the corresponding year. During data-collection at the schools, adolescents were given a sealed envelope with the 'parent-questionnaire' and an accompanying letter. The students were instructed to hand over the envelope to one of their parents the same afternoon. Three weeks later, a written reminder was sent. The adolescent and parent questionnaires were

linked by means of a bar code. To prevent matching errors, we further checked whether gender and birth date of the adolescent on the parent and adolescent questionnaire corresponded. Incentives were used to promote parent response (e.g., ten 100 euro's vouchers were raffled in 2011), resulting in response rates of 55% (2007), 52% (2009) and 49% (2011).

Study sample

In total, we received 3615 (2007), 2953 (2009) and 3229 (2011) questionnaires from both adolescents and their parents. Demographics of the total sample of adolescents and of those with a responding parent are presented in Table 1. Compared to non-responding parents, parents who returned the questionnaire had adolescents who were younger (mean age 13.7 versus 14.0, $t_s = -8.53$ to -4.59 , $p_s < .001$); more often in academic tracks, $\chi^2 = 51.1-238.0$, $p_s < .01$, less likely to have an ethnic minority background, $\chi^2 = 251.7-360.6$, $p_s < .001$, and more likely to live with both biological parents, $\chi^2 = 41.2-80.3$, $p_s < .001$. No differences were found with respect to adolescent gender. Finally, adolescent alcohol use was generally lower among adolescents of responding parents, compared to non-responding parents. With respect to the lifetime and last month prevalence of alcohol use, this effect emerged in 2007 and 2011, $\chi^2 = 16.3-68.6$, $p_s < .01$, but not in 2009. For the number of drinks during weekends, this effect emerged in all three survey years, $t_s = -6.31$ to -4.51 , $p_s < .001$.

To control for the selective response, and to make it possible to generalize the results to the Dutch school going population aged 12–16, a weighting procedure was applied to all three datasets. As statistics on parental demographics were not available, both adolescent and parent data were weighted using adolescent demographics. Post-stratification weights were calculated by comparing the joint sample distributions and known population distributions of the child's school type, grade, gender, and level of urbanization of the corresponding year (national statistics were obtained from Statistics Netherlands, CBS).

Measures

In the three study waves, identical questions on alcohol-specific parenting were posed to parents, and identical questions on alcohol use and background characteristics were posed to adolescents.

Alcohol-specific parenting: Parent report

Perceived harmfulness of drinking. The degree of perceived harm of alcohol use was measured by a scale representing the mean of three items: "How harmful (physically or in other ways) do you think it is for adolescents under 16 (the legal age of drinking in the Netherlands) to drink (1) one or two glasses every weekend; (2) one or two glasses every day; and (3) five or more glasses every week?". Response categories ranged from 1 = *not harmful* to 4 = *very harmful*. Cronbach's alphas were .75, .67, and .71 for 2007, 2009, and 2011, respectively.

Perceived quality of alcohol-specific communication. Parents were asked about the quality of communication about alcohol with their child using three items: (1) "My child and I talk easily about our opinions regarding drinking"; (2) "When my child and I talk about drinking, we both feel comfortable"; (3) "When my child and I talk about drinking, he or she feels taken seriously/understood" (Spijkerman et al., 2008). Response categories ranged from 1 = *completely untrue* to 5 = *completely true*. A high mean score reflected a high-perceived quality of parent-adolescent communication about alcohol. Cronbach's alphas were .84, .92, and .91 for 2007, 2009, and 2011, respectively.

Alcohol-specific rules. Parent reports on parental rule-setting regarding alcohol use of the adolescent were measured using four

items, two of them referring to alcohol use while parents or supervisors are present and the other two referring to alcohol use while parents or supervisors are absent. The items were: "Would you allow/Is your child allowed to drink: (1) one glass of alcohol at home with parent(s); (2) several glasses at home with parent(s); (3) alcohol at a party with friends; and (4) alcohol during weekends" (based on the scale developed by Van Der Vorst, Engels, Meeus, Deković, & van Leeuwe, 2005). Adolescent alcohol use during weekends typically occurs on a Friday or Saturday night in a bar or pub with friends. Response categories ranged from 1 = *definitely not* to 5 = *definitely*. Responses were reverse scored so that a higher mean on this scale reflected more restrictive alcohol-specific rules. Cronbach's alphas were .88, .91, and .92 for 2007, 2009, and 2011, respectively.

Adolescent alcohol use: Adolescent report

Lifetime prevalence of adolescent alcohol use was measured by asking adolescents how often they had drunk alcohol in their lifetime. Response categories ranged from 0 to 40 or more times on a 14-point scale (Malley, Bachman & Johnston, 1983). In order to establish lifetime prevalence the answers were re-coded into 0 and 1 (answers 1–40 or more).

Last month prevalence of adolescent alcohol use was measured by asking adolescents how often they had drunk alcohol during the last four weeks using the aforementioned 14-point scale. Answers were re-coded likewise into 0 and 1 (answers 1–40 or more).

Number of glasses consumed during a weekend (quantity of drinking) was measured using a Quantity-Frequency Scale (Knibbe, Oostveen, & Van de Goor, 1991; Koning et al., 2010). Quantity-frequency was computed by multiplying the number of drinking days during the weekend (Friday to Sunday) and the number of usual drinks on a weekend day. We chose to measure quantity-frequency during a weekend, as adolescents generally drink during the weekends, rather than on weekdays.

Covariates

All analyses controlled for gender (boy vs. girl), age (ranging from 12 to 16), ethnicity (ethnic minority vs. native Dutch background), family structure (living with both biological parents or not) and educational track (vocational vs. academic).

Strategy for analyses

The analyses considered two characteristics of the data. (1) Students from the same class were drawn as a single cluster and (2) weights were applied to obtain a representative sample of Dutch secondary school students. In order to obtain correct 95% CI and p -values for a re-weighted and clustered sample, robust standard errors were obtained using the Huber-White Sandwich estimation implemented in Stata. All analyses were performed using the statistical software package Stata-V12 (Stata Corp., College Station, TX).

To answer research questions 1 and 2, the weighted (raw) prevalence estimates for alcohol-specific parenting and adolescent alcohol use in 2007, 2009 and 2011 were calculated for the total sample. Multivariate (logistic) regression analyses were performed to test the significance of the time trends. Survey year, the predictor of interest, was included as a dummy variable, using the year 2007 as the reference year. To test for linear trends, we repeated this analysis with time as a continuous variable. To correct for possible differences in the demographic composition across the waves, demographic covariates (gender, age, ethnicity, family structure and educational track) were also included in these analyses.

To test whether the time-trends in both alcohol-specific parenting and adolescent drinking differ across demographic groups (adolescent gender, age and educational track), prevalence estimates for alcohol-specific parenting and adolescent alcohol use

Table 1
Basic characteristics of the adolescent and parent samples (weighted %).

Sample	All participating adolescents						Adolescents with parent report ^b					
	2007		2009		2011		2007		2009		2011	
	N	%	N	%	N	%	N	%	N	%	N	%
Total	6524	100.0	5626	100.0	6624	100.0	3615	100.0	2953	100.0	3229	100.0
Gender												
Boy	3376	51.8	2866	50.9	3433	51.8	1895	52.4	1510	51.1	1681	52.1
Educational track												
Academic	2816	43.2	2649	47.1	3029	45.9	1635	45.2	1533	51.9	1595	49.5
Vocational	3708	56.8	2977	52.9	3572	54.1	1980	54.8	1420	48.1	1629	50.5
Age												
12	1041	16.0	992	17.6	1153	17.4	609	16.8	556	18.8	598	18.5
13	1681	25.8	1414	25.1	1662	25.1	952	26.3	751	25.4	816	25.3
14	1579	24.2	1280	22.8	1594	24.1	869	24.0	666	22.6	784	24.3
15	1501	23.0	1354	24.1	1498	22.6	839	23.2	722	24.5	725	22.4
16	722	11.1	586	10.4	717	10.8	347	9.6	258	8.7	306	9.5
Ethnicity												
Minority background	799	13.1	870	16.2	864	13.9	250	7.4	256	9.0	213	7.0
Family structure												
Incomplete family ^a	1305	20.2	1137	20.2	1623	24.6	604	16.8	520	17.6	647	20.1
Lifetime-prevalence alcohol	4929	76.1	3655	65.7	4253	64.4	2704	75.3	1991	68.1	2037	63.2
Last month alcohol use	2781	44.6	2059	37.4	2253	35.1	1459	42.1	1080	37.3	1030	32.7
Number of glasses during weekends (M, SE)	3.39	.24	2.26	.20	2.81	.23	2.86	.25	1.85	.22	2.41	.23

^a Not living with both biological parents.

^b All analyses were based on this sample.

were calculated separately for different subgroups. Per subgroup, multivariate (logistic) regression analyses were performed to test the significance of the time trends. In addition, interaction analyses were performed to test whether differences between groups were statistically significant. The interaction term (demographic factor x survey year) was added to the regression analyses.

To investigate the association between alcohol-specific parenting and adolescent drinking (research questions 3 and 4), four multiple (logistic) regression analyses predicting adolescent alcohol use (controlled for demographic factors) were performed. In the first model, time was entered as a dummy variable. In Model 2, alcohol-specific parenting practices were added. In Model 3, interactions between demographic subgroup and alcohol-specific parenting practices were added to Model 2 consecutively. Finally, in Model 4, interactions between survey year and alcohol-specific parenting practices were entered consecutively.

To correct for the large datasets and the large amount of tests we conducted, associations and interaction effects were considered significant if $p < .01$. Interaction effects were interpreted based on post hoc graphical (margin) plots.

Results

Trends in alcohol-specific parenting practices between 2007 and 2011

Table 2 presents changes in parental perceptions of the harmfulness of adolescent alcohol use, the quality of alcohol-specific communication, and parental rule setting between 2007 and 2011. For conceptual reasons, perceived harmfulness of adolescent alcohol use under the age of 16 was reported only for parents whose child had not yet reached the age of 16. Besides the raw means across different (adolescent) demographic groups, the results of the regression analyses that controlled for demographic background characteristics are also presented. The ps for trend (testing linear trends) are reported in a footnote below the table. They confirm the results of the main analysis.

Perceived harmfulness of adolescent drinking increased among parents in all subgroups. In 2007, parents scored 3.33 on average on the scale (1–4). This increased to 3.54 in 2009 and stabilized at 3.47 in 2011. The increase was not equally strong across adolescent age groups. Among parents of 14–15 year olds, the increase between 2007 and 2009 was stronger compared to parents of 12–13 year olds ($B = .14, p < .001$). There were no other significant interactions.

The perceived quality of alcohol-specific communication also increased among parents in all subgroups. In 2007, parents scored 4.00 on average on the 5-point scale. In 2009, they scored 4.29 and in 2011 4.38. A significant interaction effect between age and survey year was identified. The increase across years was stronger among parents of 12–13 year olds compared to parents of 16-year olds (2011 vs. 2007; $B = -.19, p = .004$). There were no other significant interactions.

Finally, parent reports of alcohol-specific restrictive rule setting increased from 2007 to 2011. In 2007, parents scored 4.25 on average on the 5-point scale. In 2009, they scored 4.39 and in 2011, they scored 4.42. One exception involved parents of 16-year olds (compared to adolescents of younger age groups) who did not report more rule-setting over time. Further, when comparing 12–13 year olds with 14–15 year olds, the increase in alcohol-specific rules was stronger among the latter group (2011 vs. 2007). This resulted in a significant interaction effect (2011 vs. 2007: $B = .18, p < .001$). There were no other significant interactions.

Trends in adolescent alcohol use between 2007 and 2011

Time trends in adolescent lifetime and last month alcohol use are presented in Table 3. In 2007, 75.3% of the adolescents reported having ever drunk alcohol. In 2009, this percentage decreased to 68.1% and in 2011, 63.2% of the adolescents reported having ever drunk alcohol. However, lifetime prevalence among 16 year olds did not decrease, but this did not result in any significant interaction effects.

The prevalence of last month alcohol use also decreased, from 42.1% in 2007 to 32.7% in 2011. These decreases occurred to a similar degree in all subgroups of adolescents, except for the 16-year

Table 2Trends in alcohol-specific parenting practices between 2007 and 2011 ($N = 3615$ for 2007, $N = 2953$ for 2009, $N = 3229$ for 2011).

Survey year	Perceived harmfulness of drinking ^a					Quality of alcohol-specific communication ^b					Alcohol-specific rules ^b				
	M ^c			Adjusted B ^d		M ^c			Adjusted B ^d		M ^c			Adjusted B ^d	
	2007	2009	2011	2009	2011	2007	2009	2011	2009	2011	2007	2009	2011	2009	2011
Total	3.33	3.54	3.47	.21**	.15**	4.00	4.29	4.38	.28**	.37**	4.25	4.39	4.42	.12*	.16**
Gender															
Girls	3.34	3.52	3.46	.18**	.11**	4.01	4.32	4.42	.31**	.41**	4.28	4.34	4.43	.07	.14**
Boys	3.31	3.57	3.49	.25**	.18**	4.00	4.26	4.34	.25**	.33**	4.21	4.43	4.42	.15**	.18**
Age															
12–13	3.42	3.56	3.53	.14**	.12**	4.04	4.35	4.46	.31**	.43**	4.66	4.73	4.76	.07*	.11**
14–15	3.22	3.50	3.39	.28**	.18**	3.98	4.25	4.33	.26**	.34**	4.10	4.29	4.39	.18*	.29**
16	– ^a	– ^a	– ^a	– ^a	– ^a	3.96	4.19	4.21	.24*	.23**	3.09	3.18	3.00	–.03	–.13
Educational track															
Academic	3.37	3.56	3.51	.19**	.13**	4.06	4.35	4.42	.29**	.36**	4.27	4.45	4.50	.11	.19**
Vocational	3.29	3.52	3.44	.24**	.16**	3.96	4.22	4.34	.27**	.38**	4.22	4.32	4.34	.13*	.14**

p for trend analysis: significant for all parenting practices for all groups ($p < .001$), except for alcohol-specific rules for 16-year olds ($p = .18$).

To ensure that trend patterns with respect to the parenting scales were not driven by single items, we repeated all analyses with the single items. The trend patterns of the single items were, overall, identical to the trend patterns of the corresponding scales.

* $p < .01$.

** $p < .001$.

^a Parents were asked about the harmfulness of drinking under the age of 16 (legal drinking age in The Netherlands). Only parents of adolescents under the age of 16 are included in these analyses (scale range: 1–4).

^b Scale range: 1–5.

^c M = Raw mean.

^d B = Unstandardized result of multivariate regression analysis adjusted for gender, age, educational level, ethnicity, and family structure (Ref. 2007).

olds. Among 16-year olds, the prevalence of last month alcohol use did not decrease. Accordingly, significant interaction effects of age group (12–13-year olds versus 16-year olds) and survey year were identified ($OR = 2.35$, $p = .004$ in 2009; $OR = 3.41$, $p < .001$ in 2011).

Table 3 presents time trends concerning the average number of glasses of alcohol that adolescents reported drinking during a weekend. Overall, in 2007, adolescents reported drinking an average of 2.86 glasses on weekends. In 2009, this number decreased to 1.85. In 2011, however, it increased again to 2.41 glasses per weekend. The trends were similar for boys and girls and for adolescents in different educational tracks. With respect to age group, one significant interaction effect was identified. In 2009, compared

to 2007, the decrease in the number of glasses was stronger among 14–15-year olds compared to 12–13 year olds ($B = -1.06$, $p = .008$).

In an additional analysis, we repeated the trend analyses concerning the average number of glasses consumed on the weekend for drinkers (i.e., adolescents who reported to have drunk alcohol in the past month) only. Overall, drinkers reported consuming an average of 6.58 glasses on weekends in the 2007 survey, 4.89 glasses on weekends in the 2009 survey, and 7.56 glasses on weekends in the 2011 survey. Thus, among drinkers the number of glasses consumed decreased between 2007 and 2009 ($p = .004$), but increased between 2009 and 2011 ($p < .001$). The increase between 2007 and 2011 was not significant ($p = .09$).

Table 3Trends in adolescent alcohol use between 2007 and 2011 ($N = 3615$ for 2007, $N = 2953$ for 2009, $N = 3229$ for 2011).

Survey year	Lifetime-prevalence of alcohol use					Last month prevalence of alcohol use					Number of glasses during a weekend				
	% ^a			Adjusted OR ^b		% ^a			Adjusted OR ^b		M ^c			Adjusted B ^d	
	2007	2009	2011	2009	2011	2007	2009	2011	2009	2011	2007	2009	2011	2009	2011
Total	75.3	68.1	63.2	.72**	.51**	42.1	37.3	32.7	.84	.62**	2.86	1.85	2.41	–.85*	–.26
Gender															
Girls	72.8	66.4	58.9	.72*	.47**	40.6	37.4	31.9	.82	.62**	2.44	1.69	1.99	–.80*	–.35
Boys	77.6	69.7	67.2	.71*	.55**	43.6	37.3	33.5	.86	.61**	3.24	2.01	2.79	–.81	–.18
Age															
12–13	61.0	50.4	43.4	.69**	.48**	20.7	14.5	11.2	.71*	.47**	.61	.20	.28	–.35**	–.30*
14–15	84.7	79.9	75.8	.73	.54**	54.6	50.6	42.9	.87	.62**	3.74	2.36	2.87	–1.33**	–.78
16	93.3	94.2	92.2	1.34	.83	75.7	80.5	82.3	1.83	1.68	8.61	7.31	10.2	.04	2.21
Educational track															
Academic	73.7	64.7	58.4	.70*	.46**	40.0	32.2	30.4	.78	.63**	2.24	1.34	2.02	–.62	–.02
Vocational	76.6	71.8	67.9	.76	.58**	43.9	42.9	35.0	.92	.60**	3.37	2.41	2.80	–1.09*	–.49

p for trend analysis: for lifetime and last month prevalence of alcohol use, p for trend was significant for all groups ($p < .001$), except for 16-year olds. For the number of glasses during a weekend, p for trend was not significant, except for 12–13-year olds ($p < .01$).

* $p < .01$.

** $p < .001$.

^a % = Raw percentage.

^b OR = Odds ratio; result of multivariate logistic regression analysis adjusted for gender, age, educational level, ethnicity, and family structure (Ref. 2007).

^c M = Raw mean.

^d B = Unstandardized result of multivariate regression analysis adjusted for gender, age, educational level, ethnicity, and family structure (Ref. 2007).

Table 4
Results of multiple (logistic) regression analysis examining alcohol-specific parenting, time, and their interaction as possible determinants of adolescent alcohol use ($N = 3615$ for 2007, $N = 2953$ for 2009, $N = 3229$ for 2011).

	Lifetime alcohol use	Last month alcohol use	Number of glasses consumed
	OR (CI 95%)	OR (CI 95%)	B (SE)
Model 1: Time			
Time			
2009 (Ref. 2007)	0.72** (0.61–0.85)	0.84 (0.70–1.01)	–0.85* (0.24)
2011 (Ref. 2007)	0.51** (0.44–0.59)	0.62** (0.52–0.73)	–0.26 (0.23)
Model 2: + alcohol-specific parenting^a			
Time			
2009 (Ref. 2007)	0.83 (0.70–0.97)	1.03 (0.85–1.24)	–0.35* (0.22)
2011 (Ref. 2007)	0.60** (0.52–0.70)	0.78* (0.65–0.92)	–0.42 (0.22)
Perceived harmfulness	0.88 (0.80–0.97)	0.84* (0.76–0.93)	–0.13 (0.16)
Quality of alcohol-specific communication	0.80** (0.73–0.88)	0.72** (0.66–0.78)	–0.95** (0.13)
Alcohol-specific rules	0.67** (0.61–0.73)	0.62** (0.57–0.67)	–1.75** (0.15)
Model 3a: + interactions alcohol-specific parenting × gender			
Perceived harmfulness × male gender	0.99 (0.82–1.21)	1.05 (0.86–1.27)	–0.30 (0.20)
Alcohol-specific communication × male gender	0.99 (0.82–1.21)	0.94 (0.81–1.11)	–0.33 (0.23)
Alcohol-specific rules × male gender	1.17 (1.00–1.37)	1.04 (0.92–1.19)	–1.35** (0.26)
Model 3b: + interactions alcohol-specific parenting × age group			
Perceived harmfulness × 14–15-year olds	0.80 (0.64–1.00)	0.95 (0.76–1.18)	–1.13** (0.18)
Perceived harmfulness × 16-year olds	–	–	–
Alcohol-specific communication × 14–15-year olds	1.05 (0.87–1.26)	1.10 (0.94–1.30)	–1.09** (0.20)
Alcohol-specific communication × 16-year olds	0.86 (0.50–1.48)	0.86 (0.64–1.15)	–2.37** (0.67)
Alcohol-specific rules × 14–15-year olds	0.72** (0.61–0.84)	0.75** (0.64–0.88)	–1.60** (0.18)
Alcohol-specific rules × 16-year olds	0.33** (0.22–0.49)	0.59** (0.45–0.78)	–4.02** (0.45)
Model 3c: + interactions alcohol-specific parenting × educational track			
Perceived harmfulness × vocational track	0.94 (0.76–1.16)	0.92 (0.76–1.11)	–0.39 (0.23)
Alcohol-specific communication × vocational track	1.11 (0.91–1.35)	1.12 (0.94–1.33)	–0.24 (0.25)
Alcohol-specific rules × vocational track	0.99 (0.84–1.17)	1.03 (0.90–1.18)	–0.41 (0.32)
Model 4: + interactions alcohol-specific parenting × time			
Perceived harmfulness × 2009	0.98 (0.75–1.29)	0.87 (0.69–1.10)	–0.15 (0.32)
Perceived harmfulness × 2011	1.05 (0.83–1.32)	0.87 (0.67–1.12)	0.09 (0.27)
Alcohol-specific communication × 2009	0.68** (0.55–0.83)	0.80 (0.65–0.99)	–0.01 (0.31)
Alcohol-specific communication × 2011	0.66** (0.55–0.80)	0.79 (0.65–0.96)	–0.14 (0.34)
Alcohol-specific rules × 2009	0.97 (0.78–1.19)	0.96 (0.81–1.15)	0.59 (0.38)
Alcohol-specific rules × 2011	1.12 (0.91–1.37)	1.01 (0.85–1.21)	–0.31 (0.39)

Note: All models adjusted for gender, age, educational level, ethnicity, and family structure. In model 2 all parenting variables were entered simultaneously. In models 3 and 4 all interactions were entered separately. In models 3 and 4 interaction terms including “perceived harmfulness of drinking under the age of 16” were analyzed including only parents of adolescents under the age of 16.

* $p < .01$.

** $p < .001$.

^a (Changed) estimates for the time trends in Model 2 give insight into the potential influence of trends in alcohol-specific parenting on trends in adolescent alcohol use.

Are alcohol-specific parenting practices associated with adolescent alcohol use?

Table 4 presents the results of the multiple (logistic) regression analyses predicting adolescent alcohol use. In accordance with the aforementioned results, significant time effects were observed for all three alcohol outcomes (Model 1).

The results of Model 2 show that perceived harmfulness was negatively related to last month alcohol use, but not to lifetime alcohol use (although $p = .01$) and the quantity of alcohol consumed. Quality of alcohol-specific communication and alcohol-specific rule setting were negatively associated with all three outcomes of adolescent alcohol use. In Model 2, the association between survey year and adolescent alcohol use generally decreased in strength due to the addition of the alcohol-specific parenting variables. This may indicate that increasing trends in alcohol-specific parenting practices may in part account for the decreasing trends in adolescent alcohol use.

The results of Model 3a reveal that the associations between alcohol-specific parenting and adolescent alcohol use were similar for boys and girls, with one exception: the association between alcohol-specific rules and the number of glasses consumed was stronger for boys than for girls. Model 3b shows that the strength

of associations between alcohol-specific parenting and adolescent alcohol use in some instances differed across age group. First, the association between perceived harmfulness and the number of glasses consumed was stronger for 14–15-year olds, compared to 12–13-year olds. Second, the association between parental perceptions of the quality of alcohol-specific communication and the number of glasses consumed by adolescents was stronger for older age groups (14–15 and 16-year olds) compared to the youngest age group (12–13-year olds). Finally, the association between alcohol-specific rules and adolescent alcohol use (lifetime and last month alcohol use and the number of glasses consumed) was also stronger for older age groups. Model 3c showed that associations between alcohol-specific parenting practices and adolescent alcohol use were similar for adolescents attending vocational and academic educational tracks.

Model 4 revealed no significant interactions of survey year by alcohol-specific parenting practices on adolescent alcohol use, implying that these associations are stable over time. There was one exception: the association between the parental perceptions of the quality of alcohol-specific communication and adolescent lifetime alcohol use changed over time in that the association was not significant in 2007, but it was significant and negative in 2009 and 2011.

Discussion

This study aimed to identify trends in alcohol-specific parenting practices and adolescent alcohol use between 2007 and 2011. There were three main findings. First, compared to 2007, parents in 2009 reported greater awareness of the harm of alcohol use by their children, better quality of communication with their child about alcohol use, and increased likelihood of setting rules with respect to their child's alcohol use. These increases stabilized or continued in 2011. The only exception was that parents of 16-year olds did not report increasing their rule setting about alcohol use. Second, adolescent reports of both lifetime and last month prevalence of alcohol consumption decreased considerably between 2007 and 2011, while the reports of the number of glasses consumed during a weekend fluctuated. Reports of alcohol use did not decrease among 16-year olds. Third, alcohol-specific parental attitudes and practices were negatively associated with adolescent alcohol use. Associations tended to be stronger for older age groups and were generally stable across survey waves.

The increased prevalence rates of strict alcohol-specific parenting practices and the decrease in lifetime and last month alcohol use among adolescents suggest a decreased risk of experiencing the negative effects of alcohol use among Dutch adolescents, especially those in the younger age groups. It is noteworthy that these developments occurred in all age, gender and educational subgroups (except for the 16-year olds). This may reflect the fact that national prevention efforts aimed at postponing alcohol use, at least until the age of 16, have been successful. Yet, while our results are compelling and consistent with an effect of the mass media campaigns, it needs to be noted that similar changes in adolescent alcohol use have been observed in other European countries, meaning that the decrease in alcohol use among Dutch adolescents may have derived from other, more general cultural shifts in Europe. The prevention programs targeting alcohol-specific parenting practices and their potential effects on adolescent alcohol use should be interpreted in the context of these changing cultural and societal developments.

There were two main exceptions to the general increase in alcohol-specific parenting and the decrease in adolescent alcohol use. First, the number of glasses of alcohol consumed during a weekend was the only alcohol use outcome that did not decrease from 2007 to 2011. Second, the results for 16-year olds indicated a lack of an increase in parental rule setting and a lack of a decrease in adolescent alcohol use. The average number of glasses reported as being consumed on a weekend by 16-year olds remained high, dramatically higher than younger age groups. These two exceptions may possibly reflect the messages conveyed in Dutch prevention programs from 2006 onwards. Specifically, parents were advised to postpone their children's alcohol use at least until they reached the age of 16. Although prevention programs also stressed the harmful effects of alcohol on young people in general (including adolescents aged 16 and over) and underlined that *if* adolescents do drink, they should drink limited amounts of alcohol, the straightforward message of 'no drinking before the age of 16' may have been picked up by most parents. Parents may have found it difficult to continue their practices after their child turned 16, as they had already communicated the message that their child would have more freedom with respect to drinking from age 16 onwards. Furthermore, parents may have focused more on the *moment* at which their adolescent started drinking rather than the *quantity* they drank.

As expected, overall, alcohol-specific parenting practices and adolescent alcohol use were negatively associated. However, perceived harmfulness was related neither to lifetime alcohol use nor to the quantity (number of glasses) consumed. While the results revealed no direct association, parental perceived harmfulness may be a condition for the adoption of strict and effective parenting practices that reduce the amount of alcohol consumed by

adolescents. It is important to note that different alcohol-specific parenting practices can increase each other's effectiveness (Stigler, Perry, Komro, Cudeck, & Williams, 2006). Parent-based alcohol interventions should therefore not be limited to encouraging single parenting practices; they should aim for simultaneous improvement of various components within the parenting context (Koning et al., 2012).

The associations between alcohol-specific parenting and adolescent alcohol use were stronger for older age groups (14–16 year olds) compared to younger age groups (12–13-year olds). This may reflect the fact that alcohol use among younger adolescents is infrequent, which makes it more difficult to identify a strong association between alcohol use and parenting behaviors in these age groups. Our findings imply that while parents of older adolescents may believe that they have less influence on their child's behavior compared to parents of younger adolescents, their influence may be just as substantial. This entails an important prevention message for future years, suggesting that it may be fruitful to concentrate on parents of older adolescents by stressing their continued influence on their children's drinking behaviors.

The associations between adolescent alcohol use and alcohol-specific parenting practices were stable over time, except for the association between the parental perceptions of the quality of alcohol-specific communication and lifetime alcohol use. This association became stronger over time. This may be explained by the fact that prevention programs in 2009 explicitly educated parents about how to communicate effectively with their adolescents about alcohol. As a result, parental definitions of high-quality alcohol-specific communication may have changed over time. For example, parents may have increasingly conceptualized high-quality communication as communication in which they can be strict about what is allowed and not allowed while initially believing that a more lenient approach is the best.

Strengths and limitations

This study has a number of strengths, such as the use of large datasets, a standard protocol for the data collection across the three study waves, and a semi-experimental design. However, it is limited by its use of repeated cross-sectional surveys, meaning that causality cannot be inferred. While the increase in alcohol-specific parenting practices coincided with a decrease in adolescent alcohol use, and the parenting practices related negatively with adolescent alcohol use, this is not sufficient evidence to conclude that the decrease in adolescent alcohol use was *caused* by an increase in alcohol-specific parenting practices. To make such a conclusion, future longitudinal and experimental research should investigate whether adolescent alcohol use increases less over time if their parents adopt stricter alcohol-specific parenting practices.

A second limitation is that the observed increases in alcohol-specific parenting practices are relatively small. This is likely to reflect a ceiling effect, as the initial (2007) scores were already high (i.e., 3.33 out of 4; 4.00 out of 5; and 4.25 out of 5). The high initial scores in 2007 may be explained by the fact that prevention programs aimed at reducing adolescent alcohol use started in 2006 already, which may have influenced parents in 2007. Our finding that all of the three parenting scales showed a significant increase from 2007 to 2011 suggests that the increases, albeit small, are meaningful and important.

A third limitation is the selective response of parents. For each study wave, about 50% of the parents who were approached responded to our invitation to participate in the study. As a result, adolescents in our sample were younger, more often enrolled in academic tracks, less likely to have an ethnic minority background, more likely to live with both biological parents, and less likely to drink alcohol. We corrected for this selective response by

weighting our data for adolescents' educational track, grade, gender, and level of urbanization. However, as weighting procedures cannot completely compensate for non-response biases, the effect sizes in our study may be slightly inflated.

Fourth, we used self-report data on alcohol-specific parenting practices (parent report) and adolescent alcohol use (adolescent report), which entails the risk of socially desirable answers. Parent and adolescent perceptions of alcohol-specific rules differ considerably, with parents reporting stricter rules compared to adolescents (Van Dorsselaer et al., 2010; Verdurmen, Smit, van Dorsselaer, Monshouwer, & Schulten, 2008; Verdurmen, Vermeulen-Smit, van Dorsselaer, Monshouwer, & Schulten, 2012). Our parent data may thus be biased towards higher scores (reporter bias). Further, adolescent perceptions are stronger predictors of their own alcohol use compared to parent perceptions (Koning et al., 2011). Our estimates of the associations between alcohol-specific parenting practices and adolescent alcohol use should therefore be considered conservative. To ensure that adolescents would complete our questionnaire honestly, research assistants stressed anonymity before administering the questionnaires.

Finally, in this study, we did not investigate several possible determinants of adolescent alcohol use, including personality factors, such as sensation seeking and disinhibition, family factors, such as birth order and behaviors of older siblings, and biological or genetic markers. Although we included an important set of social and individual factors as confounders in our models, a more elaborate model of adolescent alcohol use should include additional personality, family, and biological factors, as well as their interactions.

Implications

This study shows that the recent change in social policy and in societal perspectives on adolescent alcohol use may have resulted in stricter alcohol-specific parenting practices and a decrease in adolescent alcohol use in the Netherlands. This study can be perceived as a test case for countries that recently experienced similar socio-cultural changes. Our findings are consistent with the national policy on adolescent alcohol use in the Netherlands between 2007 and 2011. As alcohol use among 16-year olds and the quantity of alcohol consumed did not show a decrease over time, future policy efforts might pay more attention to the quantity of alcohol consumed by adolescents and to alcohol prevention among adolescents aged 16 years and over. The large quantities of alcohol consumed by 16-year olds are especially worrisome and deserve more attention.

Conflict of interest

The authors declare no potential conflicts of interests with respect to the research, authorship, and/or publication of this article.

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