SOCIAL PROCESSES

Alcohol Portrayals in Movies, Music Videos and Soap Operas and Alcohol Use of Young People: Current Status and Future Challenges

Renske Koordeman1,*, Doeschka J. Anschutz2 and Rutger C. M. E. Engels1

1Behavioural Science Institute, Radboud University Nijmegen, PO Box 9104, Nijmegen 6500HE, The Netherlands and 2Centre for Research on Children, Adolescents and the Media, University of Amsterdam, Amsterdam, The Netherlands

*Corresponding author. Tel.: +31-24-361-1818; Fax: +31-24-361-2776; E-mail: r.koordeman@bsi.ru.nl

(Received 9 February 2012; first review notified 24 March 2012; in revised form 23 May 2012; accepted 4 June 2012)

Abstract — Aims: To provide an overview of studies of the effects of alcohol portrayals in movies, music videos and soap operas on alcohol consumption among young people. Moreover, we highlight important issues that need to be addressed in future research.

Methods: This paper reviews the current literature on alcohol portrayals on-screen and the associated gaps and challenges in alcohol media research. Results: Thirteen longitudinal studies, 8 cross-sectional studies and 6 experimental studies examined the effects of alcohol portrayals on-screen on alcohol consumption among young people. They showed a relation between on-screen alcohol exposure and onset and progression of alcohol consumption. A distinction can be made between long-term effects and immediate effects on alcohol consumption. Only lately, more attention has been paid to processes underlying the effects of on-screen alcohol exposure.

Conclusion: Replication of findings and development of new research designs is essential. On-screen alcohol exposure does not affect everyone. It is important to test individual differences in susceptibility to on-screen alcohol portrayals. Further, not all media alcohol portrayal might provoke similar effects. It is therefore essential to test the effect of different types of alcohol portrayals.

INTRODUCTION

Alcohol misuse among young people remains a major public health concern (Rehm et al., 2010; WHO, 2010) causing many social and (mental) health problems. In the last decade, more attention has been paid to the question whether alcohol portrayal in the media partially accounts for alcohol consumption of young people. Alcohol portrayals on-screen are quite common and widespread. Content analyses over the past years indicate a high prevalence of alcohol portrayal in the media (Furnham et al., 1999, 2004; Thompson and Yokota, 2001; Stern, 2005), soap operas (Purnham et al., 1997; Blair et al., 2005; Van den Bulck and Beulens, 2005; Van Hoof et al., 2009) and music videos (DuRant et al., 1997; Robinson et al., 1998). Dal Cin et al. (2008) showed that in a sample of 534 contemporary movies, 52% contained specific brands of alcohol. Roberts et al. (1999) showed that alcohol appeared in 93% of the top 200 rental films in 1996–1997 and that the majority (65%) of adult characters (mainly male) used alcohol, often depicted in a positive manner (43% of all characters). A recent content analysis of the drama series The OC indicated that more than half of all drinking acts involved female characters, and that in one-third of the drinking instances adolescent characters were involved (Van den Bulck et al., 2008).

The association between alcohol portrayals on-screen and youth alcohol use has been studied extensively. We aim to provide an overview of the existing literature on the effects of alcohol portrayal on-screen on alcohol consumption of young people. Moreover, we discuss remaining gaps and future challenges in this research area. We considered longitudinal, cross-sectional and experimental research that assessed the association between alcohol portrayals in movies, soaps or music videos and alcohol behaviour. Studies examining the association between alcohol advertising and alcohol consumption were not discussed since we assume that other underlying mechanisms play a role in the effects of on-screen advertising when compared with the effects of movie and TV alcohol portrayals. Reviews of alcohol advertising effects can be found elsewhere (Anderson et al., 2009; Smith and Foxcroft, 2009; Meier, 2011).

RESEARCH METHODS

Articles published from 1980 to May 2012 were identified through an electronic search of PubMed, MEDLINE, PsycINFO, Cochrane Library and Google scholar from 1980 to May 2012 to identify all longitudinal, cross-sectional and experimental studies assessing the association between alcohol portrayals in movies, soap operas and music videos and drinking behaviour of young people (10–29 years of age). We combined the following search terms. Alcohol consumption: (alcohol consumption(MeSH) OR alcohol* OR alcoholic beverages(MeSH) OR alcohol*beverage* OR Beer(MeSH) OR Beers OR Beer OR Wine(MeSH) OR Wine OR Liquor OR Spirits OR Alcohol* Media search: (Motion picture* OR Movie OR Portrayals OR Film OR Display OR Mass media(MeSH) OR Soap opera OR Music video OR Television(MeSH) OR Televis* OR TV) Youth search: (College OR Universit* OR High School OR Child(MeSH) OR Child OR Kids OR Child OR Youth OR Adolescent(MeSH) Adole*) Reference sections of the identified articles and Web of Science citation lists were used to find additional relevant studies. (The limited number of published studies of this topic, and the complexity that a large part of the empirical evidence stems from one or two data sets from one research group do not allow a meta-analysis.)

The first author pre-screened titles and abstracts from studies identified in the electronic search, excluding those that did not focus on the effects of alcohol portrayals in the media on alcohol-related behaviour. Subsequently, two of the authors (first and last author) independently assessed relevant full-text articles for inclusion. Articles written in
languages other than English were excluded from the search. No methodological quality criteria were used in selecting the papers for inclusion. The search yielded 936 articles. We identified 56 potentially eligible studies after screening the title and abstract and screening reference sections of the identified articles and further reduced them to 27 when assessing the full-text papers. Table 1 provides an overview of the studies, describing keywords, study design, research methods, analysis and outcome of the studies.

OVERVIEW OF LITERATURE

Longitudinal studies
Thirteen longitudinal studies were identified that tested the association between alcohol portrayals in movies (n = 10) and music videos (n = 3) on the one hand, and alcohol consumption on the other. No longitudinal studies assessed the impact of soap operas on drinking. In the 10 movie studies, movie alcohol exposure was measured according to the so-called ‘Beach’ method (Sargent et al., 2008). With this method, on-screen alcohol use was timed in a large sample of popular contemporary movies, selected according to box office success. Exposure to these movies was estimated by asking respondents whether they had seen 50 movies, randomly selected from the larger sample of movies. This way, the total number of minutes of exposure to alcohol portrayals seen by each respondent could be calculated. We discuss the results on the basis of main effects, and mediating and moderating effects.

Main effects
As one of the first researchers examining the association between movie alcohol exposure and drinking, Sargent et al. (2006) found an association between exposure to movie alcohol portrayals and increased risk of initiation of alcohol use in a sample of 2406 adolescents aged 10–14 years, after controlling for potential confounders such as socio-demographics, personality characteristics of the adolescent (sensation seeking, rebelliousness and self-esteem), school performance, parenting style and smoking experimentation. In a similar vein, Hanewinkel and Sargent (2009) showed in a sample of 2708 German teenagers (10–16 years) by movie alcohol exposure and having a television in the bedroom were independent predictors of onset and problematic alcohol use. A recent study by Stoolmiller et al. (2012) assessed in the sample of Sargent et al. (2006) predictors of alcohol onset separately from transition to binge drinking. They found that movie alcohol exposure was associated with both drinking onset and binge drinking.

Three longitudinal studies assessed the main effects of music video exposure on adolescent alcohol consumption. Robinson et al. (1998) found among 1533 adolescents [mean age 14.6 (SD 0.5) years] that increased television and music video viewing was risk factor for the onset of alcohol use but not for the maintenance of drinking. Wingood et al. (2003) indicated in a sample of 522 African American females (14–18 years) that high exposure to rap music videos was associated with alcohol consumption 12 months later. Alcohol use at baseline was not measured, so no conclusions regarding directions of associations can be drawn.

Van den Bulck and Beulens (2005) showed in a sample of 1648 adolescents (13 and 16 years of age) that overall TV viewing per day and music television viewing predicted the amount of alcoholic beverages adolescents consumed while going out 1 year later. These studies have linked the overall effect of TV viewing and music videos to alcohol consumption, but did not specifically assess the amount of alcohol displayed in the video clips in relation to alcohol use.

Mediators
Several studies used the sample described in Sargent et al. (2006) to test social and cognitive processes underlying the relation between movie alcohol portrayals and alcohol use. Dal Cin et al. (2009) showed that alcohol prototypes, expectancies and friends’ use, were mediators of the relation between movie alcohol exposure and willingness to drink and alcohol use. Higher levels of alcohol exposure predicted more favourable prototypes of drinkers, more favourable expectancies about alcohol and increases in friends’ alcohol use, and these variables were associated with willingness to drink and subsequent increases in alcohol use over time. In line with this, Wills et al. (2009) found that movie alcohol exposure was related to an increase in friends’ alcohol use, which was related to an increase in adolescents’ subsequent alcohol use. Movie alcohol exposure also directly predicted an increase in alcohol consumption over time. Gibbons et al. (2010) reported that alcohol prototypes, willingness to drink and friends’ alcohol use positively mediated the relation between drinking in movies and alcohol consumption 8 and 16 months later. In addition, they found stronger associations for White adolescents than for Black adolescents.

Hanewinkel et al. (2008) investigated the role of parenting in the effects of movie alcohol exposure. They showed in a cohort of 2110 German teenagers (10–16 years) that parental restrictions on viewing movies rated for older ages lowers the risk of problematic alcohol use. Furthermore, parental movie exposure restrictions were associated with lower movie alcohol exposure, indicating a mediational pathway between parental restrictions and alcohol use. In a US sample of 2406 10–14-year-old adolescents, Tanski et al. (2010) confirmed the findings of Hanewinkel et al. (2008) by showing a plausible causal pathway, from parental movie restrictions to lower movie alcohol exposure, to lower risks of alcohol onset. They showed that the media parenting effect operated independently from other parenting measures.

Moderators
Stoolmiller et al. (2010) showed in a sample of 6255 adolescents (ages 10–14) that sensation seeking moderated the relation between R-rated movie exposure and initiation of alcohol use. Exposure was associated with greater increases in initiation of alcohol use among low-sensation seekers than among high-sensation seekers. A study by Wills et al. (2010) in the same sample revealed that the association between movie alcohol exposure and adolescent alcohol use was moderated by self-control. The effect of movie alcohol exposure on alcohol use was lower among persons higher on self-control than among those lower on self-control.

To summarize, on-screen alcohol portrayals affect the onset and progression of alcohol use in adolescents. Prototypes, alcohol expectancies, friends’ alcohol use,
<table>
<thead>
<tr>
<th>Study</th>
<th>Key words</th>
<th>n</th>
<th>Age (range or average)</th>
<th>Country</th>
<th>Design</th>
<th>Research method</th>
<th>Analysis</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Longitudinal designs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dal Cin et al. (2009)</td>
<td>Movies, alcohol use, expectancies, prototypes, friends’ alcohol use, willingness to drink</td>
<td>4574</td>
<td>10–14 USA</td>
<td>Random digit-dial-telephone survey. Four waves with 8-month intervals</td>
<td>Telephone interview</td>
<td>Multi-level logistic regression. Adjusted for multiple covariates</td>
<td>Alcohol prototypes ($\beta = 0.01$, $P &lt; 0.05$), expectancies ($\beta = 0.01$, $P &lt; 0.05$) and friends’ use ($\beta = 0.01$, $P &lt; 0.05$) were mediators of the relation between movie alcohol exposure and willingness to drink and alcohol use</td>
<td></td>
</tr>
<tr>
<td>Gibbons et al. (2010)</td>
<td>Movies, alcohol use, willingness to drink, racial differences, prototypes, peers</td>
<td>6522</td>
<td>10–14 USA</td>
<td>Random digit-dial-telephone survey. Four waves with 8-month intervals</td>
<td>Telephone interview</td>
<td>Multi-group SEM with FIML estimation. Adjusted for multiple covariates</td>
<td>Alcohol prototypes and willingness to drink ($z = 2.70$, $P &lt; 0.01$), and friend’s alcohol use ($z = 3.40$, $P &lt; 0.001$), positively mediated the relation between drinking in movies and alcohol consumption 8 and 16 months later in White adolescents. In black adolescents no associations were found.</td>
<td></td>
</tr>
<tr>
<td>Hanewinkel and Sargent (2009)</td>
<td>Movies, alcohol initiation, binge drinking, parental knowledge</td>
<td>2708</td>
<td>10–16 Germany</td>
<td>Random selection of 42 schools of which 27 participated. Two waves with 12–13-month interval</td>
<td>Self-reported questionnaire</td>
<td>Generalized linear models using a log link. Adjusted for covariates</td>
<td>Movie alcohol exposure and having a TV in the bedroom were independent predictors of drinking without parental knowledge (RR ranging from 1.42 to 2.00 comparing quartiles 2 and 4, respectively, with quartile 1) and binge drinking (RR ranging from 1.44 to 2.23)</td>
<td></td>
</tr>
<tr>
<td>Hanewinkel et al. (2008)</td>
<td>Movies, drinking onset, parental movie restriction</td>
<td>2110</td>
<td>10–16 Germany</td>
<td>Random selection of 42 schools of which 27 participated. Two waves with 12–13-month interval</td>
<td>Self-reported questionnaire</td>
<td>Generalized linear models using log link. Multivariate analysis</td>
<td>Adolescents reporting least restrictions for viewing movies rated for older ages have a higher relative risk of future binge drinking [RR = 2.53 (95% CI = 1.55–4.12)] than those once in a while allowed [RR = 1.64 (1.03–2.63)] or those sometimes allowed [RR = 2.06 (1.31–3.25)]</td>
<td></td>
</tr>
<tr>
<td>Robinson et al. (1998)</td>
<td>Music videos, television, video games, alcohol use</td>
<td>1533</td>
<td>14.6 USA</td>
<td>Prospective cohort study Two waves with 18-month interval</td>
<td>Self-reported questionnaire</td>
<td>Logistic regression analysis separately for baseline lifetime non-drinkers and drinkers. Adjusted for covariates</td>
<td>Increased television and [OR = 1.09 (95% CI = 1.01–1.18)] music video viewing [OR = 1.31 (1.17–1.47)] were risk factors for the onset of alcohol use but not for the maintenance of drinking</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Summary of included studies
<table>
<thead>
<tr>
<th>Study Authors (Year)</th>
<th>Study Design</th>
<th>Sample Size</th>
<th>Age Range</th>
<th>Country</th>
<th>Data Collection Method</th>
<th>Statistical Analysis</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sargent et al. (2006)</td>
<td>Longitudinal survey with two waves with 18–26-month interval</td>
<td>2406 never drinkers, selected from baseline sample ($n = 4655$)</td>
<td>10–14</td>
<td>USA</td>
<td>Self-reported questionnaire with telephone interview follow-up</td>
<td>Multi-level logistic regression. Adjusted for covariates</td>
<td>Movie alcohol exposure was associated with onset of drinking [OR = 1.15 (95% CI = 1.06–1.25)]. The association was stronger among adolescents in lower exposure categories</td>
</tr>
<tr>
<td>Stoolmiller et al. (2010)</td>
<td>Random digit-dial-telephone survey. Four waves with 8-month intervals</td>
<td>6522</td>
<td>10–14</td>
<td>USA</td>
<td>Telephone interview</td>
<td>Four-wave dual-process linear growth model and discrete time hazard regression</td>
<td>Sensation seeking moderated the relation between R-rated movie exposure and initiation of alcohol use. Exposure was associated with greater increases in initiation of alcohol use among low sensation seekers than among high sensation seekers (log odds hazard = –0.75, $P &lt; 0.05$)</td>
</tr>
<tr>
<td>Stoolmiller et al. (2012)</td>
<td>Random digit-dial-telephone survey. Four waves with 8-month intervals</td>
<td>6522</td>
<td>10–14</td>
<td>USA</td>
<td>Telephone interview</td>
<td>Discrete time hazard survival models</td>
<td>High movie alcohol exposure was associated with both drinking onset [OR = 2.13 (95% CI = 1.76–2.57)] and binge drinking [OR = 1.63 (1.20–2.21)]</td>
</tr>
<tr>
<td>Tanski et al. (2010)</td>
<td>Longitudinal survey with two waves with 13–26-month interval</td>
<td>2406</td>
<td>10–14</td>
<td>USA</td>
<td>Self-reported questionnaire</td>
<td>Multivariate logistic analysis and structural equation modelling analysis</td>
<td>Adolescents reporting least restrictions for R movies have higher odds of future drinking [OR = 3.5 (95% CI = 2.0–6.0)] than those once in a while allowed [OR = 3.0 (1.7–5.1)] or those sometimes allowed [OR = 3.3 (1.9–5.6)]</td>
</tr>
<tr>
<td>Van den Bulck and Beulens (2005)</td>
<td>Randomized longitudinal survey with two waves with 12-month interval</td>
<td>1648</td>
<td>13 and 16</td>
<td>Belgium</td>
<td>Self-reported questionnaire</td>
<td>Multiple regression analyses. Adjusted for covariates</td>
<td>Overall TV viewing per day and music television viewing predicted the amount of alcoholic beverages adolescents consumed while going out 1 year later (respectively $\beta = 0.073$, $P = 0.004$ and $\beta = 0.068$, $P = 0.001$)</td>
</tr>
<tr>
<td>Wills et al. (2009)</td>
<td>Random digit-dial-telephone survey. Four waves with 8-month intervals</td>
<td>A total of 961 ever drinkers selected from baseline ($n = 6522$) at time three</td>
<td>10–14</td>
<td>USA</td>
<td>Telephone interview</td>
<td>Structural equation modelling analysis. Adjusted for covariates</td>
<td>Movie alcohol exposure at time 1 directly predicted an increase in peer alcohol use ($\beta = 0.11; P &lt; 0.05$) and adolescent use ($\beta = 0.10; P &lt; 0.05$) at time 2. Via friends’ alcohol use at time 2 movie exposure at time 1 had indirect effects to alcohol use at times 3 ($\beta = 0.09, P &lt; 0.05$) and 4 ($\beta = 0.13, P &lt; 0.05$). Further, via adolescents’ alcohol use at time 2 movie exposure at time 1 predicted alcohol use ($\beta = 0.29, P &lt; 0.05$) and alcohol problems 3 ($\beta = 0.11, P &lt; 0.05$) at time 4</td>
</tr>
</tbody>
</table>

Continued
### Table 1. Continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Key words</th>
<th>n</th>
<th>Age (range or average)</th>
<th>Country</th>
<th>Design</th>
<th>Research method</th>
<th>Analysis</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wills et al. (2010)</td>
<td>Movies, self-control, alcohol expectancies, peers</td>
<td>6522</td>
<td>10–14</td>
<td>USA</td>
<td>Random digit-dial-telephone survey. Four waves with 8-month intervals</td>
<td>Telephone interview</td>
<td>Multiple regression analysis and multiple-group analysis. Adjusted for covariates</td>
<td>The association between movie alcohol exposure and adolescent alcohol use was moderated by self-control ($t = -8.42, P &lt; 0.0001$). The effect of movie alcohol exposure on alcohol use was lower among persons being higher on self-control than among those lower on self-control</td>
</tr>
<tr>
<td>Wingood et al. (2003)</td>
<td>Rap music video, alcohol use, parental monitoring</td>
<td>522</td>
<td>14–18</td>
<td>USA</td>
<td>Survey with two waves with 12-month interval. (No baseline measurement of alcohol use)</td>
<td>Self-reported questionnaire</td>
<td>Logistic regression analysis</td>
<td>High exposure to rap music videos was associated with alcohol use 12 months later [OR = 1.60 (95% CI = 1.1–2.3)]</td>
</tr>
<tr>
<td>Cross-sectional designs</td>
<td>Dalton et al. (2002)</td>
<td>Movies, parental restrictions, smoking and alcohol use</td>
<td>4544</td>
<td>10–14</td>
<td>USA</td>
<td>Randomized survey</td>
<td>Self-reported questionnaire</td>
<td>Overdispersed log-linear quasi-likelihood models. Adjusted for covariates</td>
</tr>
<tr>
<td></td>
<td>Dalton et al. (2006)</td>
<td>Movies, parental rules, risk smoking and drinking, prototype</td>
<td>2606</td>
<td>9–12</td>
<td>USA</td>
<td>Randomized survey</td>
<td>Self-reported questionnaire and telephone interview</td>
<td>Generalized linear model using log link. Adjusted for covariates</td>
</tr>
<tr>
<td>Hanewinkel et al. (2007)</td>
<td>Movies, alcohol use, parental knowledge, binge drinking</td>
<td>5581</td>
<td>12.8</td>
<td>Germany</td>
<td>Random selection of 42 schools of which 27 participated</td>
<td>Self-reported questionnaire</td>
<td>Multivariate logistic regression analysis. Adjusted for covariates</td>
<td>Exposure to alcohol use in US movies was associated with alcohol use without parental knowledge OR = 1.47 (95% CI = 1.19–1.82), OR = 2.12 (1.75–2.57) and OR = 2.95 (2.35–3.70) for quartiles 2, 3 and 4, and binge drinking OR = 1.42 (0.93–2.28), OR = 1.84 (1.27–2.67) and OR = 2.59 (1.70–3.95) for quartiles 2, 3 and 4</td>
</tr>
<tr>
<td>Hanewinkel et al. (2012)</td>
<td>Movie exposure, binge drinking Europe, cross cultural</td>
<td>16,551</td>
<td>13.4 (10–19)</td>
<td>Germany, Poland, Italy, Iceland, The Netherlands, Scotland</td>
<td>Survey at 114 schools</td>
<td>Self-reported questionnaire</td>
<td>Multi-level mixed-effects linear regression analysis with random intercepts for country, school, and class</td>
<td>Association between movie alcohol exposure and binge drinking of adolescents in five of six European countries ($P = 0.12, P &lt; 0.001$)</td>
</tr>
<tr>
<td>Hunt et al. (2011)</td>
<td>Movies, alcohol and drug use, heavy drinking, binge drinking</td>
<td>1002</td>
<td>19.0</td>
<td>UK</td>
<td>Cross-sectional data of wave four of a randomized longitudinal cohort study</td>
<td>Computer-aided personal interviews</td>
<td>Multivariate logistic regression analysis. Adjusted for covariates</td>
<td>Association between exposure to alcohol portrayals in movies and both binge OR = 1.59 (95% CI = 1.10–2.30) comparing highest with lowest quartile of movie alcohol exposure) and heavy drinking [OR = 1.56 (1.10–2.30)]</td>
</tr>
<tr>
<td>Authors</td>
<td>Methodology</td>
<td>Sample Size</td>
<td>Age</td>
<td>Country</td>
<td>Study Type</td>
<td>Analysis Method</td>
<td>Findings</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------</td>
<td>-----</td>
<td>---------------</td>
<td>-----------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Primack et al.</td>
<td>Movies, music videos, marijuana, alcohol</td>
<td>1211</td>
<td>15.9 USA</td>
<td>Survey study</td>
<td>Self-reported questionnaire</td>
<td>Bivariate and multivariate logistic regression analysis. Adjusted for covariates Higher movie exposure was associated with ever using alcohol (OR = 1.65 (95% CI = 1.13–2.42)). The association was stronger for those who were younger than 17 (OR = 3.2 (1.8–5.6)) than those who were older than 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thomsen and Rekve</td>
<td>Television, alcohol intentions, alcohol expectancies, friends’ alcohol use</td>
<td>392</td>
<td>13.2 Norway</td>
<td>Survey study</td>
<td>Self-reported questionnaire</td>
<td>Structural equation model analysis For adolescents having no friends who drink, US-produced programmes viewing predicted both normative beliefs (β = 0.14, P &lt; 0.05) and drinking intentions (β = 0.31, P &lt; 0.01), whereas no associations were found for adolescents reported having friends who drink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tucker et al.</td>
<td>TV watching, alcohol use socio-economic status, parental income</td>
<td>394</td>
<td>15.7 USA</td>
<td>Survey study</td>
<td>Self-reported questionnaire</td>
<td>Analysis of variance for unbalanced data with \textit{a priori} comparison. Adjusted for covariates Heavy TV viewers reported more monthly alcohol use than did light viewers (F = 5.2, P = 0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental designs</td>
<td>Movies, positive and negative alcohol portrayal, role attractiveness</td>
<td>158</td>
<td>19.8 USA</td>
<td>Between-participant design with two conditions. Random assignment</td>
<td>Self-reported questionnaire</td>
<td>Independent samples t-tests. \textit{Post hoc} path analysis Role attractiveness of the drinking character increased favourableness in alcohol attitudes (r = 0.24, P &lt; 0.05) but only in the movie that portrayed alcohol positively. In the negative condition the greater the level of perceived realism the less favourable attitudes towards alcohol (r = 0.22, P &lt; 0.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bahk (2001)</td>
<td>Movies, positive and negative alcohol portrayal, role attractiveness</td>
<td>158</td>
<td>19.8 USA</td>
<td>Between-participant design with two conditions. Random assignment</td>
<td>Self-reported questionnaire</td>
<td>Independent samples t-tests. \textit{Post hoc} path analysis Role attractiveness of the drinking character increased favourableness in alcohol attitudes (r = 0.24, P &lt; 0.05) but only in the movie that portrayed alcohol positively. In the negative condition the greater the level of perceived realism the less favourable attitudes towards alcohol (r = 0.22, P &lt; 0.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engels et al.</td>
<td>Movies, advertisements, alcohol consumption, naturalistic setting</td>
<td>80</td>
<td>18–29 The Netherlands</td>
<td>Between-participant design with four conditions. Random assignment. Compared different movies</td>
<td>Observations and self-reported questionnaire</td>
<td>Analysis of variance and multi-level analyses Participants drank more alcohol when exposed to a movie with many alcohol portrayals compared with a movie with less alcohol portrayals (F = 4.44, P &lt; 0.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Koordeman et al.</td>
<td>Movies, alcohol, sex differences, identification, naturalistic setting</td>
<td>244</td>
<td>18–29 The Netherlands</td>
<td>Two by two between-participant design. Random assignment. Compared same movie</td>
<td>Observations and self-reported questionnaire</td>
<td>Multivariate regression analysis Assignment to movie alcohol increased alcohol use during the movie for men (β = –0.65, P &lt; 0.05) but not for women. Identification and weekly alcohol use did not moderate this relation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textit{Continued}
<table>
<thead>
<tr>
<th>Study</th>
<th>Key words</th>
<th>n</th>
<th>Age (range or average)</th>
<th>Country</th>
<th>Design</th>
<th>Research method</th>
<th>Analysis</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koordeman et al. (2011a)</td>
<td>Movies, imitation of alcohol consuming characters</td>
<td>79</td>
<td>18–29</td>
<td>The Netherlands</td>
<td>Observational design</td>
<td>Observations and self-reported questionnaire</td>
<td>Multi-level logistic regression and survival analysis</td>
<td>Participants were more likely to sip in accordance with the actors’ sipping than without such a cue [OR = 1.50 (95% CI = 1.28–1.75)]. Men were more likely to imitate actors’ sipping than women [HR = 1.97 (1.36–3.09)] and participants tended to respond to actors’ sipping at the beginning rather than towards the end [HR = 1.17 (0.358–1.43)]</td>
</tr>
<tr>
<td>Kulick and Rosenberg (2001)</td>
<td>Movies, positive and negative alcohol portrayal, alcohol expectancies, intentions to drink</td>
<td>108</td>
<td>18–19</td>
<td>USA</td>
<td>Between-participant design with three conditions</td>
<td>Self-reported questionnaire</td>
<td>Analysis of variance</td>
<td>Participants in the positive alcohol portrayals movie condition had more positive alcohol expectancies than participants in the control condition ($F = 3.28; P &lt; 0.05$), and participants in the positive and negative film conditions had more negative expectancies than did participants in the control condition ($F = 3.23; P &lt; 0.04$). Intentions to drink did not differ between conditions.</td>
</tr>
<tr>
<td>Van Hoof et al. (2009)</td>
<td>Soap opera, alcohol attitudes, drinking intentions, sex differences</td>
<td>248</td>
<td>12–18</td>
<td>The Netherlands</td>
<td>Two by two between-participant design</td>
<td>Self-reported questionnaire</td>
<td>Analysis of variance</td>
<td>Adolescents who were exposed to alcohol portrayal in soap series had a less positive attitude towards alcohol ($F = 4.81$, $P &lt; 0.05$) and lower drinking intentions ($F = 17.25, P &lt; 0.001$). The effects were stronger for men ($F = 10.11, P &lt; 0.005$)</td>
</tr>
</tbody>
</table>
willingness to drink, sensation seeking, self-control and parenting can be identified as mediating and moderating factors in the relation between movie alcohol exposure and the onset and progression of alcohol consumption.

Cross-sectional studies

Eight cross-sectional studies have examined the effects of movie alcohol portrayals and alcohol consumption of adolescents. We will discuss the main effects of these studies since no mediating or moderating effects have been studied.

In a German sample of 5581 adolescents [mean age 12.8 (SD = 1.2)], Hanewinkel et al. (2007) demonstrated an association between exposure to alcohol use in US movies and alcohol use without parental knowledge and binge drinking. In a similar vein, Hunt et al. (2011) showed an association between exposure to alcohol in films and both binge and heavy drinking in a cohort of 1002 Scottish young adults [mean age 19.0 (SD = 7.3)]. A recent study by Hanewinkel et al. (2012) in six European countries found an association between movie alcohol exposure and binge drinking of adolescents [mean age 13.4 (SD = 1.18)] in five of six European countries after controlling for important covariates. Primack et al. (2009) studied which media exposures were associated with alcohol use among 1211 adolescents (mean age 15.9 years). They indicated that movie exposure was associated with alcohol use. The association was stronger for adolescents younger than 17 compared with adolescents older than 17. Thomsen and Rekke (2006) showed in a sample of 392 non-drinking Norwegian adolescents (mean age 13.2 years) that for adolescents having no friends who drink, TV exposure predicted both normative beliefs and drinking intentions, whereas for adolescents having friends who drink, viewing US-produced programmes had no effect on normative beliefs or intentions to drink. Further, a study by Tucker (1985) showed in a sample of 394 adolescents (mean age 15.7) that heavy TV viewers consumed alcohol more often than did light and moderate viewers. A limitation of the latter studies is that they did not assess actual exposure to alcohol cues on TV, but just measured the overall viewing time.

Dalton et al. (2002) conducted a study of parental restrictions on movies and alcohol use among 4544 10–14 year US adolescents. They showed that parental movie restrictions were associated with lower risk of drinking. In another study of 2606 child–parent dyads (children 9–12 years of age), Dalton et al. (2006) found that parental rules and monitoring of children’s movie viewing were associated with a lower risk of adolescent drinking, over and above monitoring of non-media-related behaviours.

In sum, these cross-sectional studies showed an association between movie alcohol portrayals and drinking without parental knowledge and binge drinking. Parental movie restrictions were associated with lower risk of drinking.

Experimental studies

Six experimental studies tested the relation between movie alcohol portrayals and alcohol cognitions and alcohol consumption. We will distinguish between studies establishing main effects and moderating effects.

Main effects

Engels et al. (2009) tested in a controlled bar-lab setting among 80 male college students (ages 18–29 years) the immediate effects of movie alcohol portrayals on alcohol consumption while watching. They found that participants drank more alcohol when exposed to a movie with many alcohol portrayals compared with a movie with fewer alcohol portrayals. Kulick and Rosenberg (2001) exposed 108 college students (18–19 years) to movie clips with positive alcohol portrayals, negative alcohol portrayals or no alcohol portrayals. Participants in the positive alcohol portrayals movie condition had more positive alcohol expectancies than participants in the control condition, and participants in the positive and negative film conditions had more negative expectancies than did participants in the control condition. Intentions to drink did not differ between conditions. In a study by Bahk (2001), 158 college students (mean age 19.8 years) watched one of two movie versions that portrayed alcohol use either in a positive or in negative way. Role attractiveness of the drinking character increased favourableness in alcohol attitudes but only in the movie that portrayed alcohol positively. In the negative condition, high perceived realism decreased favourable attitudes towards alcohol. In a class-room setting, Van Hoof et al. (2009) showed in a sample of 248 adolescents (12–18 years) that participants who were exposed to alcohol portrayals in a soap opera had less positive attitudes towards alcohol and lower drinking attitudes and intentions to drink than participants who were not exposed the soap opera without alcohol portrayals. The effects were stronger for male participants.

Moderating effects

Koordeman et al. (2010) found in a sample of 244 college students (ages 18–29 years) that alcohol consumption was higher in the alcohol movie condition compared with the non-alcohol movie condition for men, but not for women. Identification and weekly alcohol consumption did not moderate the relation between movie condition and alcohol consumption. In another study Koordeman et al. (2011a) tested whether imitation of characters drinking alcohol on screen explained alcohol consumption. They showed that college students (n = 79) were more likely to sip in accordance with actors’ sipping than without such a cue. Men were more likely to imitate actors’ sipping than women and participants tended to imitate more at the beginning of the movie than at the end.

Current status

The longitudinal, cross-sectional and experimental studies in this relatively young field of research provide new and important insights into the link between on-screen alcohol portrayals and alcohol consumption. They show a relation between on-screen alcohol exposure and the onset and progression of alcohol consumption. A distinction can be made between the immediate effects of alcohol portrayals (studied via experimental studies) and long-term effects (studied via longitudinal studies). Only lately, more attention has been paid to processes underlying the effects of on-screen alcohol portrayals. Personality traits such as rebelliousness, sensation seeking and self-control, and factors such as drinker
prototypes, alcohol expectancies, willingness to drink, parenting style, parental drinking and friends’ alcohol use seem to mediate the long-term relation between movie alcohol portrayals and drinking levels. Further, being male, having friends who consume alcohol and low self-control seem to moderate the relation between movie alcohol portrayals and drinking. Concerning the immediate effects of movie alcohol portrayals, experimental studies showed that imitation processes probably explain the association between portrayals and consumption and that this seems to be stronger for men. In addition, positive alcohol portrayals lead to more positive expectancies and alcohol-related attitudes, and both positive and negative alcohol portrayals lead to more negative alcohol expectancies. However, alcohol portrayals in soap operas lead to less positive alcohol attitudes and intentions to drink.

Despite efforts to unravel mechanisms explaining the effects of on-screen alcohol portrayals on alcohol consumption, little is known about how susceptibility to media effects develops or how movie alcohol portrayals affect levels of drinking. Replication of these findings and development of new research designs is therefore essential. Furthermore, there is a possibility that publication bias may have affected our identified studies. It is possible that there are studies with negative findings or null findings that have not been published or that have been published but with no references we could retrieve with our search strategy. It is important that studies with negative or null findings should be published, to aid theory testing and balance the field of research.

**Future directions and challenges**

On the basis of previous literature, we propose several new endeavours that need to be studied (see a conceptual scheme in Fig. 1). We are aware of the fact that we cannot be complete in our suggestions, but will try to provide a basis for new directions for future research.

First, alcohol exposure is often measured as any instance where alcohol is portrayed, so no distinction is made between different contexts in which alcohol cues appear. Perhaps, not all movie alcohol portrayals provoke the same effect on alcohol consumption since there is some evidence that positive (e.g. party, dinner) and negative (e.g. drunkenness, drinking to suppress emotions) movie alcohol portrayals lead to different alcohol expectations and attitudes towards alcohol (Bahk, 2001; Kulick and Rosenberg, 2001). Mason et al. (2008) showed that positive and not negative affective stimuli were associated with increased craving. Movies mostly portray alcohol in a positive way (Everett et al., 1998; Stern, 2005) and subsequently this might induce higher levels of craving. Furthermore, specific features of movie characters consuming alcohol might provoke different responses and effects on alcohol use. Adolescents identify more with media characters when they evaluate them positively, when they perceive similarities between themselves and the character and when they wish to be like the media character (Spijkerman et al., 2012). Designs taking into account the specific social-emotional context of alcohol use (e.g. negative vs. positive portrayal; male vs. female drinking characters; different brand and types of alcoholic drinks) could lead to greater understanding of the processes by which alcohol portrayal leads to increased alcohol consumption in young viewers.

Second, there should be more emphasis on frequency of exposure as a factor promoting alcohol use among viewers. We do not know how much exposure is necessary to provoke an effect on drinking (onset). How many movies should an adolescent watch to be more vulnerable to start drinking or to increase drinking or to change from normative to abnormal drinking patterns? Designs testing the dose-response relation are warranted to explain why adolescents at some point start drinking.

Third, dual-process models (cf. Strack and Deutsch, 2004; Wiers et al., 2007; Stacy and Wiers, 2010) can provide more insight into the mechanisms affecting movie alcohol portrayals and should steer developments in this field. These models presume alcohol use and misuse to develop because of an imbalance between a fast automatic appetitive system and a slower controlled regulatory system. Research showed that repeated alcohol use produces a dopaminergic response and that this way the automatic system becomes sensitized every time it is exposed to alcohol cues (Robinson and Berridge, 2001, 2004). This automatic process causes alcohol to be perceived as necessary and allows it to acquire strong motivational properties. Automatic processing of alcohol cues is thought to interact with a slower reflective system that consists of controlled processes related to the ability to inhibit drinking and the motivation to really do so. In early stages of alcohol use controlled processing is probably more important for the initiation of alcohol use than automatic processing, whereas in more experienced drinkers the automatic processes become more salient and deliberate control decreases (Hemel-Ruiter et al., 2011). Future studies could further specify and test this type of models both for the onset of drinking and for the progression of drinking to explain individual differences in susceptibility to alcohol portrayals.

Relatedly, studies should test in which circumstances people are more susceptible to movies alcohol portrayals. Self-regulation failure is an important factor in this context. Research by Baumeister et al. (1998, 2003) suggested that self-regulation is an exhaustible resource that can be used up. Situational factors such as being tired or stressed, being in a specific social context (e.g. bar) or specific personality characteristics might lead to a decrease in deliberate control and increased susceptibility to alcohol cues. Recent cognitive neuroscience research indicates that good self-regulation depends on a balance between subcorticol regions involving reward and emotions and prefrontal regions involving self-control (Heatherton and Wagner, 2011). When the balance is more in favour of subcortical regions, the self-regulatory resource is weakened. This can happen when people see alcohol cues, or when prefrontal functioning is impaired, for example because of alcohol or depletion of self-regulatory resources (Wagner and Heatherton, 2010). Designs manipulating self-regulation prior to watching alcohol portrayals might be useful in understanding the circumstances under which effects of on-screen alcohol portrayals occur.

Fourth, genetic factors may provide support to theoretical models explaining individual differences in susceptibility to on-screen alcohol portrayals. Conflicting results in gene-environment interaction studies and the chance of false positives in small samples call for a careful selection of candidate genes (Flint and Munafo, 2008; Van der Zwaluw and Engels, 2010). Two widely studied candidate genes in relation to alcohol could be proposed that might moderate the
relation between on-screen alcohol portrayals and alcohol consumption. Both the dopamine D4 receptor gene (DRD4) as the single nucleotide polymorphisms of the μ-opioid receptor gene (OPRM1) are associated with craving for alcohol (Berridge and Robinson, 1998; Hutchison et al., 2002; Filbey et al., 2008; Van den Wildenberg et al., 2007; Ray et al., 2010) and externalizing behaviour such as impulsivity (Bakermans-Kranenburg and Van Ijzendoorn, 2006; Laucht et al., 2007). Although some studies failed to replicate the effects of the DRD4 receptor gene (Kluger et al., 2002; Van den Wildenberg et al., 2007). The role of genetic factors in the aetiology of alcohol abuse may vary at different stages of alcohol use (Laucht et al., 2007). There is preliminary evidence that OPRM1 is more involved in the onset of drinking and that DRD4 is more prominent in experienced drinkers since rewarding properties of alcohol are more important in this drinking phase (Pieters et al., 2012). Testing of specific genes to assess individual differences in the effects of on-screen alcohol portrayals could be incorporated in longitudinal and experimental paradigms.

Fifth, the interplay between alcohol advertising (both product placement and explicit advertising) and movie alcohol portrayals is an essential challenge to test. Product placement occurs when a company pays movie makers to portray their brand in a movie (Dal Cin et al., 2008). It might be that strategies to embed advertisements in a movie context with appealing actors (and without conscious processing of the intentions of the message) are even more powerful than general advertising strategies and general movie alcohol portrayals since the message is not perceived as advertising (Petty and Cacioppo, 1986; Dal Cin et al., 2009). Future studies could subcategorize movie alcohol exposure to assess the single effect of alcohol product placement on consumption compared with general alcohol portrayal in movies. Besides product placement traditional forms of TV advertising might interfere with and increase the effect of movie alcohol portrayals. Green and Brock (2002) revealed that when people feel transported into a narrative (being psychologically engaged by it), they are likely to agree with the message of that narrative. When people are highly transported into the storyline of a movie, this might lead to increased processing of the persuasive messages of alcohol advertisements. Especially when a movie and an ad share similar themes, that is, when they are thematically congruent, this might positively affect processing of advertisements (Wang and Calder, 2009). Engels et al. (2009) indeed showed that movie alcohol portrayals in combination with alcohol ads lead to increased alcohol consumption, whereas Koordeman et al. (2012) found that alcohol ads in combination with a movie in which no thematic compatible alcohol cues were included did not increase alcohol consumption. The question is however, how movie content affects an ad, and vice versa how alcohol ads affect movie alcohol portrayals (Wang and Calder, 2009). Future studies should test whether distinctive combinations of movies and advertisements have differential effects on alcohol consumption.

Sixth, a distinction can be made between the immediate effects of alcohol portrayal while watching TV and the more long-term effects of alcohol portrayal on drinking behaviour. An important question is how these two interact. Is someone who is more susceptible to imitating while watching a movie also more likely to drink more in the long term? Thus far, no study has tested this. One way to test this could be to integrate repeated observations of immediate effects of alcohol portrayals over time into a longitudinal design using the ‘Beach’ method.

Finally, the role of the social environment (parents and peers) should be taken into account while assessing the
relation between alcohol exposure and alcohol use. Adequate communication between parents and adolescents might stimulate adolescents to think more critically of the media and to have a more active role in understanding the media. A systematic theory- and research-based programme guiding parents on how to facilitate appropriate media use of their children is currently lacking. Further, peers are important in affecting substance use in adolescence (Henry et al., 2005; Hoffman et al., 2006) and seem to have a mediating role in movie effects on alcohol use (Dal Cin et al., 2009; Wills et al., 2009). However, little is known about how peers influence one another with respect to media choice and substance use. More in-depth research designs testing the influence of the social environment on the amount of media exposure of adolescents are an important step to accomplish.

CONCLUSION

In this review, we provided an overview of studies of alcohol portrayals on-screen and alcohol consumption of youth and highlighted important issues that need to be addressed in future research. This field of research is relatively young. Recently, studies have shed light the mechanisms underlying the effects of media alcohol portrayals. Essential is the development of new designs in which proposed theories (e.g. dual-process models, self-regulatory failure) can be tested. On the one hand alcohol portrayals in the media do not affect everyone and not all media alcohol portrayals might provoke similar effects. Therefore, it is important to test individual differences in susceptibility to on-screen alcohol portrayals and the effect of different alcohol portrayals should be studied.

Acknowledgements — None.

Funding — R.K. was supported by the Dutch Organization for Scientific Research (NWO). Conflict of interest statement. None declared.

REFERENCES
