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A reinforcement sensitivity perspective on adolescents’ susceptibility to the influence of soap opera viewing on alcohol attitudes. *Mass Communication & Society*

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Abstract

Previous research found support for an association between exposure to alcohol-related media content and alcohol attitudes, intentions and behavior. Nevertheless, research on what makes young people susceptible to the occurrence of this relationship is scarce. The current study examined the behavioral activation (BAS) and inhibition system (BIS) as moderators of the relationship between soap opera viewing and alcohol attitudes. A cross-sectional survey was carried out among a sample of 922 adolescents ($M_{age}=14.96$ years, $SD=.85$, 56% girls). Regression analyses showed no association between total television viewing and alcohol attitudes, but did confirm that soap opera viewing is associated with positive attitudes towards alcohol use. Moderation analyses indicated that BAS did not moderate this relationship, while BIS did; the relationship between soap opera viewing and positive attitudes towards alcohol was only significant for adolescents with a low BIS-profile. These results provide support for the premise that an elevated BIS protects adolescents for the effect of soap opera viewing frequency on their alcohol attitudes.

Introduction

Adolescence is often characterized by an increase in experimentation behavior such as drinking (high amounts of) alcohol (Arnett, 2000). Research on the possible effects of this behavior among adolescents has found associations between alcohol (mis)use and health-compromising behaviors (Windle & Windle, 2005) such as involvement in motor vehicle crashes and violent incidents (Swahn, Simon, Hammig, & Guerrero, 2004). Although the overall trend in alcohol use in Belgium among this age group is declining (Melis, Rosiers, De Paepe, & Geirnaert, 2014), adolescents still drink their first glass of alcohol on average around the age of 14 which is two years before the legal drinking age (VAD, 2014). Over the years, research has attempted to identify the predictors of alcohol abuse among adolescents. Several of these studies have examined a link between exposure to media portrayals of alcohol and adolescents' drinking behavior. Content analyses have shown that alcohol consumption is very common and prominent on the television screen (e.g., Diener, 1993; Verma, Adams, & White, 2007). As a response, a substantial body of research has focused on whether and to which extent the media influence adolescents' alcohol behavior, using experimental, longitudinal and cross-sectional designs (Koordeman, Anschutz, & Engels, 2012). Some studies showed evidence for an association between exposure to media containing alcohol references such as soap operas (van Hoof, de Jong, Fennis, & Gosselt, 2009), music videos (Van den Bulck & Beullens, 2005), advertising (Anderson, de Bruijn, Angus, Gordon, & Hastings, 2009) and movies (Engels, Hermans, van Baaren, Hollenstein, & Bot, 2009; Hanewinkel et al., 2012) on the one hand and indicators of alcohol drinking behavior on the other hand such as early-onset drinking, alcohol use intentions and binge drinking (e.g., Hanewinkel, Tanski, & Sargent, 2007; Tanski, Cin, Stoolmiller, & Sargent, 2010; Thomsen & Rekve, 2006). However, the effect sizes reported by many of these studies tended to be rather small (Koordeman et al., 2012). As a response some studies have started to

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unravel the underlying mechanisms of the relationship between media use and alcohol drinking behavior by focusing on mediators such as alcohol expectancies and moderators such as friends' alcohol use and gender (Koordeman et al., 2012). Nevertheless, few studies examined individual differences in the susceptibility to the effect of media portrayals of alcohol use and how this susceptibility can be explained (Koordeman et al., 2012). Therefore, an increasing amount of studies has stressed the need for more research on the role of individual differences in explaining such relationships (Koordeman et al., 2012; Lang & Ewoldsen, 2010; Valkenburg & Peter, 2013). In line with this research, the present study specifically argues that integrating the functioning of appetitive and inhibition systems, such as proposed in Gray's (1970) reinforcement sensitivity theory (RST) can help to understand the susceptibility of individuals to the portrayal of alcohol in the media (Koordeman et al., 2012).

Explaining behavior: a reinforcement sensitivity perspective

The RST combines neuropsychology and learning psychology to explain human behavior and to describe the biological processes underlying personality dimensions (Gray & McNaughton, 2003). It is postulated that behavior results from the functioning of two neuropsychological systems: BAS, an approach or appetitive system and BIS, an inhibition or avoidance system (Gray, 1970; Gray & McNaughton, 2003). Both systems are believed to regulate behavior in response to environmental stimuli resulting in different emotional and behavioral outcomes (Gray & McNaughton, 2003; Vervoort et al., 2010). BAS is responsive to positive, rewarding cues in the environment and activates a vigorous pursuit of these types of stimuli, almost regardless of the possible negative consequences of that behavior (Bijttebier, Beck, Claes, & Vandereycken, 2009; Corr, 2008b). Also, individuals with a higher BAS sensitivity constantly scan the environment for possible rewarding stimuli (Corr, 2008b). The functioning of BAS is believed to be related to personality differences especially with

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regard to an individual's sensitivity to rewards (Corr, 2004). The functioning of this system is associated with impulsiveness, a personality trait which has been shown to be related to addictive and high-risk behavior (Corr, 2008a).

BIS, on the other hand, is responsive to negative cues of punishment and anxiety in the environment such as signals that are associated with extreme novelty and threat (Corr, 2008a; Heubeck, Wilkinson, & Cologon, 1998). The level of BIS activity is related to individual differences in punishment sensitivity. As a response to the activation of BIS, behavior is conducted in order to avoid negative cues and aversive stimuli (Carver & White, 1994). Additionally, BIS alerts individuals for danger or punishment by creating a heightened awareness and engagement in processes related to risk assessment such as scanning the environment for threat-relevant information (Corr, 2002, 2008a; Muris, Meesters, de Kanter, & Timmerman, 2005). High activation of BIS is considered to be associated with a higher likelihood to avert risks, while low activation of BIS is assumed to be associated with more proneness towards risk behavior (Corr, 2008a).

The link between RST and alcohol use

Over the past decades, scholars have investigated the association between BAS and BIS and individuals' susceptibility to engage in risk behavior such as drug (Franken & Muris, 2006) and alcohol use (Loxton & Dawe, 2001). Given that alcohol use can result in positive outcomes (e.g., improved mood, relaxation) as well as negative outcomes (e.g., hangover, sickness) it is assumed that both BAS and BIS may play a role in explaining an individual's attitude towards alcohol use (Wardell, Read, & Colder, 2013). Individuals with a highly active BAS are by definition sensitive to rewarding cues and have an inclination towards reward seeking behavior. This makes them more susceptible to the rewarding and desirable effects of alcohol use (Franken, 2002; Wardell et al., 2013). For BIS, on the other hand, a negative relationship with alcohol use is assumed due to a heightened receptiveness to negative and

punishment cues (Gray & McNaughton, 2003; Vervoort et al., 2010), such as the consequences of alcohol misuse. This assessment of possible risky situations and stimuli among individuals with high BIS sensitivity can result in the inhibition of that behavior (Corr, 2008a). In that respect, BIS might protect individuals from engaging in risk behavior, because potential harm from alcohol might trigger avoidance or inhibition (Voigt et al., 2009).

A large body of research has examined the associations between these RST-systems and alcohol use among young adults (e.g., Franken & Muris, 2006; O'Connor & Colder, 2005; Zisseron & Palfai, 2007). These studies mostly operationalized BAS and BIS by means of Carver and White's (1994) validated, widely-used and easy to assess BIS/BAS scales. The hypothesized positive association between BAS and different types of alcohol behavior such as alcohol misuse, intention to drink alcohol and binge drinking was supported (Franken & Muris, 2006; Loxton & Dawe, 2001; O'Connor & Colder, 2005; O'Connor, Stewart, & Watt, 2009; Pardo, Aguilar, Molinuevo, & Torrubia, 2007; Voigt et al., 2009). Mixed results have been found regarding the relationship between BIS and alcohol use. Some studies showed a negative relationship (Franken & Muris, 2006; Loxton & Dawe, 2001; Pardo et al., 2007), while others found no significant association (O'Connor et al., 2009; Voigt et al., 2009).

Explaining the link between media exposure and risk behavior

Research investigating the link between media use and different types of risk behavior has been predominantly framed from the perspective of theory of planned behavior (Ajzen, 1988, 1991) and social cognitive theory (Bandura, 1986). Theory of planned behavior claims that individuals' attitudes towards behavior, which is the dependent construct in the present study, are indirect predictors of behavior through future intentions to perform that behavior. Theory of planned behavior recognizes the importance of taking into account the role of background factors such as personality and exposure to media as predictors of an individual's

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beliefs (Fishbein & Ajzen, 2010). An application of Bandura's (1986) social cognitive theory to mass communication (Bandura, 2001) explains the psychological processes through which media exposure influences human thought and action. Symbolic environments, such as the mass media, provide information regarding human thought and behavior, which can lead to observational learning and symbolic modelling in particular. Symbolic modelling is a form of observational learning which occurs through the observation of a real or fictional character in books, television programs, etc. (Bandura, 2001). Additionally, an individual's proneness to model behavior observed in the media is facilitated by vicarious reinforcement and punishment processes (Bandura, 1986). The observation of behavior that results in positive and rewarding outcomes will be more likely to be modelled. Similarly, if observed behavior has negative consequences or is punished, modelling is less likely to occur (Bandura, 2001).

Content analyses of television programs generally showed that drinking alcohol is omnipresent on the television screen and is often depicted in a positive context (Furnham et al., 1997; van Hoof et al., 2009; Verma et al., 2007). Alcohol use in soaps operas, in particular, has been associated with sociable behavior such as celebrations (Furnham et al., 1997; van Hoof et al., 2009), creating an environment in which drinking alcohol seems to be the norm (Furnham et al., 1997; Verma et al., 2007). Furthermore, drinking alcohol was often depicted as a solution for professional or personal problems, while the negative physical, mental and social consequences of alcohol use such as hangovers, alcoholism and violence are depicted to a lesser extent on the screen (Furnham et al., 1997; McGee, Ketchel, & Reeder, 2007; van Hoof et al., 2009). In line with social cognitive theory, several media effects studies have argued that this positive depiction of alcohol use in soap operas might make individuals more susceptible to this behavior. Several authors, however, have nuanced this view on how mediated information effects individuals' real-life behavior. Elson & Ferguson (2013), for instance, claim that media effects research using social cognitive theory

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as a theoretical rationale should acknowledge that media experiences and fictional acts are not equal to real experiences and real-life acts (e.g., watching a character drink versus watching parents drink). Additionally, the authors state that research should try to move away from this traditional paradigm and not only regard media consumers as passive processors of media content. Furthermore, advances in research domains such as genetic research, neurophysiology and neuropsychology have shown that human behavior cannot merely be explained by learning theories (Sherry, 2004). Communication research has, therefore, started to examine the biological basis of communication by means of a trait perspective. Following neuroscience paradigms such as Gray's RST, it is believed that individual differences in behavior tendencies result from the interaction of biologically determined personality traits with environmental cues (Sherry, 2004). The present study, therefore, examines the association between soap opera viewing and alcohol attitudes from a neuropsychological trait perspective by taking into account the role of two underlying biological systems, BAS and BIS, that are assumed to lie on the basis of individual differences in emotions and behavior.

Limited Capacity Model of Motivated Mediated Message Processing

In line with the RST, Lang's limited capacity model of motivated mediated message processing (LC4MP) distinguishes between two motivational systems, a BAS-like appetitive system and a BIS-like aversive system, which are proposed to be responsible for the way individuals process mediated information (Lang & Yegiyan, 2011; Wang, Lang, & Busemeyer, 2011). According to the LC4MP, message processing is the result of the way the structure and content of a message interact with the goals and motivation of the recipient. Each type of media content can thus lead to different motivational and cognitive responses based on individual differences in the activation of these systems (Lang, 2000). Using the LC4MP approach in media effect research, therefore, can add to a better comprehension of the systems underlying both the intended and unintended effects of media messages (Lang,

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2000). According to the LC4MP-framework, the appetitive and aversive system are involved in the three subprocesses of mediated information processing: encoding, storage and retrieval. Given individuals' limited mental resources to process information, a selection must be made to decide which information is relevant to go through these processes or not (Lang & Yegiyan, 2011; Wang et al., 2011). Especially motivational stimuli have a greater chance of getting resources allocated to them given that they are related to pleasure or danger (Lang, 2006a). Alcohol-related stimuli in the media, for instance, can be regarded as examples of motivational relevant stimuli given that through socialization and previous positive and negative experiences they might have become associated with both pleasure and danger. These motivationally relevant cues automatically activate the underlying motivational systems which main aim is to promote survival either through approach or aversive behavior increasing the attention and memory for these cues (Lang & Yegiyan, 2011; Lang, 2006a). As was shown previously by the link between BAS and BIS and alcohol use, the functioning of these systems influences the extent to which people engage in risk behavior and additionally also has an impact on the response to risky cues in a mediated environment (Lang & Yegiyan, 2011). The goal of the appetitive system is to process as much information as possible about the stimulus and the environment in which it is presented. A stimulus that is positive, rewarding or arousing increases the appetitive motivation which in turns leads to an increase in the resources allocated to the processing of the stimulus. The aversive system, on the other hand, wants to protect the individual from possible harmful and negative stimuli making it necessary to scan the environment for potentially negative cues. The higher the activation of the aversive system the more an individual will turn to retrieving existing mental resources that have been previously stored with regard to the stimulus. In that sense, the anticipation to a possible negative cue might be sufficient for the occurrence of aversive, avoidance behavior based on the retrieval of previously stored information (Lang & Yegiyan, 2011; Lang, 2006a).

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In sum, the LC4MP states that the appetitive and aversive systems are important mechanisms in explaining the way mediated information is processed and consequently in the effects of that information. Following this view, the present study integrated an appetitive and aversive system, operationalized as BAS and BIS from an RST perspective, as moderators of the relationship between soap opera viewing frequency and alcohol attitudes in order to come to a better understanding of the role these systems play in an individuals' susceptibility to alcohol-related media messages.

Goal of the study

Despite the focus of previous studies on examining the link between media portrayals and alcohol use, research examining the moderators of this association is limited (Koordeman et al., 2012). Nevertheless, it has been argued by several scholars that more attention is needed in media research to explain individuals' susceptibility to the influence of media exposure by integrating personality traits in this field of study (Lang & Ewoldsen, 2010; Valkenburg & Peter, 2013), especially in terms of BIS and BAS (Beullens, Rhodes, & Eggermont, 2014; Koordeman et al., 2012).

Social cognitive theory emphasized the role of reward and punishment in explaining why some behaviors are more likely to be modelled and additionally the LC4MP described the role of reward and punishment in explaining the way mediated information is processed. Therefore, the present study argues that the RST and its behavioral systems, BAS (reward sensitivity) and BIS (punishment sensitivity) (Gray, 1970), might play an important role in the explanation of an individual's susceptibility to media effects. Nevertheless, research on examining the role of personality traits in the association between media messages and risk behavior operationalized from the perspective of BAS and BIS is scarce. Although previous studies have integrated both systems as predictors of media use and risk behavior to the best of our knowledge, only one study has operationalized the aversive and appetitive system from

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a RST-perspective and integrated them as moderators of the relationship between exposure to music videos and risky driving attitudes (Beullens et al., 2014). The results of this particular study found an association between music video viewing through music television channels and positive attitudes towards risky driving and showed that BIS but not BAS was a moderator of this association. More specifically, the relationship only existed for people with a low BIS-profile (Beullens et al., 2014). The current study wants to add to this line of research by examining BAS and BIS as moderators of the relationship between soap opera viewing frequency and alcohol attitudes.

As indicated above, social cognitive theory (Bandura, 1986; Bandura, 2001) states that observed behavior that is rewarded has a greater chance of being modelled compared to observed behavior that is not rewarded or has negative outcomes. Content analyses of soap operas showed that alcohol use is often framed within a positive, rewarding context and that the possible negative outcomes of alcohol drinking behavior are addressed to a lesser extent in the storylines (Furnham et al., 1997; van Hoof et al., 2009). Additionally, the LC4MP proposed that a positive, rewarding or arousing stimulus will increase the appetitive motivation which in turns leads to an increase in the resources allocated to the processing of the stimulus.

Following these perspectives and results, the present study argues that adolescents with a high BAS-profile are more likely to have positive attitudes towards alcohol use given their heightened responsiveness towards rewarding stimuli, which are presented to a great extent in relation to alcohol use in soap operas. Adolescents with a low BAS-profile are assumed to respond to a lesser extent to these rewarding and positive cues. Therefore, the following hypothesis is proposed:

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H1: *BAS is a moderator of the association between soap opera viewing and attitudes towards alcohol use. The association will be stronger for adolescents with a highly active BAS, in contrast to adolescents with a less active BAS.*

Based on the LC4MP (Lang & Yegiyani, 2011; Lang, 2000) a moderation of BIS can also be expected despite the fact that the portrayal of negative cues in soap operas is limited. As indicated earlier, the aversive system has the ability to anticipate the possible negative outcomes of a certain behavior, even if those outcomes are not shown. This anticipation can lead to turning to previously stored information regarding the portrayed behavior. High BIS scores are, therefore, assumed to be related to scanning the environment for possible danger stimuli and to an inclination towards risk-assessment (Gray & McNaughton, 2003; Lang & Yegiyani, 2011) which might make adolescents more aware of the possible negative consequences of alcohol drinking. In that respect, the activation of BIS is assumed to act as a protector towards the susceptibility to the effect of media on attitudes towards risk behavior (Voigt et al., 2009). The aversive system can also anticipate to a possible negative outcome even if it is not shown as is hardly ever the case in soap operas. This anticipation might be sufficient for the occurrence of aversive, avoidance behavior given that individuals turn to the retrieval of previously stored information regarding the behavior that is shown. Therefore, the present study assumes a decrease or absence of the susceptibility to the viewing of alcohol-related cues in the media for high BIS-profiles.

H2: *BIS is a moderator of the association between soap opera viewing and attitudes towards alcohol use. The association will be weaker or absent for adolescents with a highly active BIS, in contrast to adolescents with a less active BIS.*

Method

Sample

Data for the current study were collected among a sample of 922 adolescents from the Flemish region of Belgium ($M=14.96$ years, $SD=.85$, $range=6$, 56% girls) from different education levels in 15 secondary schools. Informed consent was obtained from the legal guardians of the participants. Respondents were asked to complete a paper-and-pencil survey. At least one research collaborator was present at all time during the completion of the questionnaire to answer questions if needed. Confidentiality was assured both in the questionnaire as orally before and after the completion of the survey. Participants were informed that they could stop their participation at any time without any justification. The study followed the guidelines of the Belgian Commission for the protection of the privacy.

Measures

BIS/BAS. The validated Dutch child version (Muris et al., 2005) of the BIS/BAS questionnaire (Carver & White, 1994) was used to assess variations in the activity and reactivity of BIS and BAS. The scale consists of 20 items with response categories ranging from (1) absolute disagreement to (4) absolute agreement. Mixed results have been found regarding the factorial structure of the BIS/BAS-scales among children yielding two to even five factors (Kingsbury, Coplan, Weeks, & Rose-Krasnor, 2013; Muris et al., 2005; Vervoort et al., 2010). In the present study, a principal component analysis (PCA) using oblique rotation (direct oblimin) was conducted to test the two-factor structure by fixing the items into two factors. The two factors accounted for 38% of the total variance which is in line with previous research analyzing the two-factor solution for the BIS/BAS-scales (Muris et al., 2005). Therefore, the analyses in the current study will be conducted by using the two factors, BIS and BAS. The scores for both scales were calculated by summing the item scores. Higher scores indicated a higher activity and reactivity of BIS and BAS. Both BIS (7 items, $\alpha=.73$,

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$M=17.92$, $SD=3.99$) and BAS (13 items, $\alpha=.83$, $M=32.60$, $SD=6.68$) had a good internal consistency in the present sample.

Alcohol attitudes. Adolescents' attitudes towards alcohol use were measured by means of the attitude measure described in the theory of planned behavior questionnaire (Ajzen, 1991), which was adapted in the present study for alcohol attitudes in particular. Two 7-point semantic differentials consisting of a set of bipolar evaluative adjective pairs (bad/good and unpleasant/pleasant) were used to ask respondents about their attitude towards alcohol use. Cronbach's alpha showed that the factor had a good internal consistency ($\alpha=.71$, $M=7.42$, $SD= 2.68$). The two items were summed with higher scores indicating more positive attitudes towards alcohol use. Normality tests indicated that this variable was not normally distributed: $D(920) = 0.20$, $p < .05$. In line with the approach of Field (2009) this issue was addressed by using bootstrapping techniques in the data analyses as explained later.

Soap opera viewing. Frequency of soap opera viewing was assessed by using the question "How often do you watch soap operas [examples of soap operas that are frequently broadcasted in Flanders on any device (television, tablet, smartphone, computer)]? Response categories were (0) never, (1) a few times a year, (2) about once a month, (3) a few times a month, (4) about once a week, (5) a few times a week, (6) (almost) every day ($M=3.69$, $SD=2.54$). In order to avoid priming, soap opera viewing frequency was assessed after all questions regarding alcohol drinking behavior. Again, normality tests showed that the variable was not normally distributed: $D(908) = 0.25$, $p < .05$.

Control variables. Regarding gender it has been shown that men drink more often than women and also consume more alcoholic consumptions (WHO, 2014) and that males have more favorable attitudes towards alcohol consumption compared to females. Therefore, gender (0 = male, 1 = female) was added as a control variable in the present study. Age was entered as a control variable given that during adolescence young people start to experiment

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with alcohol and age has been shown to be positively related with alcohol drinking frequency (VAD, 2014). Previous research showed an association between frequency of going out and alcohol use among young people (Rosiers, 2013) and was therefore entered as a control variable in the analyses. Going out behavior was assessed by asking respondents “How often do you go out (e.g., party, pub, disco, ...)?”. Response categories were (0) never, (1) a few times a year, (2) about once a month, (3) a few times a month, (4) about once a week, (5) a few times a week and (6) (almost) every day. In order to assure that the hypothesized link between soap opera viewing and attitudes towards alcohol use can only be attributed to this specific genre and not to the viewing of television in general, weekly television viewing volume was entered as a control variable. Television viewing volume was assessed using a timeline for each day of the week consisting of check boxes each representing 30 minutes of television viewing (Eggermont, 2005). Respondents were asked to indicate when they usually watch television on that particular day. The number of checked boxes was summed and multiplied by 30 (minutes) resulting in the total television viewing time per week in minutes. This measure to assess television viewing has been frequently used in previous research on media effects (Beyens & Eggermont, 2014; Vandenbosch & Eggermont, 2011).

Data analyses

All analyses in the current study were conducted using IBM's SPSS 22.0. Adolescents' attitudes towards alcohol use were entered as the dependent construct in an hierarchical regression model using bootstrapping. Gender, age and going out behavior were entered as control variables in step 1. Total television viewing (in minutes) was successively entered in step 2. Soap opera viewing was entered in step 3 followed by BIS and BAS constructs in step 4. In addition, moderation analyses were conducted using Hayes' (2013) OLS regression based PROCESS macro using bootstrapping (model 1) for SPSS to investigate whether BIS and BAS moderate the relationship between soap opera viewing and

alcohol attitudes. Effects are considered significant, if $p < .05$ and are reported as unstandardized coefficients. Possible problems with non-normality were handled by the bootstrapping method used in the analyses (Field, 2009). Additionally, the sample size of the current study is large and, therefore, the validity of the linear regression analyses should not be affected by not-normally distributed scores.

Results

Descriptive analyses

Correlation analyses were conducted in order to get a first view on the associations of the variables integrated in the present study with adolescents' attitudes towards alcohol use. Table 1 provides a complete overview of the means, standard deviations and zero-order correlations of all the variables studied.

[TABLE 1 ABOUT HERE]

Soap opera viewing as a determinant of alcohol attitudes

The results of the hierarchical regression analysis presented in Table 2 showed that the total model examining adolescents' attitudes with gender, age, going out behavior, total television viewing, soap opera viewing, BIS and BAS is significant $F(7/820)=15.23$, $p < .001$ and explains 11.7% of the variance. In step 1 of the regression model gender was a predictor of alcohol attitudes with girls reporting less positive attitudes towards alcohol use compared to boys ($\beta = -.08$, $p < .05$). Age is negatively associated with alcohol attitudes indicating more positive alcohol attitudes among younger adolescents ($\beta = -.09$, $p < .05$), while going out behavior is positively associated with more positive alcohol attitudes ($\beta = .26$, $p < .001$). Although several content analyses (Furnham et al., 1997; van Hoof et al., 2009; Verma et al., 2007) showed that positive portrayals of alcohol use are very prevalent on the screen, total television viewing in step 2 was not associated with our dependent variable ($\beta = -.04$, $p > .05$). The frequency of viewing the specific soap opera genre in step 3 was associated with positive attitudes towards alcohol use ($\beta = .19$, $p < .001$). As expected, a positive relationship was

established between BAS and alcohol attitudes in step 4 showing that reward sensitive individuals have more positive attitudes regarding the drinking of alcohol ($\beta=.10, p<.01$). A relationship between BIS and alcohol attitudes was not found ($\beta=-.02, p>.05$).

[TABLE 2 ABOUT HERE]

BAS as a moderator

The present study hypothesized that the relationship between soap opera viewing and alcohol attitudes is stronger for individuals with a high BAS-profile assuming that these individuals are more susceptible to alcohol-related media content. In view of examining this possible moderating role of BAS, this construct was entered as a moderator in a regression model using Hayes' Process macro for SPSS. The results showed no support for a moderating role of BAS in the association between soap opera viewing and attitudes towards alcohol after controlling for gender, age, BIS, total television viewing and going out behavior. In particular, the model ($R=.34, R^2=.12, F(8, 819)=13.61, p<.001$) showed that gender (coeff=-.41, $SE=.02, t=-2.10, p<.05$), age (coeff=-.28, $SE=.11, t=-2.48, p<.05$), going out behavior (coeff=.54, $SE=.08, t=7.11, p<.001$), BAS (coeff=.06, $SE=.02, t=-2.90, p<.001$) and soap opera viewing (coeff=.45, $SE=.17, t=-2.61, p<.01$) are significantly associated with adolescents' attitudes towards alcohol use. The other variables integrated in the model, including the interaction term between soap opera viewing and BAS, did not make a significant contribution. Therefore, hypothesis 1 could not be supported.

BIS as a moderator

The present study also assumed that BIS serves as a moderator of the relationship between soap opera viewing and alcohol attitudes. More specifically, it was expected that the relationship between soap opera viewing and positive alcohol attitudes is weaker among individuals with a high BIS profile. A second model was estimated for the BIS construct by integrating it as a moderator in PROCESS model 1 in order to examine if the relationship

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between soap opera viewing and alcohol attitudes is indeed moderated by BIS ($R=.34$, $R^2=.12$, $F(8, 819)=13.96$, $p<.001$). The result confirmed that BIS was a moderator (coeff $=-.02$, $SE=.01$, $t=-2.15$, $p<.05$) of this relationship after controlling for gender, age, BAS, total television viewing and going out behavior supporting hypothesis 2. Also, the results indicated that gender (coeff $=-.42$, $SE=.20$, $t=-2.14$, $p<.05$), age (coeff $=-.29$, $SE=.11$, $t=-2.59$, $p<.05$), going out behavior (coeff $=.56$, $SE=.08$, $t=7.12$, $p<.001$), BAS (coeff $=.04$, $SE=.01$, $t=-2.62$, $p<.01$), BIS (coeff $=.08$, $SE=.04$, $t=-2.00$, $p>.05$) and soap opera viewing (coeff $=.54$, $SE=.16$, $t=-3.36$, $p<.001$) are significantly associated with adolescents' attitudes towards alcohol use.

[TABLE 3 ABOUT HERE]

The model's R^2 significantly increased by introducing the interaction term between soap opera viewing and BIS in the regression model (R^2 -change $=.0050$, $F(1/819)=4.62$, $p<.05$). The interaction indicated that the association between soap opera viewing and adolescents' alcohol attitudes is stronger (i.e., more positive) for those with a low BIS-profile, while this association gets weaker when BIS increases. Additionally, the present study used the Johnson-Neyman technique to probe the moderation of BIS (Hayes, 2013). This technique allows to probe interactions in linear models in order to identify the regions in the range of the moderator for which the effect of the independent on the dependent construct is significant or not (Hayes & Matthes, 2009). The analysis indicated that a significant relationship between soap opera viewing and attitudes towards alcohol was found only for adolescents with a BIS score lower than 22.71 (86.84% of the sample). For adolescents with a higher BIS score, there was no association between soap opera viewing and attitudes. The conditional association for adolescents with the lowest possible BIS score of 7, for example, has an unstandardized coefficient of .41 ($SE=.10$, $t=4.00$, $p=.0001$). As BIS increased, a gradual decrease of the strength of the conditional association was observed. This result showed that the relationship between soap opera viewing and alcohol attitudes gets weaker and even disappears when BIS

increases. Among respondents with a BIS of 20.65 for example, an unstandardized coefficient of .15 ($SE=.04$, $t=3.39$, $p=.0094$) was found. Once BIS reached a score equal or higher to 22.71 (13.16% of the sample) the association was no longer significant (coeff=-.11, $SE=.06$, $t=-1.96$, $p=.0500$). The results of these analyses were used to visualize the interaction in Figure 1. The graph shows that the upper and lower limit 95% confidence interval lines are situated completely above zero for BIS values below 22.71 indicating an association between soap opera viewing frequency and alcohol attitudes. For BIS values equal or higher to 22.71, the lower bound is situated below zero indicating an absence of an association between soap opera viewing and alcohol attitudes for adolescents with a high BIS.

[FIGURE 1 ABOUT HERE]

Discussion

Over the past decade, several studies found support for an association between media exposure to alcohol cues and alcohol drinking attitudes, intentions and behavior (e.g., Hanewinkel et al., 2007; Koordeman et al., 2012; van Hoof et al., 2009). The current study adds to the existing literature by examining the link between soap opera viewing frequency and alcohol attitudes among adolescents, whereas previous research has mainly focused on actual drinking behavior in adult samples. The main goal of the present study was to make a contribution to the existing literature by examining if the association between soap opera viewing frequency and alcohol attitudes holds for all adolescents or whether it is conditional and is reduced or strengthened by an adolescent's responsiveness to media effects. The behavioral activation (BAS) and inhibition system (BIS) described in the RST were hypothesized to act as moderators of that relationship following the LC4MP in which their role in the way information is processed is described. These concepts have been linked extensively to alcohol use in young adults. Previous studies showed an overall positive association between BAS and different types of alcohol drinking behavior (e.g., Franken &

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Muris, 2006; O'Connor et al., 2009), while the association with BIS was less clear (e.g., Loxton & Dawe, 2001; Pardo et al., 2007; Voigt et al., 2009). In line with these studies, the present study provided support for the positive association between BAS and alcohol attitudes while no link was found between alcohol attitudes and BIS. Given the mixed results that have been found regarding BIS, more research is needed to examine the association between BIS and different types of risk behavior (e.g. drug use, unhealthy eating, reckless driving, unsafe sex) in order to come to a better understanding of the precise link between BIS and alcohol drinking behavior in particular.

The need for more research focusing on the possible non-media moderators (e.g., personality) in media effects research was extensively advocated in the differential susceptibility to media effects model (DSMM) (Valkenburg & Peter, 2013). According to this model, it is necessary to examine various conditions under which media effects are present or absent and become stronger or weaker. Additionally, the LC4MP (Lang, 2006b) emphasized the role of an appetitive and aversive system in the way mediated information is processed. Following these models stressing the importance of individual differences in susceptibility to media effects, the present study argued that BAS and BIS may be relevant and important concepts to take into account as moderators when examining the link between media use and risk behavior. Content analyses of soap operas in general showed that alcohol is mostly depicted in a positive context, while less attention is paid to the possible negative consequences of alcohol use (e.g., Furnham, Ingle, Gunter, & McClelland, 1997; van Hoof et al., 2009). The present study found support for the association between soap opera viewing frequency and alcohol attitudes showing that adolescents who watch soaps more frequently have a more positive attitude towards alcohol use compared to less frequent soap viewers. It was surprising, however, that total television viewing was not at all associated with attitudes towards alcohol use. Several content analyses have shown that alcohol use is often portrayed

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in a positive way in a variety of television programs and genres. Nevertheless, the present study found no indication of an association between overall television viewing and attitudes. The absence of a correlation might indicate that soaps are a unique genre in which the use of alcohol by familiar and attractive characters influences adolescents' attitudes towards this behavior. This null finding might be an indication that television viewing in general should not be regarded as a reason for concern, but rather that content of the media should be taken into account when examining the possible effects on adolescents' risk behavior. Nevertheless, more research on the precise role and added value of overall television viewing and specific genres in which alcohol use is presented remains necessary in the future.

Given the sensitivity of BAS to rewarding, positive stimuli it was expected that a highly active BAS would strengthen the association between soap opera viewing and positive alcohol attitudes while this association was assumed to be weaker or even absent for adolescents with a less active BAS. The results, however, did not provide support for this hypothesized moderation by BAS. A possible explanation might be that for BAS to play a moderating role a correlation with the media genre is required, while this was not the case in the present study. Previous research showed that individuals with a highly active appetitive system such as BAS prefer arousing and exciting media genres such as fight games (Potter, Lee, & Rubenking, 2011) and violent movies (Aluja-Fabregat & Torrubia-Beltri, 1998). Less arousing genres such as sitcoms and soaps were shown to be more attractive to individuals with a highly active inhibition system (BIS) (Potter et al., 2011). Future research should therefore examine if a moderation of BAS occurs for the link between risk behavior and media genres with which BAS is associated.

Additionally the present study hypothesized in line with the LC4MP framework (Lang, 2006a) that a high BIS-profile serves as a protector against the effects of possible negative stimuli. Individuals with an active BIS will scan the environment for possible danger

or harmful stimuli to anticipate negative outcomes (Corr, 2008a). The more this system is activated, the more individuals will turn to information they have stored previously with regard to the stimulus that is shown (Lang & Yegiyan, 2011; Lang, 2006b). In line with our expectations the link between soap opera viewing and positive alcohol attitudes was moderated by BIS. Only in adolescents with relatively low BIS scores (<22.71), soap opera viewing was linked with positive alcohol attitudes. In adolescents with high BIS scores (>22.71, 13.16% of the sample) this link disappeared. As such, a highly active BIS might serve as a protector against the positive portrayal of alcohol-related cues in soap operas. It can be argued that adolescents with a high BIS-profile who view alcohol use in soaps will easily turn to what they already know regarding the possible negative, unrewarding consequences based on previous observations or through direct experience. Therefore, a high BIS-profile might protect adolescents to the positive depiction of alcohol use in soaps operas.

Implications and directions for future research

The results of the present study provided evidence that individual differences exist between adolescents in their susceptibility to the association between soap opera viewing and alcohol attitudes. Although, BAS was shown not to moderate the relationship between soap opera viewing frequency and positive alcohol attitudes; BIS did serve as a moderator showing that the association does not occur for adolescents with a high BIS-profile.

Currently, alcohol is often presented positively in commercials and television programs, which might influence adolescents to think that drinking alcohol is the social norm (Wakefield, Loken, & Hornik, 2010). Therefore, several authors (Spath, Greenberg, & Turrisi, 2008; van Hoof et al., 2009) have emphasized the need for research on the influence of the mass media on adolescents alcohol drinking behavior. Based on their view and the results of present study it can be argued that steps should be taken in terms of media literacy. The depiction of a balance between the negative and possible harmful outcomes of alcohol

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use such as hangovers, diseases and addiction and more positive outcomes such as having fun with friends might help to give adolescents' a better view on what alcohol does in the real world. The portrayal of these negative outcomes might even help to activate BIS among individuals with a lower sensitivity inhibition system. Consequently, this activation might trigger the protective function of BIS and empower adolescents against the possible harmful influence of media exposure on alcohol drinking behavior.

Despite the relevance of the results of the present study, there are some limitations that should be taken into account in future research on the complex interplay between BIS, BAS, media and risk behavior. First of all, the cross-sectional nature of the study design does not allow to make causal inferences regarding the associations between BIS, BAS, alcohol attitudes and soap opera viewing. Longitudinal research can help to confirm these cross-sectional findings and can lead additional insights on how and if alcohol attitudes affect future drinking intentions and trajectories. Additional experimental research is needed to examine the causality of the association. Also the current study did not integrate any manipulation checks in the survey, which should be addressed in future experimental and survey studies as well. Second, effect sizes were small in the present study. The regression model with the interaction between BIS and soap opera viewing frequency was included explained 12% of the variance in alcohol attitudes. Hence, a large part of the variance remains unexplained by the variables used in the present study. Future research should therefore take into account the need to integrate additional predictors and control variables. Environmental factors such as alcohol use of family and friends could play a role in the explanation of adolescents' alcohol attitudes. Furthermore, other personality traits such as sensation seeking and impulsivity might add to the explanation of the dependent variable. Third, the current study used an adolescent sample given that BAS and BIS become more sensitive around this time of age. Therefore, the results cannot be extrapolated to other populations. Additional research is

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needed to examine the moderating role of BIS and BAS in media effects in other age groups such as adults or young children as well. Fourth, the measure used in the present study to assess soap opera viewing only measured viewing frequency and not the duration or the viewing of specific genres. A more detailed measure of this concept might be interesting to integrate in future studies on this topic.

Despite these limitations, the present study makes a valuable contribution to the theoretical understanding of the moderating role of BAS and BIS in research focusing on media and risk behavior. It showed that BIS is a moderator of the association between media and attitudes towards risk behavior, while BAS was not. From a theoretical point of view these results emphasize and support the importance and value of incorporating BAS and BIS in media research to investigate individual differences in risk behavior.

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Table 1

Descriptives and zero-order correlations

	1	2	3	4	5	6	7	8
1. Gender	-							
2. Age	-.05	-						<i>M</i> =14.96, <i>SD</i> =.85, <i>Range</i> =6
3. Going out behavior	-.71*	.29**	-					<i>M</i> =1.45, <i>SD</i> =1.26, <i>Range</i> =6
4. Total TV Viewing	-.18	.06	-.03	-				<i>M</i> =1469.83, <i>SD</i> =828.93, <i>Range</i> =4530
5. Soap Opera Viewing	.28**	-.09**	.01	.11**	-			<i>M</i> =3.69, <i>SD</i> =2.54, <i>Range</i> =6
6. BAS	-.02	.01	.18	.08*	.01	-		<i>M</i> =32.60, <i>SD</i> =.6.68, <i>Range</i> =39
7. BIS	.35**	-.03	-.08*	.01	.15**	.17**	-	<i>M</i> =17.92, <i>SD</i> =3.99, <i>Range</i> =21
8. Attitude Alcohol	-.03	-.02	.23**	-.02	.17**	.15**	.05	<i>M</i> =7.42, <i>SD</i> =2.28, <i>Range</i> =12

Note. **p* < .05; ***p* < .01

Table 2

Hierarchical regression model for alcohol attitudes

	<i>B</i>	<i>SE B</i>	β
<i>Step 1</i>			
Gender	-.41	.20	-.08*
Age	-.29	.11	-.09*
Going Out Behavior	.55	.08	.26***
	$\Delta R^2 = .073***$		
<i>Step 2</i>			
Total TV Viewing	.000	.000	-.04
	$\Delta R^2 = .000$		
<i>Step 3</i>			
Soap Opera Viewing	.20	.04	.19***
	$\Delta R^2 = .034***$		
<i>Step 4</i>			
BAS	.04	.01	.10**
BIS	.01	.02	.02
	$\Delta R^2 = .010$		
Final adjusted $R^2 = .117$			
<i>F</i> = 15.23			
<i>df</i> = 7/820			

Note. **p* < .05; ***p* < .01; ****p* < .001

REINFORCEMENT SENSITIVITY, ALCOHOL, SOAP OPERA VIEWING

Table 3

Regression model predicting adolescents' alcohol attitudes and the moderating role of BIS

	Coeff	SE	t	p	95% CI	
					LL	UL
Constant	8.09	1.80	4.48	.00	4.55	11.64
BIS	.08	.04	2.00	.05	.00	.16
BAS	.04	.01	2.62	.01	.01	.06
Gender	-.42	.20	-2.14	.03	-.80	-.04
Age	-.29	.11	-2.59	.01	-.51	-.07
Going out behavior	.56	.08	7.12	.00	.41	.71
Total TV Viewing	-.00	.00	-.88	.38	-.00	.00
Soap Operas	.54	.16	3.36	.00	.22	.86
Soap Operas*BIS	-.02	.01	-2.15	.03	-.04	-.00

$R = .34, R^2 = .12, F(8, 819) = 13.96, p < .001$

Note. CI = coincidence interval; LL = lower limit; UL = upper limit.

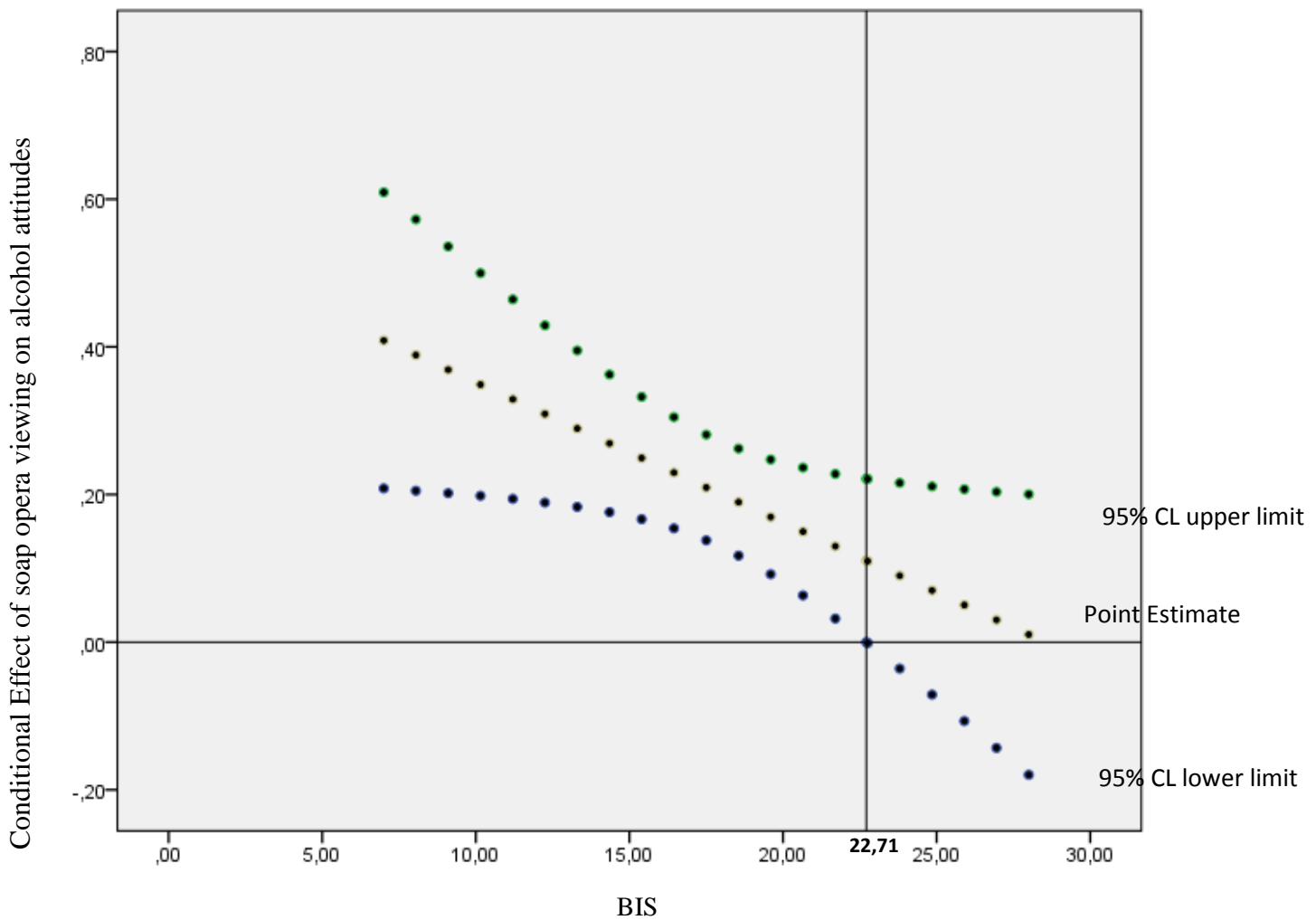


Figure 1. The conditional effect of soap opera viewing on adolescents' alcohol attitudes as a function of Behavioral Inhibition