

# Explaining adolescents' media use and differential susceptibility to the association between media use and risk behavior: A reinforcement sensitivity perspective

**Jolien VANGEEL**

Proefschrift aangeboden tot het verkrijgen van de  
graad van Doctor in de Sociale Wetenschappen

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Co-promotor: Prof. Dr. Kathleen Beullens  
Onderzoekseenheid: School voor Massacommunicatieresearch



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## LIST OF ABBREVIATIONS

BAS	the Behavioral Activation System
BIS	the Behavioral Inhibition System
BMI	Body Mass Index
CI	Confidence Interval
DN	Descriptive Norm
DSMM	Differential Susceptibility to Media Effects Model
EEG	Electroencephalography
FFM	Five Factor Model
fMRI	Functional Magnetic Resonance Imaging
FPS	First Person Shooter
GEQ	Game Engagement Questionnaire
IN	Injunctive Norm
LC4MP	Limited Capacity Model of Motivated Mediated Message Processing
MAM	Motivation Activation Measure
MMORPG	Massively Multiplayer Online Role-Playing Games
PCA	Principal Component Analysis
RST	Reinforcement Sensitivity Theory
SCT	Social Cognitive Theory
TPB	Theory of Planned Behavior
UGT	Uses and Gratifications Theory

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# Introduction

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*“Instead of thinking about the media first and their impact on people second, what happens when we start with people and move to the media?”*

Glenn Sparks

The question that Glen Sparks (2016, p. 77) puts forward in his book *Media Effects Research: A Basic Overview* immediately pinpoints the general goal of this dissertation: examining the role of individual characteristics in explaining media use and media effects. The influence of the use of certain media and exposure to media messages on individuals' behavior has been debated and examined to a great extent within media (effects) research. Although many of these studies have integrated individual characteristics to some extent, research in which the individual is regarded as the central starting point of media uses and effects is of particular importance. To understand why and how exposure to media messages impacts us, it is crucial to begin with a thorough examination of the individual indicators that might explain why people choose to use certain media platforms, genres and content over others.

In fact, Sparks' question is not at all new and has concerned academics from the very beginning of communication and media research in the 20<sup>th</sup> century. Some of the most early and notable examples in this respect are the Payne Fund Studies (Cumberbatch, 2010), conducted in the 1920's and 1930's, in which the importance of taking into account individual characteristics, for instance, age and emotional responses, was stressed when studying the effects of motion pictures on children (Blumer & Hauser, 1933; Dysinger & Ruckmick, 1933). In the following decades, numerous theoretical frameworks (e.g., the uses and gratifications theory (Katz, Blumler, & Gurevitch, 1973) and the cultivation theory (Gerbner, 10998)) were developed and tested, providing media scholars with accumulating amounts of information regarding the predictors of media use, such as personality traits (e.g., Finn, 1997; Weaver, 1991) and social contextual factors (e.g., Jordan, Hersey, Mcdivitt, & Heitzler, 2006; Livingstone & Helsper, 2008). Despite the existing theoretical and empirical evidence, conducting research on the indicators of media use remains of utmost importance for our understanding of media effects, given that the specific type of media content that is selected is precisely the content that is likely to affect the attitudes, beliefs and behaviors of the audience (Valkenburg & Peter, 2013b). Additionally, in a rapidly changing media environment both in terms of technologies and content formats, a profound understanding of the reasons why people use media, as well as specific media genres and content, is therefore crucial for the comprehension of the contemporary role of the media in our daily lives (Hall, 2005) as well as their

effect on people's behavior. More research is also needed on potential enhancing and protecting factors explaining the influence of the media on individuals' behavior. It is generally assumed media consumers do not use media in the same way and that differences exist in the way mediated content is processed. Gaining insight into individual factors that make people more or less susceptible to media use and exposure is thus of great importance for our knowledge on media effects.

## **A DIFFERENTIAL SUSCEPTIBILITY PERSPECTIVE FOR MEDIA USE AND EFFECTS**

Over the years, thousands of studies have looked into the effects of the media on cognitive, emotional and behavioral outcomes (Potter & Riddle, 2007). Meta-analyses summarizing and comparing the results have found consistent effect sizes indicating that the media are indeed likely to affect these outcomes (e.g., Anderson et al., 2010; Mares & Woodard, 2007). Although the effect sizes might be generally consistent, they can also be categorized as small to moderate, which has led to an ongoing, often polarized debate regarding the relevance and implications of these findings (Valkenburg & Peter, 2013a). It has been suggested that in order to truly comprehend the significance and nature of media effects, attention has to be paid to differences between people who are susceptible, less susceptible and insusceptible to these effects (Valkenburg & Peter, 2013b). For that reason, a comprehensive framework for the examination of these effects in which conditional media effects play a central role is needed (Valkenburg & Peter, 2013a, 2013b). The main question is thus not whether media effects exist, but for which people and under which circumstances. The incorporation of individual differences is in other words regarded as the key factor when conducting research on media use and effects. Valkenburg and Peter (2013b), therefore, suggested bringing together all potential roles of media and nonmedia variables (e.g., individual characteristics and social contexts) in one model: the differential susceptibility to media effects model (DSMM). More specifically, the model uses existing micro-level media-effects theories such as Bandura's (1986) social cognitive theory, Lang's (2006) limited capacity model of motivated mediated message processing and the uses and gratifications theory by Katz and al. (1973) to come up with a comprehensive overview of the predicting, moderating and mediating roles of different types of variables in media effect research. The DSMM stresses the need for a differential conceptualization of three types of so-called 'differential-susceptibility variables,' which are all preexisting and thus measurable before and without the use of media. Dispositional susceptibility refers to characteristics predisposing media use, some of which are more stable over time (e.g., personality) compared to others (e.g., mood). Developmental susceptibility can be regarded as the cognitive, social and emotional development across the life span, and social susceptibility refers to the impact of social-context variables (e.g., family, peers, school and society).



The conceptual role of these variables is twofold: first, they can act as predictors of media use and explain why an individual uses and selects a specific type of medium, and second, as moderators of media effects by stimulating or reducing the impact of media use and exposure on a certain outcome (e.g., wellbeing, behavior, attitudes).

The current dissertation's main goal is to investigate the dual role of stable dispositional susceptibility variables by specifically focusing on the predicting and moderating roles of personality factors in research on media use and effects. As was stated earlier in this introduction, many media effects have been established over the years, but information on which people are the most vulnerable to the influence of the media is still incomplete. The focus on personality traits as the main variable of interest in this dissertation is driven by the fact that even though previous research has yielded interesting results on how certain personality characteristics explain different types of media use, research systematically integrating personality factors as moderators of media effects is more limited. Therefore, this dissertation aims to add to the scientific literature by focusing on the dual role that personality can take as a predictor and a moderator in media effects research. It should be noted, however, that throughout the different chapters, other types of individual variables such as age, gender, media engagement, peer norms and parent norms will also receive attention, although to a lesser extent.

## **INTRODUCING A REINFORCEMENT SENSITIVITY PERSPECTIVE IN MEDIA RESEARCH**

Media research that has considered personality traits as predictors of media use and as moderators of media effects has mainly focused on specific traits, for example sensation seeking (Zuckerman, 1971) and aggressiveness (e.g., Anderson & Dill, 2000), or has used descriptive personality models such as the five factor model (Costa & McCrae, 1992) in order to operationalize individual differences in personality. This dissertation aims to integrate an alternative theoretical account on personality in media (effects) research by focusing on the neuropsychological foundations of individual differences in reaction to punishing and rewarding stimuli from the perspective of the reinforcement sensitivity theory (RST). This theory was developed by psychologist Jeffrey Gray (1970) and has been used to a great extent in psychological research on people's vulnerability to psychopathology (Bijttebier, Beck, Claes, & Vandereycken, 2009), for instance, anxiety disorders (e.g., Kimbrel, Nelson-Gray, & Mitchell, 2012), substance abuse (e.g., Franken & Muris, 2006; O'Connor, Stewart, & Watt, 2009) and eating disorders (e.g., Nederkoorn, Braet, Van Eijs, Tanghe, & Jansen, 2006). In contrast to many other – often descriptive – theories of personality, Gray approached personality from a bottom-up point of view and first identified the basic characteristics of the brain systems that are hypothesized to lie on the basis of variations

in behavior and emotion. Consequently, these observed variations were linked to existing measures of personality (Corr, 2008).

The RST describes human personality traits as the result of the underlying biological properties of the individual (Gray, 1970, 2010). In particular, the theory postulates that variations in behavior and emotion and differences in personality dimensions originate from differences in the (re)activity of two primary neuropsychological motivational systems: the behavioral activation system (BAS) –also referred to as the behavioral approach system – and the behavioral inhibition system (BIS) (Corr, 2008). BAS and BIS each respond to different types of stimuli in a specific way and are believed to vary in a relatively stable manner across individuals (Smillie, Pickering, & Jackson, 2006).

BAS is driven by dopaminergic projections in the frontal and striatal brain regions (Pickering & Gray, 1999). The activation system is primarily responsive and sensitive to appetitive environmental stimuli that are mostly associated with rewards. Exposure to these stimuli initiates BAS activation, which in turn elicits approach behavior in the direction of the presented rewarding cues in order to obtain the specific reward (Corr, 2008). Therefore, *reward sensitivity* as a personality trait is regarded as an important outcome of the (re)activity of BAS (Pickering & Smillie, 2008).

BIS, on the other hand, is driven by the septohippocampal system in the brain and its neocortical projections in the frontal lobe (Carver & White, 1994). The inhibition system mostly responds to aversive stimuli associated with punishment, reward termination, extreme novelty and innate fear (e.g., snakes and blood). Exposure to these stimuli activates BIS, which in turn leads to inhibition and avoidance of behavior that might have negative, punishment-related outcomes (Gray & McNaughton, 2003). In the literature, the personality trait *punishment sensitivity* tends to be used to refer to the outcome of BIS activation (Carver & White, 1994).

### ***Behavioral activation and inhibition in adolescence***

Adolescence is an essential period in the development of the prefrontal cortex, which plays a dominant role in one's ability to control and regulate behavior (Hooper, Luciana, Conklin, & Yarger, 2004). Previous studies on adolescents' behavior have indicated a discordance between highly sensitive reward processes and less developed inhibitory control processes during this developmental phase (Hardin & Ernst, 2009). The integration of the RST is of great importance in adolescent samples given that while BAS peaks during adolescence, BIS appears to mature at a much slower pace (Steinberg, 2007). This imbalance can be regarded as an important explanation for the novelty/sensation seeking and experimentation behaviors, by which adolescence is usually characterized (Spear, 2000). As a consequence, the differences in the (re)activity of BAS and BIS

have implications for adolescents' involvement in potential negative health behaviors as well (Steinberg, 2007; Van Leijenhorst et al., 2010). Previous research has demonstrated that this neuropsychological immaturity might undermine competent decision-making, causing a heightened vulnerability for engagement in potentially risky health behaviors (e.g., alcohol use, smoking and substance use) among adolescents (Steinberg, 2007). Therefore, integrating the RST in adolescent samples is thus particularly interesting when examining adolescents' health and potentially risk-involving behaviors. The importance of examining health issues among adolescents and the role of the media in this respect will be discussed further in this introduction.

### ***RST versus limited capacity model of motivated mediated message processing***

The number of studies that have incorporated and applied the RST in media (effects) research is very limited. There exists, however, a media processes and effects theory that outlines the role of a BAS-like approach and a BIS-like aversive system in the way mediated information is processed and that shows important parallels with the RST: the limited capacity model of motivated mediated message processing (LC4MP) of Annie Lang (2006). The LC4MP is defined as an information processing model with theoretical roots that lie in cognitive psychology and social science research (Lang, 2000). The LC4MP applies information processing models to media effects research by focusing on the role of two motivational systems in the (sub)processes (i.e., encoding, storage and retrieval) underlying these effects in particular (Lang, 2000, 2006). In line with the RST, the LC4MP assumes that an appetitive and aversive system lie on the basis of motivational activation and are designed to promote survival and protect individuals from harm (Lang, 2009). Additionally, the theory proposes that given people's limited mental resources, the systems automatically allocate and reallocate resources to a selection of stimuli depending on their motivational relevance (Lang, 2006). Given that the appetitive system described by Lang (2006) is activated by positive and the aversive system by negative environmental stimuli, the functioning and sensitivity of the systems can be assumed to be very similar to BAS and BIS, respectively.

Although the current dissertation acknowledges the value and contribution of Lang's LC4MP to research on media use, processes and effects, there are important theoretical and methodological arguments in favor of integrating the RST perspective. First, the goal of the current dissertation was to explore the importance of personality factors in media use and effects. The RST is developed in view of understanding the biological foundation of personality traits, while the LC4MP's has been established mainly in the interest of understanding the processing of mediated information. Additionally, while the LC4MP has been mainly designed for and integrated in media research, the RST has received widespread attention in a variety of psychological research topics.

Finally, the scales designed to measure the LC4MP systems are less applicable to child and adolescent samples. The Motivation Activation Measure (MAM) and MiniMAM expose participants to a range of pictures, some of which are highly violent and explicit (Lang, Bradley, Sparks, & Lee, 2007; Lang, Kurita, Rubenking, & Potter, 2011). To the best of our knowledge, no studies have developed or validated a scale for child or adolescent samples, which would seem appropriate given the explicit nature of many of the pictures used in the instrument.

Based on these arguments, the current dissertation aims to incorporate the neuropsychological basis of personality in media research using the perspective of the RST of Gray (1970). More specifically, the hypothesized dual role of BAS and BIS as predictors and moderators will be examined.

## **PERSONALITY AS A PREDICTOR OF MEDIA USE**

The assumption that media users are not the same and that individual factors such as personality traits play a crucial role in the media selection process is one of the central premises of the uses and gratification theory (Katz et al., 1973). More specifically, the theory posits that individuals' social and psychological needs lie on the basis of the selection of a certain medium, media genre or mediated content. Media consumers are thus not considered to be passive couch potatoes, but as active consumers who use media in a goal-directed way by selecting their media based on what they think and feel is necessary to fulfill their needs. The time that people spend with media and the type of content they select is thus regarded as the result of a deliberate choice (Sparks, 2016). For that reason, gaining insight into individual differences in media use patterns requires a profound examination of the individual needs that are believed to result, at least in part, from individual differences in personality characteristics. For that reason, personality traits are crucial factors when studying individual differences in media use and selection (Katz et al., 1973; Rosengren, 1976; Weaver, 1991).

Consequently, most studies examining the association between personality factors and media use are imbedded in this uses and gratifications perspective. A significant amount of studies have focused on the association between personality factors, and a wide variety of media and media genres (Finn, 1997; Weaver, Brosius, & Mundorf, 1993; Weaver, 2000). Additionally, specific attention has been paid to the link between personality and violent media content (e.g., violent movies, television programs and games). The interest of media scholars in violent content can be explained by the concerns that are often raised regarding the use, and especially the potential negative effects, of this type of media use (Browne & Hamilton-Giachritsis, 2005). Several specific personality factors, for instance, sensation seeking and trait-aggressiveness, as well as factors from

more inclusive personality models such as the five factor model (Costa & McCrae, 1992) have been found to be positively associated with the use of violent media content (e.g., Greene & Krmar, 2005; Kiewitz & Weaver, 2001; Slater, 2003).

As stated earlier in this introduction, however, few of the above mentioned studies considered the role of the neuropsychological processes that might be involved in media selection and preferences for certain media genres. A limited number of studies have explored personality from the perspective of the RST by linking BAS and BIS to violent movies (Aluja-Fabregat & Torrubia-Beltri, 1998), computer use (Giles & Price, 2008) and internet misuse (Meerkerk, van den Eijnden, Franken, & Garretsen, 2010; Park et al., 2013). An important aim of the current study is to investigate the association between these RST concepts and both violent and nonviolent types of media use in a more systematic way than has been done in previous studies on this topic.

## **PERSONALITY AS A MODERATOR IN MEDIA EFFECTS STUDIES ON HEALTH BEHAVIOR**

### ***Health issues in adolescence***

Adolescence is an important developmental phase in which in a short period of time youngsters encounter a wide variety of challenges such as hormonal changes, changing states of arousal, body growth and many more (Berk, 2006). To overcome these challenges, being in good health - physically, emotionally and socially - is crucial (Currie, Hurrelman, Settertobulte, Smith, & Todd, 2000). It is clear that attention to health issues in this age group is thus of great importance (Berk, 2006). Nevertheless, adolescence is also a time that is often characterized by experimentation with substances, for instance, tobacco and alcohol, initiation of sexual activities, emotional problems and poorer dietary habits (Arnett, 2000; Berk, 2006). Adolescents are, in other words, an important risk group from a health prevention and promotion perspective regarding a wide variety of health issues (WHO, 2014).

In the current dissertation, a selection of three of these health issues will receive attention: smoking, alcohol use (e.g., getting drunk, binge-drinking) and unhealthy eating patterns. As stated earlier in this introduction, previous research has shown that the RST – the central personality theory of this dissertation – is an important explanatory framework for the study of these behaviors. Additionally, research on the indicators of engagement in these health issues should be high on the agenda, given the unfavorable negative short-term (e.g., weight gain, aggression, car accidents, and hangovers) and long-term health consequences (e.g., cancer, addiction, and depression). Professor Rutger Engels, expert in health issues and addiction among adolescents, recently stated in this respect that in order to develop successful strategies for the prevention and improvement of these behaviors, the central questions for researchers should be: 1) Why do adolescents engage in risky

health behaviors? 2) Which adolescents are doing this? And 3) Which factors are protecting and which are enhancing? (Engels, 2016). The current dissertation aims to make a contribution to answering these questions by examining the protecting or enhancing role of BAS and BIS in health-related media effects research. To get a first and general view of this differential susceptibility role, a number of classic media effects regarding alcohol use, smoking and unhealthy eating will be studied.

### ***The effect of the media on health behaviors***

Throughout the years, a large group of media scholars has looked into the potential harmful effects of different types of media use on people's health. The effects of the media on health (indicators) among children and adolescents have especially been expressed as worrisome and a reason for concern (Strasburger, Jordan, & Donnerstein, 2012). This should come as no surprise given that children and adolescents currently grow up in media-saturated environments and are thus exposed to a wide variety of media platforms and different types of media content from a very young age (Vandewater et al., 2007). Several content analyses examined the prevalence of health behaviors such as smoking and drinking in the media and the context in which they are portrayed. The results indicated that smoking, and especially drinking, is very prevalent in media genres such as soaps and movies, but even more importantly, that these behaviors are in most cases depicted as positive and fun, while the negative health consequences are rarely shown on the television screen (Furnham, Ingle, Gunter, & McClelland, 1997; Koordeman, Anschutz, & Engels, 2012; Verma, Adams, & White, 2007).

As a response, a substantial body of empirical studies has investigated the effects of these types of media use on young people's health behaviors using experimental, longitudinal, and cross-sectional designs (Koordeman et al., 2012). Following Bandura's (1986) social cognitive theory, these studies have assumed that exposure to smoking and drinking behaviors in the media produces an increased likelihood of modeling the behavior, given the seemingly rewarding outcomes of these behaviors in the media (Bandura, 1986, 2001). In line with the theory of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 2010), not only have association between media use and actual smoking and drinking behaviors been explored, but precursors of behavior, for instance, attitudes, social norms and behavioral intentions, have as well. According to the theory of planned behavior, several background factors, of which the media are an example, can impact health behaviors through these precursors. Previous studies have supported an association between viewing soaps, movies and music videos and health indicators such as smoking and drinking intentions, social norms regarding alcohol and tobacco use, and binge-drinking (e.g., Engels, Hermans, van Baaren, Hollenstein, & Bot, 2009; Hanewinkel et al., 2012; Tanski & Cin, 2010; Van den Bulck & Beullens, 2005).

In addition to studies looking at the influence of exposure to media content, media scholars have also been alarmed about the amount of time that young people spend on different types of media use. The fact that the media are mostly used in a sedentary way has especially led to a public and academic debate on the role of media in the development of overweight and obesity (Marshall, Biddle, Gorely, Cameron, & Murdey, 2004; Must & Tybor, 2005). Television viewing and gaming, for instance, have been blamed for the encouragement of unhealthy lifestyles that displace more active pastimes among youngsters. Additionally, previous research has shown a link between sedentary media activities and increased intake of sugar-sweetened beverages, unhealthy snacks and fast food (e.g., Börnhorst et al., 2015; Pearson & Biddle, 2011; Van den Bulck & Van Mierlo, 2004). Most of these studies examined the effect of television use on unhealthy eating behaviors, while the potential impact of game use has received far less attention in the scientific literature. The current dissertation, therefore, aims to make an important contribution by examining the role of time spent on gaming in this respect and additionally by exploring the possible enhancing or protecting role of individual characteristics.

It was previously discussed in this introduction that the effect sizes of studies looking at the association between media use and different types of behavior are usually small to moderate (Valkenburg & Peter, 2013a). This is also the case for most of the studies on media and the health issues described above (Koordeman et al., 2012). Considering the moderating role of personality traits can be of a great added value to this type of research by unravelling whether differences in adolescents' personality correspond to differences in their susceptibility to media effects. Research examining this enhancing or protecting role of personality is, however, rather limited. Especially from an RST perspective, survey research focusing on the moderating role of BAS and BIS is almost non-existing. To the best of our knowledge, only one previous study found support for a moderation of BIS in the association between music television viewing and risky driving attitudes, showing that BIS served as a protector in this respect (Beullens, Rhodes, & Eggermont, 2016). The current study, therefore, aims to make an important contribution to this line of research by exploring BAS and BIS as moderators in a variety of traditional media effects within the field of media and health. These studies will all be imbedded in a reinforcement sensitivity perspective (Gray, 1970), as well as in line with the differential susceptibility to media effects model (Valkenburg & Peter, 2013b).

## **GOALS AND OUTLINE OF THE DISSERTATION**

Generally, media scholars have always been convinced of the notion that different people select different types of media and that these media do not affect the audience members in one

uniform manner (Valkenburg & Peter, 2013b). Systematic research on the diverse roles of personality is crucial for our current and future understanding of media uses and effects. The studies in this dissertation aim to contribute to this line of research in a number of ways. They do so first by assessing the dual role of personality as a predictor of media use and a moderator of media effects. Second, they will examine, in one of the first studies, the value of a reinforcement sensitivity perspective for media (effects) research, a perspective that has been applied to a great extent in psychological research focusing on the explanation of human behavior. Finally, throughout the different chapters of the dissertation both perspectives will be linked to a wide variety of media genres and media effects in order to assess their value across genres and effects. These three goals will be the common thread throughout the different parts and chapters of the dissertation. More specifically, in the **first part** the RST systems, BAS and BIS, are examined as predictors of different types of violent and nonviolent media genres (i.e., movies and games). The **second part** focuses on BAS and BIS as moderators of the association between media use and a variety of health behaviors, for instance, alcohol use and unhealthy snacking. The **third and final part** of the dissertation combines the potential roles of BAS and BIS by examining both the predicting and moderating roles of the systems in a model in which risky media content is linked to risky health behaviors such as binge-drinking and smoking.

### ***PART 1: BIS and BAS as predictors of media use***

The first and second chapters of the present dissertation build on the traditional uses and gratifications theory (Katz et al., 1973) and examine personality characteristics as important determinants of the choice of violent and nonviolent media genres (i.e., movies and games). The two studies are thus imbedded in a traditional perspective, but add to the existing literature by focusing on the role of the neuropsychological perspective of the RST and not on more frequently used personality frameworks in media research, such as the five factor model. The primary goal of the first two studies was to establish whether violent and nonviolent media content is selected and used depending on the (re)activity of the RST systems (i.e., BAS and BIS) (**chapter 1 and chapter 2**). The second goal was to examine to what extent BAS and BIS are related to levels of engagement in media, and additionally whether these engagement levels play a role in the relationship between BAS and BIS, and violent and nonviolent media use (**chapter 2**).

**Chapter 1** explores the link between BAS and BIS and the viewing of violent and nonviolent movies. BIS is assumed to be related to behaviorally inhibited and risk-avoidant behaviors. Furthermore, the system is responsible for experiencing negative feelings, for instance, anxiety and fear, in response to cues of punishment and novelty (Gray, 1970). Following this



premise, it examines whether individuals with high BIS levels will be more likely to avoid violent movie genres because of their scary, arousing and unpredictable characteristics and to prefer nonviolent movies. Given that BAS is an appetitive, approach system that is sensitive to appealing and rewarding stimuli, chapter 1 investigates whether violent, as well as nonviolent media genres, can serve as such an appealing stimulus. **Chapter 2**, looks at whether the proposed hypotheses and associations found in chapter 1 between BAS and BIS on the one hand and violent and nonviolent movies on the other hand can be extrapolated to violent and nonviolent games as well. Additionally, game engagement is taken into account as an important explanatory mechanism between personality characteristics and game use. More particularly, the second chapter studies which adolescents are more likely than others to achieve high levels of engagement during game play, and whether these engagement levels in turn affect violent and nonviolent game play.

### ***PART 2: Exploring BIS and BAS as moderators of media effects***

In the second part of the dissertation the central question is whether individual characteristics play a role in the presence or strength of the association between media use and negative health behaviors. More specifically, it addresses whether these characteristics thus have the ability to serve as an enhancing and/or protective factor. **Chapter 3** takes a closer look at the association between soap opera viewing and attitudes toward alcohol use. It examines whether BAS and BIS can be regarded as moderators in this association. Based on the literature, it is assumed that BAS is likely to serve as a risk and enhancing factor, while BIS is more likely to protect adolescents from possible negative and harmful media effects. While **chapter 3** focuses on the influence of exposure to certain types of media content, **chapter 4** investigates whether time spent on games is associated with adolescents' intake of unhealthy snacks such as chocolate, chips, cookies and sugar-sweetened drinks. Again, the potential enhancing and protecting functioning of BAS and BIS are examined.

### ***PART 3: Exploring the dual role of BIS and BAS in media use and effects***

The third and final part of the dissertation uses an integrated approach and examines BAS and BIS as predictors and moderators in one model. More particularly, **chapter 5** looks into the link between exposure to the often risk-glorifying MTV reality shows such as *Geordie Shore* and *Jersey Shore*. First, it examines whether BAS and BIS are predictors of viewing frequency of this media genre. Additionally, it investigates whether these concepts serve as moderators of the association between MTV reality shows and behavioral intentions toward smoking, getting drunk

and binge-drinking. Additionally, **chapter 5** adopts a social norms approach and examines how descriptive and injunctive peers', parents' and friends' norms fit into this model.

The dissertation concludes with a discussion of the results, a reflection on the relevance and implications of the findings and an agenda for future media research.

## REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Aluja-Fabregat, A., & Torrubia-Beltri, R. (1998). Viewing of mass media violence, perception of violence, personality and academic achievement. *Personality and Individual Differences*, 25, 973–989. [http://doi.org/10.1016/S0191-8869\(98\)00122-6](http://doi.org/10.1016/S0191-8869(98)00122-6)
- Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology*, 78(4), 772–790.
- Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., ... Saleem, M. (2010). Violent video game exposure and aggression: A literature review. *Psychological Bulletin*, 136, 151–173. <http://doi.org/10.1037/a0018251>
- Arnett, J. J. (2000). Emerging adulthood. A theory of development from the late teens through the twenties. *The American Psychologist*, 55, 469–480. <http://doi.org/10.1037/0003-066X.55.5.469>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. PrenticeHall series in social learning theory (Vol. 1). New Jersey: Prentice Hall.
- Bandura, A. (2001). Social Cognitive Theory of Mass Communication. *Media Psychology*, 3(3), 265–299. [http://doi.org/10.1207/S1532785XMEP0303\\_03](http://doi.org/10.1207/S1532785XMEP0303_03)
- Berk, L. E. (2006). *Development through the lifespan*. Boston: Pearson.
- Beullens, K., Rhodes, N., & Eggermont, S. (2016). Behavioral activation and inhibition as moderators of the relationship between music video-viewing and joyriding attitudes. *Media Psychology*, 19(2), 181-202. doi:10.1080/15213269.2014.950756
- Bijttebier, P., Beck, I., Claes, L., & Vandereycken, W. (2009). Gray's Reinforcement Sensitivity Theory as a framework for research on personality-psychopathology associations. *Clinical Psychology Review*, 29(5), 421–30. <http://doi.org/10.1016/j.cpr.2009.04.002>
- Blumer, H., & Hauser, P. M. (1933). *Movies, delinquency, and crime*. New York: MacMillan.
- Börnhorst, C., Wijnhoven, T. M., Kunešová, M., Yngve, A., Rito, A. I., Lissner, L., ... Breda, J. (2015). WHO European Childhood Obesity Surveillance Initiative: associations between sleep duration, screen time and food consumption frequencies. *BMC Public Health*, 15(1), 442. <http://doi.org/10.1186/s12889-015-1793-3>
- Browne, K., & Hamilton-Giachritsis, C. (2005). The influence of violent media on children and adolescents: a public-health approach. *The Lancet*, 365. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0140673605179525>

- Carver, C. S., & White, T. L. (1994). Behavioral Inhibition , Behavioral Activation , and Affective Responses to Impending Reward and Punishment : The BIS / BAS Scales. *Journal of Personality and Social Psychology*, 67(2), 319–333. <http://doi.org/10.1037/0022-3514.67.2.319>
- Corr, P. J. (2008). The Reinforcement Sensitivity Theory (RST): introduction. In *The Reinforcement Sensitivity Theory of Personality* (pp. 1–43). Cambridge: Cambridge University Press.
- Costa, P., & McCrae, R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment*, 4(1), 5–13. <http://doi.org/10.1037//1040-3590.4.1.5>
- Cumberbatch, G. (2010). Effects. In D. Albertazzi & P. Cobley (Eds.), *The Media: an introduction* (pp. 354–368). Harlow: Pearson.
- Currie, C., Hurrelman, K., Settertobulte, W., Smith, R., & Todd, J. (2000). *Health and Health Behaviour among Young People*. Copenhagen.
- Dysinger, W. S., & Ruckmick, C. A. (1933). *The emotional responses of children to the motion picture situation*. New York: MacMillan.
- Engels, R. C. M. E. (2016). *Alcoholpreventie bij jongeren: nieuwe uitdagingen*. Brussel: VAD Studiedag: Over alcohol, geen klein bier!
- Engels, R. C. M. E., Hermans, R., van Baaren, R. B., Hollenstein, T., & Bot, S. M. (2009). Alcohol portrayal on television affects actual drinking behaviour. *Alcohol and Alcoholism*, 44(3), 244–9. <http://doi.org/10.1093/alcalc/agp003>
- Finn, S. (1997). Origins of Media Exposure: Linking Personality Traits to TV, Radio, Print, and Film Use. *Communication Research*, 24(5), 507–529.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behaviour: The reasoned action approach*. Psychology Press. New York: Psychology Press.
- Franken, I., & Muris, P. (2006). BIS/BAS personality characteristics and college students' substance use. *Personality and Individual Differences*, 40(7), 1497–1503. <http://doi.org/10.1016/j.paid.2005.12.005>
- Furnham, A., Ingle, H., Gunter, B., & McClelland, A. (1997). A content analysis of alcohol portrayal and drinking in British television soap operas. *Health Education Research*, 12(4), 519–529. <http://doi.org/10.1093/her/12.4.519>
- Gerbner, G. (1998). Cultivation analysis: An overview. *Mass Communication and Society*, 1(3-4), 3–12.
- Giles, G., & Price, I. R. (2008). Adolescent computer use: Approach, avoidance, and parental control. *Australian Journal of Psychology*, 60(2), 63–71. <http://doi.org/10.1080/00049530701829896>

- Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy*, 8(3), 249–266. [http://doi.org/10.1016/0005-7967\(70\)90069-0](http://doi.org/10.1016/0005-7967(70)90069-0)
- Gray, J. A. (2010). The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system. *Behavioral and Brain Sciences*, 5(3), 469–484.
- Gray, J. A., & McNaughton, N. (2003). *The Neuropsychology of Anxiety: An Enquiry Into the Function of the Septo-hippocampal System*. New York: Oxford University Press.
- Greene, K., & Krcmar, M. (2005). Predicting exposure to and liking of media violence: a uses and gratifications approach. *Communication Studies*, 56(1), 71–93. <http://doi.org/10.1080/0008957042000332250>
- Hall, A. (2005). Audience Personality and the Selection of Media and Media Genres. *Media Psychology*, 7(4), 377–398.
- Hanewinkel, R., Sargent, J. D., Poelen, E., Scholte, R., Florek, E., Sweeting, H., ... Morgenstern, M. (2012). Alcohol consumption in movies and adolescent binge drinking in 6 European countries. *Pediatrics*, 129(4), 709–20. <http://doi.org/10.1542/peds.2011-2809>
- Hardin, M., & Ernst, M. (2009). Functional brain imaging of developmental-related risk and vulnerability for substance use in adolescents. *J Addict Med*, 3(2), 47–54. <http://doi.org/10.1097/ADM.0b013e31819ca788>.Functional
- Hooper, C. J., Luciana, M., Conklin, H. M., & Yarger, R. S. (2004). Adolescents' performance on the Iowa Gambling Task: implications for the development of decision making and ventromedial prefrontal cortex. *Developmental Psychology*, 40(6), 1148–1158. <http://doi.org/10.1037/0012-1649.40.6.1148>
- Jordan, A. B., Hersey, J. C., Mcdivitt, J. a, & Heitzler, C. D. (2006). Reducing Children 's Television-Viewing Time: A Qualitative Study of Parents and Their Children. *Pediatrics*, 118(5). <http://doi.org/10.1542/peds.2006-0732>
- Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and Gratifications Research. *Public Opinion Quarterly*, 37(4), 509–523.
- Kiewitz, C., & Weaver, J. B. (2001). Trait aggressiveness, media violence, and perceptions of interpersonal conflict. *Personality and Individual Differences*, 31(6), 821–835.
- Kimbrel, N., Nelson-Gray, R. O., & Mitchell, J. T. (2012). BIS, BAS, and bias: The role of personality and cognitive bias in social anxiety. *Personality and Individual Differences*, 52(3), 395–400. <http://doi.org/10.1016/j.paid.2011.10.041>
- Koordeman, R., Anschutz, D. J., & Engels, R. C. M. E. (2012). Alcohol portrayals in movies, music videos and soap operas and alcohol use of young people: current status and future challenges. *Alcohol and Alcoholism*, 47(5), 612–23. <http://doi.org/10.1093/alcalc/ags073>

- Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication*, 50(1), 46–70. <http://doi.org/10.1111/j.1460-2466.2000.tb02833.x>
- Lang, A. (2006). Motivated cognition (LC4MP): The influence of appetitive and aversive activation on the processing of video games. In P. Messaris & L. Humphreys (Eds.), *Digital media: Transformation in human communication* (pp. 237–256). Peter Lang Publishing.
- Lang, A. (2009). The limited capacity model of motivated mediated message processing. In R. L. Nabi & M. B. Oliver (Eds.), *Media Processes and Effects* (pp. 193–204). California: Sage.
- Lang, A., Bradley, S. D., Sparks, J. V., & Lee, S. (2007). The Motivation Activation Measure (MAM): How Well Does MAM Predict Individual Differences in Physiological Indicators of Appetitive and Aversive Activation? *Communication Methods and Measures*, 1(2), 113–136. <http://doi.org/10.1080/19312450701399370>
- Lang, A., Kurita, S., Rubenking, B. R., & Potter, R. F. (2011). MiniMAM: Validating a Short Version of the Motivation Activation Measure. *Communication Methods and Measures*.
- Livingstone, S., & Helsper, E. J. (2008). Parental mediation of children’s internet use. *Journal of Broadcasting & Electronic Media*, 52(4), 581–599. <http://doi.org/10.1080/08838150802437396>
- Mares, M., & Woodard, E. (2007). Positive Effects of Television on Children’s Social Interactions : A Meta-Analysis. *Media Psychology*, 7, 301–322.
- Marshall, S. J., Biddle, S. J. H., Gorely, T., Cameron, N., & Murdey, I. (2004). Relationships between media use, body fatness and physical activity in children and youth : a meta-analysis. *International Journal of Obesity*, 28, 1238–1246. <http://doi.org/10.1038/sj.ijo.0802706>
- Meerkerk, G.-J., van den Eijnden, R. J. J. M., Franken, I., & Garretsen, H. F. L. (2010). Is compulsive internet use related to sensitivity to reward and punishment, and impulsivity? *Computers in Human Behavior*, 26(4), 729–735. <http://doi.org/10.1016/j.chb.2010.01.009>
- Must, A., & Tybor, D. J. (2005). Physical activity and sedentary behavior : a review of longitudinal studies of weight and adiposity in youth. *International Journal of Obesity*, 29, S84–S96. <http://doi.org/10.1038/sj.ijo.0803064>
- Nederkoorn, C., Braet, C., Van Eijls, Y., Tanghe, A., & Jansen, A. (2006). Why obese children cannot resist food: The role of impulsivity. *Eating Behaviors*, 7(4), 315–322. <http://doi.org/10.1016/j.eatbeh.2005.11.005>
- O’Connor, R. M., Stewart, S. H., & Watt, M. C. (2009). Distinguishing BAS risk for university students’ drinking, smoking, and gambling behaviors. *Personality and Individual Differences*, 46(4), 514–519. <http://doi.org/10.1016/j.paid.2008.12.002>

- Park, S. M., Park, Y. A., Lee, H. W., Jung, H. Y., Lee, J. Y., & Choi, J. S. (2013). The effects of behavioral inhibition/approach system as predictors of Internet addiction in adolescents. *Personality and Individual Differences*, *54*(1), 7–11. <http://doi.org/10.1016/j.paid.2012.07.033>
- Pearson, N., & Biddle, S. J. H. (2011). Sedentary Behavior and Dietary Intake in Children, Adolescents, and Adults. *American Journal of Preventive Medicine*, *41*(2), 178–188. <http://doi.org/10.1016/j.amepre.2011.05.002>
- Pickering, A. D., & Gray, J. A. (1999). The neuroscience of personality. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research (2nd ed.)* (pp. 277–299). New York: Guilford Press.
- Pickering, A. D., & Smillie, L. D. (2008). The behavioral activation system: challenges and opportunities. In P. J. Corr (Ed.), *The Reinforcement Sensitivity Theory of Personality* (pp. 120–154). Cambridge: Cambridge University Press. <http://doi.org/10.1017/CBO9780511819384>
- Potter, W. J., & Riddle, K. (2007). A Content Analysis of the Media Effects Literature. *Journalism & Mass Communication Quarterly*, *84*(1), 90–104. <http://doi.org/10.1177/107769900708400107>
- Rosengren, K. E. (1976). Uses and Gratifications: A Paradigm Outline. In G. Blumler & E. Katz (Eds.), *The Uses of Mass Communications* (pp. 135–165). Harmondsworth: Penguin.
- Slater, M. D. (2003). Alienation, Aggression, and Sensation Seeking as Predictors of Adolescent Use of Violent Film, Computer, and Website Content. *Journal of Communication*, *53*(1), 105–121.
- Smillie, L., Pickering, A., & Jackson, C. (2006). The new reinforcement sensitivity theory: Implications for personality measurement. *Personality and Social Psychology Review*, *10*(4), 320–335. <http://doi.org/10.1207/s15327957pspr1004>
- Sparks, G. (2016). *Media effects research: a basic overview* (5th edition). Boston: Cengage Learning.
- Spear, L. P. (2000). *The adolescent brain and age-related behavioral manifestations. Neuroscience and Biobehavioral Reviews* (Vol. 24). [http://doi.org/10.1016/S0149-7634\(00\)00014-2](http://doi.org/10.1016/S0149-7634(00)00014-2)
- Steinberg, L. (2007). Risk taking in adolescence: New perspectives from brain and behavioral science. *Current Directions in Psychological Science*, *16*(2), 55–59.
- Strasburger, V. C., Jordan, A. B., & Donnerstein, E. (2012). Children, Adolescents, and the Media: Health Effects. *Pediatric Clinics of North America*, *59*, 533–587. <http://doi.org/10.1016/j.pcl.2012.03.025>
- Tanski, S., & Cin, S. D. (2010). Parental R-rated movie restriction and early-onset alcohol use. *Journal of Studies on Alcohol and Drugs*, *71*(3), 452–459.

- Valkenburg, P. M., & Peter, J. (2013a). Five Challenges for the Future of Media-Effects. *International Journal of Communication*, 7, 197–215. <http://doi.org/1932-8036/2013FEA0002>
- Valkenburg, P. M., & Peter, J. (2013b). The Differential Susceptibility to Media Effects Model. *Journal of Communication*, 63(2), 221–243. <http://doi.org/10.1111/jcom.12024>
- Van den Bulck, J., & Beullens, K. (2005). Television and music video exposure and adolescent alcohol use while going out. *Alcohol and Alcoholism*, 40(3), 249–53. <http://doi.org/10.1093/alcalc/agh139>
- Van den Bulck, J., & Van Mierlo, J. (2004). Energy intake associated with television viewing in adolescents, a cross sectional study. *Appetite*, 43, 181–184.
- Van Leijenhorst, L., Moor, B., Op de Macks, Z. A., Rombouts, S. A. R. , Westenberg, P. , & Crone, E. A. (2010). Adolescent risky decision-making: neurocognitive development of reward and control regions. *NeuroImage*, 51(1), 345–55. <http://doi.org/10.1016/j.neuroimage.2010.02.038>
- Vandewater, E., Rideout, V. J., Wartella, E., Huang, X., Lee, J. H., & Shim, M. (2007). Digital Childhood: Electronic Media and Technology Use Among Infants, Toddlers, and Preschoolers. *Pediatrics*, 119(5), e1006–e1015. <http://doi.org/10.1542/peds.2006-1804>
- Verma, T., Adams, J., & White, M. (2007). Portrayal of health-related behaviours in popular UK television soap operas. *Journal of Epidemiology and Community Health*, 61(7), 575–7. <http://doi.org/10.1136/jech.2006.050757>
- Weaver, J. B. (1991). Exploring the links between personality and media preferences. *Personality and Individual Differences*, 12(12), 1293–1299.
- Weaver, J. B. (2000). Personality and entertainment preferences. In D. Zillmann & P. Vorderer (Eds.), *Media entertainment: The psychology of its appeal*. (pp. 235–248). Lawrence Erlbaum Associates Publishers.
- Weaver, J. B., Brosius, H.-B., & Mundorf, N. (1993). Personality and movie preferences: A comparison of American and German audiences. *Personality and Individual Differences*. 14(2), 307-315.
- WHO. (2014). Global status report on alcohol and health-2014. Retrieved from [http://www.who.int/substance\\_abuse/publications/global\\_alcohol\\_report/msb\\_gsr\\_2014\\_1.pdf?ua=1](http://www.who.int/substance_abuse/publications/global_alcohol_report/msb_gsr_2014_1.pdf?ua=1)
- Zuckerman, M. (1971). Dimensions of sensation seeking. *Journal of Consulting and Clinical Psychology*, 36(1), 45–52.



# PART 1

## BIS and BAS as predictors of media use

# **CHAPTER 1: A Reinforcement Sensitivity Perspective on the Relationship between Personality and Adolescents' Violent and Nonviolent Movie Viewing**

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Substantial scholarly attention has been devoted to the association between personality and media use (e.g., Hall, 2005; Weaver, 1991). To date, most studies focused on distinct personality characteristics such as sensation seeking (Zuckerman, 1971) or conceptualized personality in terms of a descriptive model such as the five-factor model (FFM) (Costa & McCrae, 1992). However, according to Gray's (1970) reinforcement sensitivity theory (RST), differences in these traits result mainly from differences in the (re)activity of two neuropsychological systems: the behavioral activation (BAS) and inhibition system (BIS). Yet, despite the large number of studies that have examined associations between personality and media use (e.g., Finn, 1997; Hall, 2005), only few have conceptualized personality from a RST perspective (e.g., Aluja-Fabregat & Torrubia-Beltri, 1998). Additionally, research examining this link among adolescents is limited compared to the larger amount of studies conducted in adults.

The present study, therefore, wants to expand scholarly knowledge on this topic by using a RST perspective and by linking BIS and BAS to adolescents' violent and nonviolent movie viewing. It can be expected that the choice for violent or nonviolent movies is associated with differences in personality, and specifically with the sensitivity of BAS and BIS as previous studies already linked personality traits related to BAS and BIS with (mainly violent) media genres (Chory & Goodboy, 2011; Slater, 2003). Movies were chosen because of their appealing character to different age groups (Rideout, Foehr, & Roberts, 2010). Additionally, due to the rise of streaming services such as Netflix a large amount of movies is only a click away making them an accessible type of media (Adhikari et al., 2012).

## **PERSONALITY AND MEDIA PREFERENCES**

The choice for a medium or media genre is assumed to be a personal choice driven by social and psychological needs (Katz, Blumler, & Gurevitch, 1973; McQuail, 2000). According to the uses and gratifications theory (UGT) (Katz et al., 1973), personality traits are indispensable factors in explaining media use (Rosengren, 1976). The UGT considers media use to be a motivated choice aimed at fulfilling one's needs (Katz et al., 1973; McQuail, 2000) and adds that predictions of media use patterns can be obtained from an examination of these needs (Amiel & Sargent, 2004) which are believed to correspond, at least partially, to an individual's predominant personality traits (Weaver, 1991). The importance of individual predispositions is addressed by the disposition-

content congruency hypothesis (Klapper, 1960) according to which individuals tend to seek out content that is congruent with preexisting attitudes, emotions, beliefs, behavior, and cognitions (Valkenburg & Peter, 2013). Individuals mainly select content of which the rewarding value exceeds the expenditures needed to obtain it. Media content that is incongruent with preexisting dispositions will be less likely to be estimated as gratifying and to be selected (Klapper, 1960).

Consequently, studies described the relationship between differences in personality and media use. However, these studies were mainly conducted in adults, and to lesser extent in adolescents. Personality traits, such as trait-aggressiveness (Kiewitz & Weaver, 2001), trait-anxiety (e.g., Scealy, Phillips, & Stevenson, 2002), and disinhibition (Krcmar & Greene, 1999) have been incorporated in research on this topic to conceptualize personality. Research has paid particular attention, however, to the concept of sensation seeking (e.g., Potts, Dedmon, & Halford, 1996; Slater, 2003). Through an interaction of habituation and dishabituation, high sensation seekers are continuously looking for arousing stimuli (Zuckerman, 1971). Habituation refers to the reduction of responses and arousal after repeated exposure to a stimulus. Dishabituation is the revival of responses and arousal after exposure to a novel stimulus or change in the familiar stimulus. High sensation seekers proceed to dishabituation by seeking new stimuli or changing the familiar stimulus to avoid a decline in arousal (Zuckerman, 1971). Violent movies can provide such arousing sequences and offer the sensation needed by those individuals (Greene & Krcmar, 2005). Previous studies showed that sensation seeking predicted the viewing of action and adventure films (Aluja-Fabregat & Torrubia-Beltri, 1998), crime shows (Krcmar & Greene, 1999), overall violent movie viewing (Greene & Krcmar, 2005) among adolescents. Additionally, those higher in sensation seeking reported more enjoyment of frightening and violent media (Hoffner & Levine, 2005).

In addition to these distinct personality traits, studies have integrated broader personality models. Relying on the FFM (Costa & McCrae, 1992), media use has been associated with openness, extraversion and neuroticism, and to a lesser extent with agreeableness and conscientiousness (Finn, 1997). Krcmar & Kean (2005), for instance, reported that neuroticism was positively related to watching violent media, reality police shows, and drama. Extraversion was negatively related to overall television viewing, but when extraverts did watch television, they preferred violent genres. Openness was positively related to a preference for violent media, agreeableness was negatively related to violent content.

These studies showed a substantial insight into the relationship between personality and media use. However, by linking a large amount of different, but at the same time related, traits to mainly violent media this research lacks a clear and transparent view on the associations between individual characteristics and both violent and nonviolent movie viewing among adolescents.

Additionally, previous studies paid little attention to how neuropsychological processes are involved in media preferences. A possible approach to address this limitation lies in integrating neuropsychological constructs that are hypothesized to lie on the basis of individual differences in personality in media research. A large field of research has emerged over the last decades on the role of these biological systems in explaining personality (Gray, 1970). Incorporating these systems, which have been shown to vary in a stable way across individuals (Smillie, Pickering, & Jackson, 2006), can make important contributions to this line of research.

## **REINFORCEMENT SENSITIVITY THEORY**

The RST is a refined and nuanced perspective on personality in which BAS and BIS are described as neuropsychological motivational systems of which individual differences in their (re)activity result in differences in behavior, personality, and emotions (Gray, 1970; Gray & McNaughton, 2003). The personality models developed over the years (e.g., FFM; Costa & McCrae, 1992) have often resulted in rather descriptive measures of personality. The RST's emphasis on the biological basis of behavior is a substantial and valuable contribution compared to other personality conceptualizations (Corr, 2008; Revelle, 2008) and has, therefore, been described as “a unique exception” (Smillie, Pickering, & Jackson, 2006, p. 320) and “a shift in scientific fortune” (Corr, 2004, p. 318) for personality research.

The RST states that variations in the sensitivity of BAS and BIS influence individual differences in behavior. BAS is an activation system that is susceptible and responsive to positive and rewarding stimuli. The initiation of approach behavior toward rewards is, therefore, driven by the (re)activity of this system (Corr, 2008; Gray, 1970). Given its activation by rewarding cues, BAS has often been labelled with ‘reward sensitivity’ (e.g., Harrison, Treasure, & Smillie, 2011). BAS is assumed to be (at least partially) related to dopamine (Corr, 2008), a neurotransmitter in the central nervous system (Di Chiara, 1995), and to be located in the frontal and striatal brain regions involved in the production and release of dopamine (Pickering & Gray, 1999). BIS, on the other hand, is an inhibition or avoidance system that is activated by extreme novelty or negative signals associated with threat, anxiety, and punishment. The inhibition of behavior following negative cues is, therefore, driven by the (re)activity of this system. Due to its activation by punishment, the system is often labeled as “punishment sensitivity” (e.g., Loxton & Dawe, 2001). Given their sensitivity for these types of cues, individuals with a sensitive BIS scan their surroundings for potential threats and danger (Gray & McNaughton, 2003). Activation of BIS results in the avoidance of situations and/or the inhibition of behavior that might lead to negative stimuli (Corr, 2008). Also, in stressful or threatening situations they will experience more anxiety than individuals with a less sensitive BIS

(Vervoort et al., 2010). The neurological basis of BIS is assumed to be subsumed under septo-hippocampal brain structures that are responsible for the detection of threats (Pickering & Gray, 1999). Especially during adolescence, BAS becomes more sensitive, while BIS matures at a slower pace (Urošević, Collins, Muetzel, Lim, & Luciana, 2012). Therefore, associations between movie viewing and these systems are especially interesting to examine in adolescents.

## **THE CURRENT STUDY**

Several distinct personality traits have been associated with different media genres (Slater, 2003; van der Aa et al., 2009). According to the RST, however, personality results from the (re)activity of two neuropsychological systems, BIS and BAS (Gray, 1970). This stresses the necessity to incorporate these systems in research examining personality as a predictor of media use and preferences. Yet, few survey studies have integrated these systems in media research. Some studies, for instance, suggested that a higher BAS might be linked to problematic internet use among adolescents (e.g., Meerkerk et al., 2007; Park et al., 2013). Furthermore, among adolescents positive correlations between watching violent movies and reward sensitivity were found (Aluja-Fabregat & Torrubia-Beltri, 1998). In a college-student sample the approach system was associated with interest in arousing media genres such as pornography and war games, while the inhibition system was related to interest in tame and predictable genres such as sitcoms (Potter, Lee, & Rubenking, 2011). Following previous research (Aluja-Fabregat & Torrubia-Beltri, 1998), the present study assumes that violent movies serve as a rewarding stimulus for individuals with higher BAS scores. Brain scan studies indicated that reward-related brain areas were activated by exposure to violent games (Mathiak & Weber, 2006). Furthermore, fMRI studies showed that striatal reward-related brain areas were activated while playing a first-person-shooter game (Kätsyri, Hari, Ravaja, & Nummenmaa, 2013). These results support the premise that violent media content is related to the activation of reward-related brain regions.

Hypothesis 1: BAS is positively associated with watching violent movies.

BIS is an inhibition system that is sensitive to anxiety relevant and novel stimuli (Corr, 2008; Gray & McNaughton, 2003). Violent movies contain a large amount of scary and unpredictable content (e.g., Yokota & Thompson, 2015) and can induce feelings of anxiety, especially among children and adolescents (e.g., Strasburger, Jordan, & Donnerstein, 2012). Individuals with a sensitive BIS respond to stimuli related to fear and novelty by inhibiting and avoiding behavior that might lead to situations in which these cues are presented. An experimental study showed that

children who watched scary media contents were more likely to avoid behavior related to the events portrayed on the screen (Cantor & Omdahl, 1991). Therefore, the present study proposes the following hypothesis:

Hypothesis 2: BIS is negatively associated with watching violent movies.

Following the UGT (Katz et al., 1973; McQuail, 2000), however, it is likely that nonviolent movies are rewarding for some people as well. The choice for a certain medium or media genre is motivated by an individual's needs. Nonviolent genres can correspond to the needs of certain people as well, reflecting the individual's personality. Following that perspective the following hypothesis is suggested:

Hypothesis 3: BAS is positively associated with watching nonviolent movies.

Compared to violent movies, nonviolent movies contain less anxiety-inducing stimuli and are less scary and more predictable (Potter et al., 2011). Individuals with a sensitive BIS might thus be drawn to these genres. Research examining and supporting this premise is still scarce, but in line with Potter et al.'s (2011) findings it can be argued that nonviolent movies are more attractive for individuals with a sensitive BIS compared to movies containing violent content.

Hypothesis 4: BIS is positively associated with watching nonviolent movies.

BAS can be seen as a construct that lies on the basis of individual differences in personality (Gray, 1970). Sensation seeking has been shown to be positively related to BAS (Ball & Zuckerman, 1990). More specifically, an individual's level of sensation seeking is not merely determined by arousal, but by reward sensitivity as well. When an individual is faced with an opportunity for sensation, sensation seekers experience appetitive arousal and show a strong tendency toward approach behavior (Zuckerman, 1994). In spite of this association, it has also been argued that the constructs should be considered as distinct predictors (Lang, Shin, & Lee, 2005; Scott-Parker, Watson, King, & Hyde, 2012, 2013). The current study wants to examine sensation seeking as a predictor of violent movie viewing in addition to BAS and BIS to come to a better understanding of the predictive value of each of these concepts.

Hypothesis 5: The association between BAS and watching violent movies remains significant after introducing sensation seeking in a hierarchical regression model, while sensation seeking does not add to the explanation of violent movie viewing.

Following the premise that the activation of two motivational systems lies on the basis of personality as described for instance by the FFM (Gray, 1970; Matthews & Gilliland, 1999), earlier studies (Mitchell et al., 2007; Smits & Boeck, 2006) investigated whether BAS and BIS indeed explain individual differences in the characteristics of the FFM. Results showed that extraversion and neuroticism are explained well by BAS and BIS. Neuroticism is negatively associated with BAS and positively with BIS, while the opposite was true for extraversion with a negative association being found with BIS and a positive association with BAS (Smits & Boeck, 2006). Other research mainly confirmed these results, although a positive association emerged between BAS and neuroticism (Mitchell et al., 2007). Furthermore, studies showed negative associations between BAS and agreeableness and conscientiousness and positive associations between BIS and these two FFM-concepts (Mitchell et al., 2007; Smits & Boeck, 2006). For the fifth factor, openness, the relationship with BAS and BIS is rather unclear as inconsistent results have appeared (Mitchell et al., 2007; Smits & Kuppens, 2005). Following the premise that BAS and BIS lie on the basis of individual differences in behavior, the following hypothesis is examined:

Hypothesis 6: The association between BAS and BIS and watching violent and nonviolent movies remains significant after introducing the FFM-concepts in a hierarchical regression model, while the FFM-concepts do not add to the explanation of violent and nonviolent movie viewing.

## METHOD

### *Participant recruitment*

A quantitative survey was conducted in 15 secondary schools with different schooling levels in Flanders, Belgium. A total of 922 adolescents ( $M_{age}=14.96$  years,  $SD=.85$ , 14-17 years old, 56% girls) was asked to complete a pencil-and-paper survey with a researcher being present to answer all questions. Confidentiality of respondents' answers was guaranteed before and after completion of the questionnaire.

### *Measures*

**Movie viewing.** A seven-point scale with response categories (0) (almost) 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) daily was used to ascertain how often pupils watched various film genres (Beullens & Van den Bulck, 2008). A principal component analysis (PCA) using oblique rotation showed that action, horror, and thriller movies loaded on one factor (violent content) explaining 37.44% of the variance. Romantic, family, and animation movies formed a second factor (nonviolent content) and accounted for an additional 14.32% of the variance. For both factors, items were summed to form a scale (range: 0-18) (Violent content: Cronbach's  $\alpha = .81$ ;  $M = 6.73$ ,  $SD = 0.14$ ; nonviolent content: Cronbach's  $\alpha = .71$ ;  $M = 5.34$ ,  $SD = 0.12$ ).

**BIS/BAS.** To assess individual differences in the sensitivity of BIS and BAS the Dutch child version (Muris, Meesters, de Kanter, & Timmerman, 2005) of the BIS/BAS questionnaire (Carver & White, 1994) was used. Respondents indicated their agreement with 20 items scored on a four-point scale from *absolute disagreement* (=1) to *absolute agreement* (=4). A principal component analysis (PCA) (oblique rotation) supported the two factor structure (38% explained variance): BIS (7 items) (Cronbach's  $\alpha=.73$ ,  $M=17.92$ ,  $SD=3.99$ ) and BAS (13 items) (Cronbach's  $\alpha=.83$ ,  $M=32.60$ ,  $SD=6.68$ ).

**Sensation Seeking.** The 8-item brief sensation seeking scale was integrated to measure sensation seeking (Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002). Response categories were: *totally disagree* (=1), *disagree* (=2), *undecided* (=3), *agree* (=4), and *totally agree* (=5) (Cronbach's  $\alpha = .76$ ;  $M = 25.20$ ,  $SD = 0.19$ ). Factor analyses showed that all items load on one factor explaining 38.55% of the variance. Sensation seeking was calculated by summing and averaging the items, with higher scores indicating higher sensation seeking levels.

**FFM.** The concepts described by the FFM of personality (i.e., extraversion, neuroticism, conscientiousness, agreeableness and openness to experience) were assessed by the Dutch version (Denissen, Geenen, van Aken, Gosling, & Potter, 2008) of the Big Five Inventory (John & Srivastava, 1999). The scale consists of 44 items that are scored on a five-point Likert scale ranging from (1) absolute disagreement to (5) absolute agreement. PCA analyses showed that the five factor solution accounted for 42.14% of the variance. All five subscales showed to have moderate to good internal consistency in the present sample of adolescents which is in line with some other studies among this age group (Lynam et al., 2005; Selfhout et al., 2010). Items were summed and averaged: extraversion (8 items, Cronbach's  $\alpha = .63$ ;  $M = 3.51$ ,  $SD = .68$ ), agreeableness (9 items, Cronbach's  $\alpha = .63$ ;  $M = 3.48$ ,  $SD = .50$ ), conscientiousness (9 items, Cronbach's  $\alpha = .62$ ;  $M = 3.03$ ,  $SD = .58$ ), neuroticism (8 items, Cronbach's  $\alpha = .75$ ;  $M = 3.13$ ,  $SD = .67$ ) and openness to experience (10 items, Cronbach's  $\alpha = .71$ ;  $M = 3.26$ ,  $SD = .57$ ).

**Demographics.** Gender (0=boys, 1=girls) and age were entered as control variables in all analyses.



**Table 1:** Means and standard deviations

	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>SD</b>
BIS	7	28	17.92	3.99
BAS	13	52	32.60	6.68
Sensation seeking	8	40	25.20	5.91
Extraversion	1	5	3.51	0.68
Conscientiousness	1	5	3.03	0.58
Neuroticism	1	5	3.13	0.67
Openness	1	5	3.26	0.57
Agreeableness	1	5	3.48	0.50
Violent Movies	0	18	6.73	4.27
Nonviolent Movies	0	18	5.34	3.69

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### **Data analyses**

Analyses were conducted using IBM's SPSS 22.0. Hierarchical linear regression analyses were conducted with violent and nonviolent movie viewing frequency as the dependent variables. In all models gender and age were entered in step 1 as control variables, followed by BAS and BIS in step 2. In order to assess the possible additional explained variance by either sensation seeking or the concepts of the FFM, these variables were entered in step 3 in new regression models.

## **RESULTS**

**Descriptive analyses.** Table 1 provides an overview of all descriptive statistics for the variables in the present study and Table 2 summarizes all bivariate correlations. These showed a negative association between BIS and violent movie viewing ( $r = -.20, p < .01$ ). A positive association was found between violent movies and BAS ( $r = .25, p < .01$ ), sensation seeking ( $r = .26, p < .01$ ), extraversion ( $r = .11, p < .01$ ), and openness ( $r = .08, p < .05$ ). A negative association was found between violent movies and the FFM-concept neuroticism ( $r = -.18, p < .01$ ). For nonviolent movie viewing the results showed a positive association with both BIS ( $r = .16, p < .01$ ), BAS ( $r = .08, p < .05$ ), conscientiousness ( $r = .068, p < .05$ ), neuroticism ( $r = .14, p < .01$ ), and openness ( $r = .06, p < .05$ ).

**Table 2:** Correlation Analyses

	1	2	3	4	5	6	7	8	9	10	11	12
1) Gender	-											
2) Age	-,051	-										
3) BIS	,347**	-,029	-									
4) BAS	-,017	,008	,167**	-								
5) Sensation Seeking	-,092**	,052	-,006	,513**	-							
6) Extraversion	-,025	-,025	-,177**	,347**	,296**	-						
7) Conscientiousness	,043	,031	,012	-,079*	-,238**	,038	-					
8) Neuroticism	,347**	,046	,585**	-,009	-,082*	-,275**	-,023	-				
9) Openness	,026	,040	,139**	,233**	,268**	,210**	,084*	-,022	-			
10) Agreeableness	,093**	-,054	,123**	-,094**	-,077*	,130**	,273**	-,065	,050	-		
11) Violent Movies	-,294**	,106**	-,203**	,247**	,260**	,108**	-,010	-,176**	,079*	-,057	-	
12) Nonviolent Movies	,235**	,051	,159**	,077*	-,006	,035	,068*	,139**	,066*	,045	,228**	-

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**BAS/BIS and violent movies.** The first objective of the study was to examine the link between BAS and BIS, and movie viewing. The results (Table 3) indicated that the total model for the viewing of violent movies was significant  $F(4,891) = 47.071, p < .001$ , and explained 17.1% of the variance. Gender was a significant predictor ( $\beta = -.228, p < .001$ ) with boys having a higher likelihood to watch violent movies. Furthermore, age is positively associated with the viewing of violent movie genres ( $\beta = .087, p < .01$ ). In line with hypothesis 1, BAS ( $\beta = .27, p < .001$ ) was a significant positive predictor of violent movie viewing. Additionally, a significant negative relationship was found between BIS and watching violent movies ( $\beta = -.16, p < .001$ ), supporting hypothesis 2.

**Table 3:** Hierarchical regression model violent movie viewing

	<i>B</i>	<i>SE B</i>	$\beta$
<b>(Constant)</b>	-.122	2.43	
<b>Step 1</b>			
Gender	-1.97	.281	-.228***
Age	.437	.153	.087**
	Change in $R^2 = .092^{***}$		
<b>Step 2</b>			
BAS	.173	.020	.270***
BIS	-.174	.035	-.161***
	Change in $R^2 = .079^{***}$		
Final $R^2$ (= adjusted) = .171			
$F = 47.071$			
$df = 4/891$			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**BAS/BIS and nonviolent movies.** Next, it was examined whether BAS and BIS are associated with nonviolent movie viewing (Table 4). The results showed that the total model for the viewing of **nonviolent movies** was significant  $F(4,891) = 17.79, p < .001$ , and explained 7% of the variance. Gender was a predictor ( $\beta = .22, p < .001$ ), with girls having a higher likelihood to watch nonviolent movies, while age was not. No association was found between BAS and watching nonviolent movies in addition to gender and age ( $\beta = .64, p > .05$ ). Thus, no confirmation was found for hypothesis 3. In line with hypothesis 4, BIS ( $\beta = .084, p < .05$ ) was a significant positive predictor of nonviolent movie viewing.

**Table 4:** Hierarchical regression model nonviolent movie viewing

	<i>B</i>	<i>SE B</i>	$\beta$
<b>(Constant)</b>	.31	2.11	
<b>Step 1</b>			
Gender	1.613	.256	.217***
Age	.269	.140	.062
Change in $R^2 = .060^{***}$			
<b>Step 2</b>			
BAS	-2.50	.018	.064
BIS	2.23	.032	.084*
Change in $R^2 = .010^{**}$			
Final $R^2$ (= adjusted) = .070			
$F = 17.786$			
$df = 4/891$			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**Sensation seeking and violent movies.** Hypothesis 5 was tested by introducing sensation seeking in step 3 of the hierarchical regression model for violent movie viewing described above. Resultantly, the explained variance increased significantly from 17.1% to 18.3% ( $\Delta R^2 = .012, p < .001$ ). The overall model and its predictors were significant ( $F=5,889 = 40.98, p < .001$ ): gender ( $\beta = .22, p < .001$ ), age ( $\beta = .082, p < .01$ ), BAS ( $\beta = .19, p < .001$ ), BIS ( $\beta = -.15, p < .001$ ), and sensation seeking ( $\beta = .14, p < .001$ ). In line with our expectations, BAS and BIS remained significant predictors when entering sensation seeking in the model for violent movies. Nevertheless, sensation seeking still added to the model despite our assumption that it would not add to the explanation of violent movies in addition to BAS.

**Table 5:** Hierarchical regression model violent movie viewing with sensation seeking

	<i>B</i>	<i>SE B</i>	$\beta$
<b>(Constant)</b>	1.26	2.41	
<b>Step 1</b>			
Gender	-1.930	.279	-.224***
Age	.411	.152	.082**
Change in $R^2 = .093^{***}$			
<b>Step 2</b>			
BAS	.124	.023	.194***
BIS	-.162	.035	-.151***
Change in $R^2 = .088^{***}$			
<b>Step 3</b>			
Sensation Seeking	.097	.026	.135***
Change in $R^2 = .012^{***}$			
Final $R^2$ (= adjusted) = .183			
$F = 40.976$			
$df = 5/889$			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**FFM and violent movies.** Additionally, it was hypothesized that the associations between BAS and BIS on the one hand and violent and nonviolent movie viewing on the other hand (Table 3 and 4) would remain significant and that the FFM would not make a significant contribution to the model above BAS and BIS. In confirmation of hypothesis 6, neither of the five FFM-concepts added to the explanation of violent-movie viewing in the current sample. The positive association between BAS and violent movie viewing ( $\beta = .28, p < .001$ ) and the negative association between BIS and this type of movie viewing ( $\beta = -.18, p < .001$ ), however remained significant.

**Table 6:** Hierarchical regression model violent movie viewing with FFM

	<i>B</i>	<i>SE B</i>	$\beta$
<b>(Constant)</b>	-2.21	2.78	
<b>Step 1</b>			
Gender	-1.974	.289	-.229***
Age	.422	.154	.084**
	Change in $R^2 = .092^{***}$		
<b>Step 2</b>			
BAS	.179	.022	.279***
BIS	-.196	.044	-.182***
	Change in $R^2 = .089^{***}$		
<b>Step 3</b>			
Extraversion	.223	.222	-.035
Neuroticism	.043	.257	.007
Agreeableness	.194	.285	.023
Conscientiousness	.120	.235	.016
Openness	.315	.240	.042
	Change in $R^2 = -.002$		
Final $R^2$ (= adjusted) = .169			
$F = 21.24$			
$df = 9/886$			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**FFM and nonviolent movies.** The same regression model was run for nonviolent movie viewing and showed that none of the traits were significantly associated with the viewing of these movies. The small positive association between BIS and nonviolent movie viewing disappeared after introducing the FFM-concepts. These results provide partial support for hypothesis 6 by showing no significant added value of integrating the FFM-concepts in a model with BAS and BIS as predictors of violent and nonviolent movies.

**Table 7:** Hierarchical regression model nonviolent movie viewing with FFM

	<i>B</i>	<i>SE B</i>	$\beta$
<b>(Constant)</b>	-4.30	2.53	
<b>Step 1</b>			
Gender	1.523	.263	.205***
Age	.251	.141	.058
	Change in $R^2 = .060^{***}$		
<b>Step 2</b>			
BAS	.030	.020	.068
BIS	.064	.040	.040
	Change in $R^2 = .010^{**}$		
<b>Step 3</b>			
Extraversion	.216	.203	.040
Neuroticism	.224	.215	.040
Agreeableness	.030	.260	.004
Conscientiousness	.033	.215	.052
Openness	.104	.219	.016
	Change in $R^2 = .000$		
Final $R^2$ (= adjusted) = .070			
$F = 8.477$			
$df = 9/886$			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

## DISCUSSION

Prior studies and theories have noted the importance of explaining media use from the perspective of differences in an individual's personality (Katz et al., 1973; Valkenburg & Peter, 2013). A large body of research has investigated media use patterns from the UGT perspective by examining the link between media use and distinct personality characteristics such as sensation seeking (e.g., Hoffner & Levine, 2005; Slater, 2003) and the FFM-concepts (Costa & McCrae, 1992). According to the RST (Gray, 1970), BIS and BAS are underlying neuropsychological systems that control behavior and emotion. Distinct personality traits are assumed to result from differences in the (re)activity of BIS and BAS. Although individuals' BIS/BAS profile has been studied extensively in psychological research (Corr, 2004; Vervoort et al., 2014), little attention has been paid to this approach within media research. The present study examined BAS and BIS as predictors of violent and nonviolent movie viewing among adolescents. Additionally, sensation seeking and the FFM-traits were added to the analyses to come to a better understanding of the role of the combination of these personality models in explaining media use.

In line with our expectations, BAS was a positive determinant of violent movie viewing. This association can be explained by taking into account the exciting and arousing nature of these films which have been hypothesized to be a rewarding cue for individuals with a sensitive BAS

(Aluja-Fabregat & Torrubia-Beltri, 1998). Violent movies expose viewers to high levels of physical and sexual aggression, and unexpected plot changes (Smith et al., 1995). Individuals with a higher BAS are more sensitive to appetitive stimuli associated with reward (Gray, 1970). Consequently, these individuals are more responsive to these stimuli and are more likely to seek out environments in which these cues are presented. Following the results of the present study, it can be argued that violent movies are appealing to individuals with a highly active BAS. Additionally, it was analyzed whether BIS is negatively related to violent movie viewing given the association of the system with strong anxiety and risk-avoidant behavior (e.g., Vervoort et al., 2014). This negative association between BIS and violent media use was supported by the results of the present study. The violent content and stimuli that are appealing to individuals with a sensitive BAS, appear to function as negative cues for individuals with a sensitive BIS. Individuals with an active BIS are sensitive for cues related to anxiety and threat (Corr, 2004, 2008). Given the high amount of violent scenes in violent movies, they can be regarded as anxiety-related cues for people with a high BIS profile, which in turn can lead to avoidance of these movies, explaining the negative association.

Zuckerman (1979) hypothesized that sensation seeking is related to reward sensitivity or BAS. Following the assumption that BAS lies on the basis of individual differences in behavior, the present study analyzed if sensation seeking adds to the explanation of violent movie viewing in addition to BAS. Our results indicated that sensation seeking has an added value for explaining violent movie viewing and that BAS and sensation seeking each explain a significant amount of variance in violent movie viewing. Therefore, they should be considered as distinct predictors of this type of media use. Sensation seeking, however, only explains an additional 1.2% of the variance showing that especially BAS and BIS are important predictors of violent movies. This might indicate that BAS and BIS are the concepts that lie on the basis of individual differences in violent movie viewing. The same approach was used to examine the value of the FFM-traits in addition to BIS and BAS in explaining violent movies. These results did support our hypothesis and showed that these traits did not add to the model above BAS and BIS supporting the idea that BAS and BIS are basic concepts of which other personality traits are derived.

The present study further hypothesized that nonviolent movies can serve as a rewarding stimulus making them an attractive media genre for reward sensitive individuals. The uses and gratification framework states that media use is a motivated choice aimed at fulfilling one's social and psychological needs (Rosengren, 1974). Therefore, nonviolent movies can be assumed to be rewarding for some people if these movies correspond to the needs of the individual. This study investigated the link between BAS and nonviolent movies as well. The functioning of an individual's BAS is reflected in the sensitivity to reward of that person and the activation of BAS

leads to approach behavior. It is hypothesized that BAS is positively associated to nonviolent movies. Our findings did not support this assumption and show that BAS does not significantly add to the explanation of nonviolent movie viewing. It can be hypothesized that individuals with a sensitive BAS need stimuli that are more arousing and novel and that nonviolent movies do not present these to the extent that is needed to activate approach behavior toward these genres. The exciting and maybe even violent nature of movies appears to be an important condition for people with a sensitive BAS to make a choice for a certain movie genre. Also, adding the FFM-concepts in the regression model did not explain the preference for nonviolent movies.

Additionally, it was expected that BIS was positively related to nonviolent movie viewing, but as for BAS this was not supported in the model with the FFM-traits. Even without the FFM, the association between BIS and violent movies was small. The finding that both BAS as well as the FFM-traits are not associated with nonviolent movie viewing could be explained by the premise of Chory and Goodboy (2011) that personality might be a more influential predictor of video games compared to traditional types of media. An explanation might be that games are an interactive medium in which the media consumer engages in the violent game play, while television is a rather passive medium through which the content is presented to the audience. BIS, however, was correlated with the viewing of nonviolent movies. Therefore, it remains necessary for future research to explore the association between BIS and BAS and violent and nonviolent movies in addition to other personality models. Integrating BIS/BAS profile in these studies could provide a deeper knowledge of the relationships of BIS/BAS profile and media use patterns.

The current study has some important strengths by being the first to link BIS and BAS to both violent and nonviolent movie preferences. In addition, this study was undertaken in a large adolescent sample and has as such taken into account the sensitivity that starts to change during this period. Despite the study's strengths, there are some limitations that warrant attention. First, follow-up research is needed to check whether the reported associations hold in other samples. Second, the cross-sectional nature precludes causal interferences. The aim of this study was to examine whether associations between BIS/BAS profile and violent and nonviolent movie viewing exist. Future research should examine the different roles BIS and BAS might have, for instance, as moderators in a media effects model. BAS and BIS could possibly modify or strengthen the effect of media use on a certain outcome.

In conclusion, the present study increases scholarly knowledge on adolescents' media use from the UGT by focusing on basic neuropsychological systems instead of only looking at distinct personality characteristics using the RST (Gray, 1970). This study shows that the approach system (BAS) and the inhibition systems (BIS) are adequate concepts to explain adolescents' violent movie



viewing. Also, sensation seeking had an additional but small added value in explaining violent movie viewing.

## REFERENCES

- Adhikari, V. K., Guo, Y., Hao, F., Varvello, M., Hilt, V., Steiner, M., & Zhang, Z. (2012). Unreeling Netflix: Understanding and Improving Multi-CDN Movie Delivery. In *Proceedings IEEE Infocom* (pp. 1620–1628).
- Aluja-Fabregat, A., & Torrubia-Beltri, R. (1998). Viewing of mass media violence, perception of violence, personality and academic achievement. *Personality and Individual Differences*, *25*, 973–989. [http://doi.org/10.1016/S0191-8869\(98\)00122-6](http://doi.org/10.1016/S0191-8869(98)00122-6)
- Amiel, T., & Sargent, S. L. (2004). Individual differences in Internet usage motives. *Computers in Human Behavior*, *20*(6), 711–726. <http://doi.org/10.1016/j.chb.2004.09.002>
- Ball, S., & Zuckerman, M. (1990). Sensation seeking, Eysenck's personality dimensions and reinforcement sensitivity in concept formation. *Personality and Individual Differences*, *11*(4), 343–353. [http://doi.org/10.1016/0191-8869\(90\)90216-E](http://doi.org/10.1016/0191-8869(90)90216-E)
- Beullens, K., & Van den Bulck, J. (2008). News, music videos and action movie exposure and adolescents' intentions to take risks in traffic. *Accident Analysis and Prevention*, *40*, 349–356. <http://doi.org/10.1016/j.aap.2007.07.002>
- Cantor, J., & Omdahl, B. L. (1991). Effects of fictional media depictions of realistic threats on children's emotional responses, expectations, worries, and liking for related activities. *Communication Monographs*, *58*(4), 384–401. <http://doi.org/10.1080/03637759109376237>
- Carver, C. S., & White, T. L. (1994). Behavioral Inhibition, Behavioral Activation, and Affective Responses to Impending Reward and Punishment: The BIS / BAS Scales. *Journal of Personality and Social Psychology*, *67*(2), 319–333. <http://doi.org/10.1037/0022-3514.67.2.319>
- Chory, R. M., & Goodboy, A. K. (2011). Is basic personality related to violent and non-violent video game play and preferences? *Cyberpsychology, Behavior and Social Networking*, *14*(4), 191–198. <http://doi.org/10.1089/cyber.2010.0076>
- Corr, P. J. (2004). Reinforcement sensitivity theory and personality. *Neuroscience and Biobehavioral Reviews*, *28*(3), 317–332.
- Corr, P. J. (2008). The Reinforcement Sensitivity Theory (RST): introduction. In *The Reinforcement Sensitivity Theory of Personality* (pp. 1–43). Cambridge: Cambridge University Press.
- Costa, P., & McCrae, R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment*, *4*(1), 5–13. <http://doi.org/10.1037//1040-3590.4.1.5>
- Costa, P. T., & McCrae, R. (1992). *Revised NEO Personality Inventory and NEO Five-Factor Inventory Professional Manual*. Odessa: Psychological Assessment Resources.

- Denissen, J. J. A., Geenen, R., van Aken, M. A. G., Gosling, S. D., & Potter, J. (2008). Development and validation of a Dutch translation of the Big Five Inventory (BFI). *Journal of Personality Assessment*, *90*(2), 152–157. <http://doi.org/10.1080/00223890701845229>.
- Di Chiara, G. (1995). The role of dopamine in drug abuse viewed from the perspective of its role in motivation. *Drug and Alcohol Dependence*, *38*(2), 95–137. [http://doi.org/10.1016/0376-8716\(95\)01118-I](http://doi.org/10.1016/0376-8716(95)01118-I)
- Finn, S. (1997). Origins of Media Exposure: Linking Personality Traits to TV, Radio, Print, and Film Use. *Communication Research*, *24*(5), 507–529.
- Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy*, *8*(3), 249–266. [http://doi.org/10.1016/0005-7967\(70\)90069-0](http://doi.org/10.1016/0005-7967(70)90069-0)
- Gray, J. A., & McNaughton, N. (2003). *The Neuropsychology of Anxiety: An Enquiry Into the Function of the Septo-hippocampal System*. New York: Oxford University Press.
- Greene, K., & Krmar, M. (2005). Predicting exposure to and liking of media violence: a uses and gratifications approach. *Communication Studies*, *56*(1), 71–93. <http://doi.org/10.1080/0008957042000332250>
- Hall, A. (2005). Audience Personality and the Selection of Media and Media Genres. *Media Psychology*, *7*(4), 377–398.
- Harrison, A., Treasure, J., & Smillie, L. D. (2011). Approach and avoidance motivation in eating disorders. *Psychiatry Research*, *188*(3), 396–401. <http://doi.org/10.1016/j.psychres.2011.04.022>
- Hoffner, C. A., & Levine, K. J. (2005). Enjoyment of Mediated Fright and Violence: A Meta-Analysis. *Media Psychology*, *7*(2), 207–237. [http://doi.org/10.1207/S1532785XMEP0702\\_5](http://doi.org/10.1207/S1532785XMEP0702_5)
- Hoyle, R. H., Stephenson, M. T., Palmgreen, P., Lorch, E. P., & Donohew, R. L. (2002). Reliability and validity of a brief measure of sensation seeking. *Personality and Individual Differences*, *32*(3), 401–414.
- John, O. P., & Srivastava, S. (1999). The Big Five Trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research (2nd ed.)* (pp. 102–138). Guilford Press.
- Kätsyri, J., Hari, R., Ravaja, N., & Nummenmaa, L. (2013). Just watching the game ain't enough: striatal fMRI reward responses to successes and failures in a video game during active and vicarious playing. *Frontiers in Human Neuroscience*, *7*, 278. <http://doi.org/10.3389/fnhum.2013.00278>
- Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and Gratifications Research. *Public Opinion Quarterly*, *37*(4), 509–523.

- Kiewitz, C., & Weaver, J. B. (2001). Trait aggressiveness, media violence, and perceptions of interpersonal conflict. *Personality and Individual Differences*, 31(6), 821–835.
- Klapper, J. T. (1960). *The Effects of Mass Communication*. *Annual Review of Psychology* (Vol. 32). Free Press. <http://doi.org/10.1146/annurev.ps.32.020181.001515>
- Krcmar, M., & Greene, K. (1999). Predicting Exposure to and Uses of Television Violence. *Journal of Communication*, 24, 24–45.
- Krcmar, M., & Kean, L. G. (2005). Uses and Gratifications of Media Violence: Personality Correlates of Viewing and Liking Violent Genres. *Media Psychology*, 7(4), 399–420. [http://doi.org/10.1207/S1532785XMEP0704\\_5](http://doi.org/10.1207/S1532785XMEP0704_5)
- Lang, A., Shin, M., & Lee, S. (2005). Sensation Seeking, Motivation, and Substance Use: A Dual System Approach. *Media Psychology*, 7(1), 1–29. [http://doi.org/10.1207/S1532785XMEP0701\\_1](http://doi.org/10.1207/S1532785XMEP0701_1)
- Loxton, N. J., & Dawe, S. (2001). Alcohol abuse and dysfunctional eating in adolescent girls: the influence of individual differences in sensitivity to reward and punishment. *The International Journal of Eating Disorders*, 29(4), 455–62. <http://doi.org/10.1002/eat.1042>
- Lynam, D. R., Caspi, A., Moffitt, T. E., Raine, A., Loeber, R., & Stouthamer-Loeber, M. (2005). Adolescent psychopathy and the big five: Results from two samples. *Journal of Abnormal Child Psychology*, 33(4), 431–443. <http://doi.org/10.1007/s10648-005-5724-0>
- Mathiak, K., & Weber, R. (2006). Toward brain correlates of natural behavior: fMRI during violent video games. *Human Brain Mapping*, 27(12), 948–56.
- Matthews, G., & Gilliland, K. (1999). The personality theories of H.J. Eysenck and J.A. Gray: a comparative review. *Personality and Individual Differences*, 26, 583–626. [http://doi.org/10.1016/S0191-8869\(98\)00158-5](http://doi.org/10.1016/S0191-8869(98)00158-5)
- McQuail, D. (2000). *Mass Communication Theory*. *Mass Communication Theory* (Vol. 3rd). Thousand Oaks: SAGE.
- Meerkerk, G. J., Van den Eijnden, R. J. J. M., Vermulst, A. A., & Garretsen, H. F. L. (2007). The relationship between personality, psychosocial wellbeing and compulsive Internet use: The Internet as cyber Prozac? In *Pwned by the Internet – Explorative research into the causes and consequences of compulsive Internet use* (pp. 86–101). Rotterdam: Erasmus Universiteit.
- Mitchell, J. T., Kimbrel, N. A., Hundt, N. E., Cobb, A. R., Nelson-Gray, R. O., & Lootens, C. M. (2007). An analysis of reinforcement sensitivity theory and the five-factor model. *European Journal of Personality*, 21(7), 869–887.
- Muris, P., Meesters, C., de Kanter, E., & Timmerman, P. E. (2005). Behavioural inhibition and behavioural activation system scales for children: relationships with Eysenck's personality

- traits and psychopathological symptoms. *Personality and Individual Differences*, 38(4), 831–841.  
<http://doi.org/10.1016/j.paid.2004.06.007>
- Park, S. M., Park, Y. A., Lee, H. W., Jung, H. Y., Lee, J. Y., & Choi, J. S. (2013). The effects of behavioral inhibition/approach system as predictors of Internet addiction in adolescents. *Personality and Individual Differences*, 54(1), 7–11. <http://doi.org/10.1016/j.paid.2012.07.033>
- Pickering, A. D., & Gray, J. A. (1999). The neuroscience of personality. In *Handbook of personality: Theory and research* (2nd ed.) (pp. 277–299).
- Potter, R. F., Lee, S., & Rubenking, B. E. (2011). Correlating a Motivation-Activation Measure With Media Preference. *Journal of Broadcasting & Electronic Media*, 55(3), 400–418.  
<http://doi.org/10.1080/08838151.2011.597468>
- Potts, R., Dedmon, A., & Halford, J. (1996). Sensation seeking, television viewing motives, and home television viewing patterns. *Personality and Individual Differences*, 21(6), 1081–1084.  
[http://doi.org/10.1016/S0191-8869\(96\)00127-4](http://doi.org/10.1016/S0191-8869(96)00127-4)
- Revelle, W. (2008). The contribution of reinforcement sensitivity theory to personality theory. In P. J. Corr (Ed.), *The Reinforcement Sensitivity Theory of Personality* (pp. 508–527).
- Rideout, V., Foehr, U. G., & Roberts, D. F. (2010). *Generation M2: Media in the Lives of 8 to 18 Year-Olds. The Henry J. Kaiser Family Foundation*. Retrieved from <http://kff.org/other/report/generation-m2-media-in-the-lives-of-8-to-18-year-olds/>
- Rosengren, K. E. (1976). Uses and Gratifications: A Paradigm Outline. In G. Blumler & E. Katz (Eds.), *The Uses of Mass Communications* (pp. 135–165). Harmondsworth: Penguin.
- Sealy, M., Phillips, J. G., & Stevenson, R. (2002). Shyness and anxiety as predictors of patterns of Internet usage. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, 5(6), 507–515.
- Scott-parker, B., Watson, B., King, M. J., & Hyde, M. K. (2012). The influence of sensitivity to reward and punishment , propensity for sensation seeking , depression , and anxiety on the risky behaviour of novice drivers: A path model. *British Journal of Psychology*, 248–267.  
<http://doi.org/10.1111/j.2044-8295.2011.02069.x>
- Scott-parker, B., Watson, B., King, M. J., & Hyde, M. K. (2013). A further exploration of sensation seeking propensity , reward sensitivity , depression , anxiety , and the risky behaviour of young novice drivers in a structural equation model. *Accident Analysis and Prevention*, 50, 465–471.  
<http://doi.org/10.1016/j.aap.2012.05.027>
- Selfhout, M., Burk, W., Branje, S., Denissen, J., van Aken, M., & Meeus, W. (2010). Emerging Late Adolescent Friendship Networks and Big Five Personality Traits: A Social Network

- Approach. *Journal of Personality*, 78(April 2010), 509–538. <http://doi.org/10.1111/j.1467-6494.2010.00625.x>
- Slater, M. D. (2003). Alienation, Aggression, and Sensation Seeking as Predictors of Adolescent Use of Violent Film, Computer, and Website Content. *Journal of Communication*, 53(1), 105–121.
- Smillie, L., Pickering, A., & Jackson, C. (2006). The new reinforcement sensitivity theory: Implications for personality measurement. *Personality and Social Psychology Review*, 10(4), 320–335. <http://doi.org/10.1207/s15327957pspr1004>
- Smith, S. L., Wilson, B. J., Kunkel, D., Linz, D., Potter, W. J., Colvin, C. M., ... Olivarez, A. (1995). *National Television Violence Study*. (J. Federman, Ed.) (Vol. 3). Santa Barbara: Center for Communication and Social Policy.
- Smits, D. J. M., & Boeck, P. (2006). From BIS / BAS to the Big Five y. *European Journal of Personality*, 270 , 255–270. <http://doi.org/10.1002/per.583>
- Smits, D., & Kuppens, P. (2005). The relations between anger, coping with anger, and aggression, and the BIS/BAS system. *Personality and Individual Differences*, 39(4), 783–793.
- Strasburger, V. C., Jordan, A. B., & Donnerstein, E. (2012). Children, Adolescents, and the Media: Health Effects. *Pediatric Clinics of North America*, 59, 533–587. <http://doi.org/10.1016/j.pcl.2012.03.025>
- Urošević, S., Collins, P., Muetzel, R., Lim, K., & Luciana, M. (2012). Longitudinal changes in behavioral approach system sensitivity and brain structures involved in reward processing during adolescence. *Developmental Psychology*, 48(5), 1488–1500.
- Valkenburg, P. M., & Peter, J. (2013). The Differential Susceptibility to Media Effects Model. *Journal of Communication*, 63(2), 221–243. <http://doi.org/10.1111/jcom.12024>
- Van der Aa, N., Overbeek, G., Engels, R. C. M. E., Scholte, R. H. J., Meerkerk, G.-J., & Van den Eijnden, R. J. J. M. (2009). Daily and compulsive internet use and well-being in adolescence: a diathesis-stress model based on big five personality traits. *Journal of Youth and Adolescence*, 38(6), 765–76. <http://doi.org/10.1007/s10964-008-9298-3>
- Vervoort, L., Verbeken, S., Vandeweghe, L., De Decker, A., Vangeel, J., De Cock, N., ... Van Lippevelde, W. (2014). An innovative approach to the study and promotion of healthy food choices in infants, children and adolescents: the REWARD-project's conceptual framework and design. *Manuscript in Preparation*.
- Vervoort, L., Wolters, L. H., Hogendoorn, S. M., de Haan, E., Boer, F., & Prins, P. J. M. (2010). Sensitivity of Gray's Behavioral Inhibition System in clinically anxious and non-anxious

children and adolescents. *Personality and Individual Differences*, 48(5), 629–633.  
<http://doi.org/10.1016/j.paid.2009.12.021>

Weaver, J. B. (1991). Exploring the links between personality and media preferences. *Personality and Individual Differences*, 12(12), 1293–1299.

Yokota, F., & Thompson, K. M. (2015). Violence in G-rated animated films. *JAMA: The Journal of the American Medical Association*, 283(20), 2716–2720.  
<http://doi.org/10.1001/jama.283.20.2716>

Zuckerman, M. (1971). Dimensions of sensation seeking. *Journal of Consulting and Clinical Psychology*, 36(1), 45–52.

## CHAPTER 2: The Role of Behavioral Activation and Inhibition in explaining adolescents' game use and game engagement levels<sup>1</sup>

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### ABSTRACT

*According to Gray's reinforcement sensitivity theory, variations in the functioning of two neuropsychological systems, the behavioral activation (BAS) and inhibition (BIS) system, can result in individual differences in personality. Several studies have looked at associations between personality and media use but media research integrating BAS and BIS is scarce. The current cross-sectional survey study (n = 1016) representative for Flemish adolescents investigated associations between BAS and BIS and game use and game engagement in adolescents. Results showed that BAS was positively associated with playing both violent and nonviolent games. BIS was negatively associated with violent game use while it was positively associated with nonviolent games. Also, BAS was positively associated with game engagement. No association was found between BIS and game engagement. Game engagement was shown to mediate the relationship between BAS and playing both violent and nonviolent games. Based on these results, the present study argues that integrating the reinforcement sensitivity theory in media research makes an important contribution to the understanding of the link between personality and game engagement and game use.*

### INTRODUCTION

Video games are played by millions of people around the world and can be considered as one of the most popular forms of pastime, in particular, among adolescents (Griffiths, Davies, & Chappell, 2004; Jansz & Martens, 2005). This popularity is evidenced by the large amount of time young people spend with playing games. Belgian adolescents between the ages of 13 and 17 spend, on average, 1 hour and 7 minutes on gaming on a school day and 2 hours and 16 minutes on a day during the weekend or a holiday (Klein et al., 2014). A wide variety of game genres, from violent games such as first person shooter games and fighting games to nonviolent games such as puzzle and platform games, has been shown to be appealing to adolescents (Klein et al., 2014).

Drawing from the uses and gratifications theory (UGT; Katz, Blumler, & Gurevitch, 1973; McQuail, 2000), it can be assumed that personality characteristics are important determinants of the choice for a certain game and of the extent to which someone gets engaged in the game during game play. Previous studies investigating the association between personality and game use have

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<sup>1</sup> Based on Vangeel, J., Beullens, K., Vervoort, L., De Cock, N., Van Lippevelde, W., Goossens, L., Eggermont, S. (2016). The Role of Behavioral Activation and Inhibition in explaining adolescents' game use and game engagement levels. *Media Psychology*. doi: 10.1080/15213269.2016.1142378



primarily operationalized personality in terms of the five-factor model (FFM) of personality (i.e., openness, conscientiousness, extraversion, agreeableness, and neuroticism; Costa & McCrae, 1992; Goldberg, 1992) or the biologically based theory of Eysenck (1963; i.e., psychoticism, extraversion, and neuroticism), or they have looked at distinct personality traits such as sensation seeking and aggressiveness (Arriga & Esteves, 2006; Gentile, Lynch, Linder, & Walsch, 2004). Although these studies confirm that personality serves as an important determinant of game use by explaining the use and consequences of different types of games, studies focusing on game use and game engagement operationalizing personality from the perspective of the RST of Gray (1970) are extremely scarce. This theory can, however, provide important new insights regarding the relationship between personality and media use, in addition to other categorizations of personality, given that its theoretical basis addresses the neural, biological, and psychological processes that underlie personality dimensions (Corr, 2008).

### **REINFORCEMENT SENSITIVITY THEORY**

Over the years, several descriptive measurement models have been developed in view of identifying personality dimensions; examples are the analytical psychology based on the philosophy of Carl Jung (1960) and factor analyses of psychological adjectives (John & Srivastava, 1999; Smillie, Pickering, & Jackson, 2006). The descriptive model resulting from these approaches was considered to be the final model (e.g., Big Five framework; Goldberg, 1992) or was further investigated by identifying the underlying causes of individual differences in personality characteristics (e.g., Eysenck, 1963). The RST of Gray (1970) is an exception to these approaches by its focus on the neuropsychology of emotion, motivation, and learning (Smillie et al., 2006) and has several important advantages compared to other personality models. First of all, the RST describes the basis of personality by proposing the functioning of brain-behavioral systems that might play a role in observed variations in human behavior (Corr, 2008). One of the most important contributions of the RST approach is, therefore, its focus on the biological basis of personality by regarding the functioning of and variations in brain systems as the main source of personality differences (Corr, 2008; Revelle, 2008). Second, due to this neuropsychological approach, the RST proposes a very nuanced perspective on personality and its dimensions (Wilt, Condon, Brown-Riddell, & Revelle, 2012) in which the fundamental aspects of behavior and the core elements of emotion and motivation are described (Corr, 2008). Third, several validated scales have been developed to measure the RST concepts which are all easy to assess in child, adolescent, and adult samples (Carver & White, 1994; Franken, Muris, & Rassin, 2005; Muris, Meesters, de Kanter, & Timmerman, 2005).

According to the RST, behavior stems from the complex interplay of individual differences in the activity and reactivity of two neuropsychological systems: the behavioral activation system (BAS) and the behavioral inhibition system (BIS). Variations in the functioning of BAS and BIS are hypothesized to be responsible for individual differences in behavior. BAS is related to “reward sensitivity” (e.g., Corr, 2008; Gray, 1970) given that it is a mediator of the sensitivity to rewarding stimuli and is activated each time a rewarding cue is presented. The system, therefore, has a large influence on the initiation of approach behavior (Corr, 2008). Activation of BAS motivates individuals’ behavior toward rewarding goals and stimuli. BAS is (at least partially) located within striatal and frontal brain regions, which are strongly innervated with dopaminergic projections (Pickering & Gray, 1999). Therefore, the functioning of BAS is hypothesized to be determined in part by variations in the transmission of the neurotransmitter dopamine through mesolimbic and mesocortical pathways that are located in the ventral tegmental area of the midbrain, the nucleus accumbens, and the frontal cortex (Pickering & Gray, 1999; Wang et al., 2001).

BIS, on the other hand, is related to “punishment sensitivity” (Loxton & Dawe, 2001; Potts, George, Martin, & Barratt, 2006). This defensive system constitutes sensitivity to aversive stimuli such as signals of punishment, threat, and novelty (Corr, 2008). Behavior that might lead to negative or painful outcomes is inhibited by the activation of BIS (Carver & White, 1994). BIS is associated with septohippocampal brain structures (Gray & McNaughton, 2003) of which the main function is to detect potential threats and expectancy violations (Amodio, Master, Yee, & Taylor, 2008). Individuals with a strong BIS will, therefore, experience higher anxiety levels than others (Fowles, 1987; Vervoort et al., 2010). These people are more likely to be aware of risky situations by scanning the environment for possible dangerous situations and stimuli compared to individuals with a lower BIS sensitivity (Gray & McNaughton, 2003). BAS and BIS are theorized to be independent in the sense that the sensitivity of one system does not influence the sensitivity of the other. Nevertheless, if both systems are activated concurrently, the behavior resulting from this activation will be generated by an interaction between BAS and BIS (Corr & McNaughton, 2008)

For a long time, no consensus was reached on how to measure manifestations of these neuropsychological systems. Researchers used scales that were originally designed to measure personality traits related to BAS and BIS such as the extraversion and neuroticism scale (Eysenck & Eysenck, 1975) or the tridimensional personality questionnaire (Cloninger, 1987). As a response to this lack of consensus, Carver and White (1994) developed a self-report measure appropriate to assess the functioning and sensitivity of both BAS and BIS in survey research, which has become a widespread and frequently used instrument in psychological literature (Franken et al., 2005; Jorm

et al., 1999; Vervoort et al., 2014). However, in survey research on the topic of media use and preferences, this self-report measure of RST concepts has been rarely used. The present study aims to add to the literature by examining these concepts in research on video game use and effects.

### **INDIVIDUAL DIFFERENCES REGARDING MEDIA USE**

Scholars have recently stressed the need to conduct more research on the associations between media variables and non-media variables, such as personality traits, in order to improve our understanding of media use and its effects (Valkenburg & Peter, 2013). The UGT (Katz et al., 1973; McQuail, 2000) is one of the most cited theories in explaining the link between personality and media use. The theory describes why people use certain media and why different people develop different media preferences. The UGT regards members of the audience as active individuals who use media in a goal-directed way: they select a certain medium or content based on the degree to which it has the ability to satisfy their needs. These gratifications sought by the audience result, at least partially from psychological dispositions such as personality traits (Katz et al., 1973). Therefore, personality traits are considered as “self-evident” factors in explaining an individuals’ media use within the uses and gratification framework (Rosengren, 1974, p. 273).

Following this perspective, a limited number of studies has investigated associations between personality and media use like playing video games. These studies showed, for instance, that online game players are more open, conscientious, and extraverted compared to non-gamers, while no differences were found for being agreeable and neurotic (Teng, 2008). Regarding violent games specifically, it was found that individuals that are more open, neurotic, and extraverted but less agreeable tend to play games with a violent character more frequently compared to other, nonviolent, types of games (Chory & Goodboy, 2011). Furthermore, sensation seeking predicts the use of violent media genres such as action films, shooter games, and violence-orientated websites (Slater, 2003). In their meta-analysis, Hoffner and Levine (2005) confirmed that those higher in sensation seeking reported more enjoyment of media content containing fright and violence. Additionally, experimental research indicated that the reactions elicited by a certain game vary according to individuals’ personality. High sensation seekers got more engaged while playing a violent shooter game, while the opposite was true during nonviolent game play (Ravaja et al., 2004). However, none of these studies operationalized personality in terms of BAS and BIS to explain the use of violent and nonviolent games.

## THE LINK BETWEEN RST AND GAME USE

Survey research examining BAS and BIS as predictors of media use is rather limited. A study among early adolescents did show that BAS is positively related to the viewing of violent movies (Aluja-Fabregat & Torrubia-Beltri, 1998). Additionally, research on the topic of Internet addiction found that BAS is positively related to this type of internet misuse (Park et al., 2013; Yen et al., 2012). Regarding gaming, in particular, no survey studies have examined BAS and BIS as predictors of violent and nonviolent game use. One study did report a negative association between BIS and using a computer for game purposes (Giles & Price, 2008). Other studies found indications for an association between RST-related concepts and game use. Lang's Limited Capacity of Mediated Message Processing (LC4MP; Lang, Sanders-Jackson, Wang, & Rubenking, 2013; Lang, 2000) describes an appetitive and defensive system, which seem closely related to BAS and BIS given their comparable emphasis on an appetitive or approach system and a defensive or inhibition system. The BAS-like appetitive system is associated with interest in arousing game genres that tend to be violent or competitive, such as fight games, sports games, and war games. The BIS-like defensive system, on the other hand, is linked in a positive way with interest in nonviolent game genres such as puzzle games and classic games. Negative associations were found between this defensive system and massively multiplayer online role-playing games (MMORPG), which might be attributed to their violent character (Potter, Lee, & Rubenking, 2011). Different from focusing on specific game genres, several studies investigated game use and its effects in a more general way, simply by making the distinction between violent and nonviolent games (Graybill, Strawniak, Hunter, & O'Leary, 1987; Persky & Blascovich, 2007). The present study follows this general approach by linking BAS and BIS to both violent and nonviolent game use.

In addition to evidence based on self-reports, several brain scan studies have provided some neurological insights on the possible nature of the relationship between BAS and game use. To the best of our knowledge no brain studies have investigated the link between BIS and game use. Several studies found associations between game use and dopamine release. A study using positron emission tomography scans, for instance, showed that the dopaminergic reward system, by which BAS is driven, is activated during game play (Koepp et al., 1998). Additional support for this result was found in studies using functional magnetic resonance imaging (fMRI) scans, showing that striatal reward related brain areas are activated while playing a gambling game (Reuter et al., 2005), a nonviolent game (Hoefl, Watson, Kesler, Bettinger, & Reiss, 2008), and a first-person shooter game (Kätsyri, Hari, Ravaja, & Nummenmaa, 2013). Also, Mathiak et al. (2011) found striatal dopamine release during a first person shooter game but found no support to contribute this release to the occurrence of violent events in the game. These results show that

playing violent as well as nonviolent games is associated with an activation of reward regions in the brain. Therefore, it can be proposed that merely the presence of violence in a game does not suffice to explain why individuals are attracted to a game. The level of competition in a game, for instance, might also play an important role in the extent to which a game, violent or nonviolent, is rewarding for the players. Research already showed that the presence of competition in a game had a larger influence on aggressive behavior than the violent character of a game (Adachi & Willoughby, 2011), providing evidence for the importance of taking into account this characteristic of games in research on the topic.

Rewarding cues in games have also been shown to be associated with an increase in propensity to continue game play (Chumbley & Griffiths, 2006). These results are consistent with the activating function of BAS. Combining the functioning of BAS with the proposition of the UGT (McQuail, 2000) that states that people select a media content based on its ability to satisfy their needs and the assumption that video games in general are fun and enjoyable (King, Delfabbro, & Griffiths, 2009), the present study assumes that both violent and nonviolent game genres can provide an appetitive, rewarding stimulus making them both attractive genres for individuals with a sensitive BAS.

Hypothesis 1: Behavioral activation (BAS) is positively correlated with playing violent games.

Hypothesis 2: Behavioral activation (BAS) is positively correlated with playing nonviolent games.

BIS, on the other hand, is sensitive for signals of punishment, fear, and threat which can lead to avoidance behavior regarding situations in which this type of signal is often encountered (Corr, 2008). Violent, aggressive games have been shown to induce feelings of anxiety (Anderson & Ford, 1986; Baldaro et al., 2004) and hostility (Anderson & Ford, 1986; Arriaga & Esteves, 2006). For that reason, we assume that BIS is negatively associated with violent gaming. On the other hand, in line with the findings of Potter et al. (2011), a positive relationship is expected between BIS and nonviolent games that are less likely to provide anxiety-related stimuli and are more tame in nature making them more attractive for individuals with higher BIS scores compared to violent games.

Hypothesis 3: Behavioral inhibition (BIS) is negatively correlated with playing violent games.

Hypothesis 4: Behavioral inhibition (BIS) is positively correlated with playing nonviolent games.

## GAME ENGAGEMENT

Although games often differ in game design, story lines, and appearance, they have one important thing in common: They provide a distraction from everyday life by drawing people into the world of the game (Jennett et al., 2008). This subjective experience has been labeled with a wide variety of constructs (Boyle, Connolly, Hainey, & Boyle, 2012; Procci, James, & Bowers, 2013) such as immersion (Brown & Cairns, 2004), presence (Wirth et al., 2007), and flow (Csikszentmihalyi, 1988; Jegers, 2007). Immersion can be described as a state in which gamers are engaged in the game but are still aware of the real-world surroundings (Banos et al., 2004). Almost all game players experience some level of immersion (Brockmyer et al., 2009). Presence can be defined as a “state facilitated by feelings of empathy and atmosphere, which links immersion to factors of graphics, plot, and sounds in addition to emergent gameplay” (Nacke & Lindley, 2008, p. 81), making users feel personally and physically present in the environment being displayed (Wirth et al., 2007). The concept of flow was introduced by Csikszentmihalyi (1988) in view of explaining the characteristics of an optimal human experience and has been applied to a variety of domains such as game use. A state of flow can be described as “a dynamic equilibrium between skills and challenges which can be achieved in an intrinsic rewarding activity such as game play” (Nakamura & Csikszentmihalyi, 2002, p. 90).

Brockmyer et al. (2009) attempted to combine some of these dimensions by developing a measure that represents the aspects most commonly referred to and labelled this construct “game engagement.” Immersion is defined as the lowest level of engagement followed by presence, flow and the highest level of engagement: absorption. The game engagement concept shows some important intersections with the transportation theory of Green and Brock (2000). According to this theoretical perspective, transportation occurs on a physical and/or psychological level when an individual “loses access to some real-world facts in favor of accepting the narrative world that the author has created” (Green & Brock, 2000, p. 702). Related concepts such as transportation, presence, and flow have been shown to be strongly associated with enjoyment (Green, Brock, & Kaufman, 2004; Weibel, Wissmath, Habegger, Steiner, & Groner, 2008). Higher engagement levels are associated with more willingness to use a certain game again in the future (Green et al., 2004). In that sense, game engagement can be hypothesized to be an important determinant of game use and game preferences. Several studies have stressed the importance of investigating associations between personality traits and media engagement given that not every individual will be just as likely to become engaged to the same extent during media use (Green et al., 2004; Lombard & Ditton, 1997; Wirth et al., 2007). Nevertheless, to date, little is known about the role of personality traits as a possible determinant of game engagement. Regarding media use in general, Weibel,

Wissmath, and Mast (2010) did show that individuals scoring high on openness to experience, extraversion, and neuroticism are more susceptible to getting engaged in media-related activities such as television viewing and gaming. Psychological dimensions such as locus of control and dissociation (Murray, Fox, & Pettifer, 2007) and an individual's need to learn, need to compete, and need for activity (Seger & Potts, 2012) have been associated with engagement in virtual realities. These results provide some preliminary support for the association between personality factors and game engagement, but more research needs to be conducted on this topic. Gray's (1970) RST might provide a valuable framework to further explore the link between personality and game engagement.

The present study hypothesizes that a positive relationship exists between BAS and game engagement assuming that individuals who are more sensitive to rewards will be more likely to get caught up in the virtual game environment due to their quest for rewards in the game. For BIS, on the other hand, a negative relationship is hypothesized with game engagement given that individuals scoring high on BIS are very focused on the constant scanning of the environment for danger, making it less likely for them to get engaged and caught up in a game.

Hypothesis 5: Behavioral activation (BAS) is positively correlated with game engagement.

Hypothesis 6: Behavioral inhibition (BIS) is negatively correlated with game engagement.

Several consumer studies have hypothesized a direct relationship between media engagement, operationalized in terms of flow, and the amount of media use, mainly in online environments (e.g., Novak, Hoffman, & Yung, 2000; Webster, Trevino, & Ryan, 1993). The experience of flow is considered to be an enjoyable state, making it likely that the activity causing this flow experience will be repeated (Ghani & Deshpande, 1994), which, in turn, can also lead to habit formation (Lee & LaRose, 2007). For gaming, in particular, mixed results have been found regarding the relationship between engagement and game use. Lee and LaRose (2007) found no support for an association, while Giles and Price (2008) found a positive association between engagement and computer game use. The present study investigated whether the hypothesized relationship between BAS, on the one hand and violent and nonviolent game use, on the other hand is mediated by game engagement operationalized by the recently developed Game Engagement Questionnaire of Brockmeyer et al. (2009). As was indicated above in the rationale leading up to Hypothesis 5, a direct positive relationship can be assumed between BAS and game engagement. More specifically, it can be expected that gamers who score high on reward sensitivity (BAS) will be more likely to become more engaged during game play. Game engagement might,

in turn, lead to an increase in both violent and nonviolent game play. In order to come to a better understanding of the precise role of game engagement in this association, the following research question is examined:

RQ1: Does game engagement mediate the association between BAS and violent and nonviolent game play?

## METHOD

### *Participant Recruitment*

Data were collected among a sample of 14- to 16-year-old secondary school children with different education types from 20 schools in Belgium. Schools were selected at random from the official list of secondary schools available at the website of the Ministry of Education. A minimum sample size of 900 adolescents was needed to estimate the variance in BAS and BIS scores with a relative error of 10%, a 95% confidence interval, and an anticipated dropout of 15%. Based on the design of the study (design effect = 1.177) the minimum sample was set to 1100 adolescents. This effect was calculated using a cluster size of 60 students per school and an intraclass correlation coefficient of 0.003, which was estimated from a pretest in five schools. An oversampling of 10% was used to guarantee the anticipated sample. The PASS software package was used to calculate sample size (Jerry Hintze, Kayville, UT, USA). Earlier experience with cross-sectional research in secondary schools indicated that the response rate of secondary schools is often low (Roberts et al., 2007), hence, schools were oversampled by 50%. Therefore, a proportionate random sample of 40 schools was selected, stratified by public and private education networks. Schools were selected using a probability proportionate to the number of pupils in the third and fourth grade. An email with a recruitment letter was sent to the principals of the selected 40 schools, followed by a personal follow-up phone call a week later. In total, 20 schools confirmed their participation in the study. The principals were asked to provide the researchers with a list of all students of the third and fourth grade. A random sample of approximately 60 students per school was selected from this list. Information letters and passive informed consent forms were sent to the legal guardians of the selected adolescents. This procedure resulted in a total of 1016 eligible adolescents between the ages of 14 and 16 years old ( $M = 14.73$ ,  $SD = 0.72$ ) of which 50.3% were male. The adolescents were asked to complete a pencil-and-paper survey in the classroom. Two researchers were present at all times to provide clarification when necessary. Confidentiality and anonymity were assured by the researchers both before and after the completion of the survey. Additionally, the adolescents were informed that they could stop their participation at any time.



## **Measures**

**BIS/BAS.** The activity and reactivity of the BIS and BAS were assessed by the Dutch child version (Muris et al., 2005) of the BIS/BAS scale (Carver & White, 1994). The scale consists of 20 items scored on a 4-point scale ranging from absolute disagreement (1) to absolute agreement (4). In agreement with Carver and White (1994), the items are allocated to two scales: BIS scale (7 items; Cronbach's  $\alpha = .74$ ,  $M = 2.40$ ,  $SD = 0.59$ ) and BAS scale (13 items; Cronbach's  $\alpha = .83$ ,  $M = 2.41$ ,  $SD = 0.51$ ). Examples of BAS items are "I go out of my way to get things I want," "I often act on the spur of the moment," and "When good things happen to me, it affects me strongly." Examples of BIS items are "I feel worried when I think I have done poorly at something important" and "I worry about making mistakes." The average score for both scales was calculated by summing the item scores and dividing it by the number of items. Higher scale scores are an indication of higher activity and reactivity of the system.

**Game Use.** A 7-point scale with response categories 0 ((almost) 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) daily) was used to ascertain to what extent adolescents play a variety of game genres played on a computer or console. A list of nine game genres was developed based on previous studies (Beullens, Roe, & Van Den Bulck, 2011; Tanis & Jansz, 2008; Vorderer & Bryant, 2006): action/adventure, drive 'em up, fighting, first person shooter (FPS), MMORPG, simulation, platform, horror, and party games. A principal component analysis (PCA) was conducted on the nine game genres using oblique rotation (direct oblimin). Sample adequacy was assessed by the Kaiser–Meyer–Olkin measure ( $KMO = .81$ ). Furthermore, all KMO values for the individual items were between .66 and .88 and, thus, above the acceptable limit of .50. Bartlett's test of sphericity,  $\chi^2(36) = 2173.44$ ,  $p < .001$ , showed sufficiently large correlations between the items for PCA. Two components were extracted explaining 57.47% of the variance. A good internal consistency was found for the six items of the first component (Cronbach's  $\alpha = .83$ ). Therefore, the items (i.e., action/adventure, first person shooter, fight, drive 'em up, MMORPG, horror) were summed and divided by the number of genres to form a violent game scale with a range from 0 to 6 ( $M = 1.61$ ,  $SD = 1.49$ ). Also, the items of the second component (i.e., party, platform, and simulation) showed sufficient internal consistency (Cronbach's  $\alpha = .63$ ) and were summed and divided to form a nonviolent game scale with again a range from 0 to 6 ( $M = 1.25$ ,  $SD = 1.29$ ). Higher scores on these scales are an indication of more frequent use of violent and nonviolent games, respectively. Normality tests showed that both for the violent and nonviolent game variable were not normally distributed as many cases were observed near the lower ends of the scale (violent games:  $D(798) = 0.14$ ,  $p < .05$  and nonviolent games:  $D(798) = 0.16$ ,  $p < .05$ ). Following the advice of Field

(2009), this problem of non-normality was solved, however, by using bootstrapping techniques in the data analyses as explained later.

**Game Engagement.** In order to assess the extent to which gamers become involved in the game or get carried away while playing, the Game Engagement Questionnaire (GEQ; Brockmyer et al., 2009) was included in the survey. The GEQ consists of 19 items for each of which respondents had three options to indicate whether or not a certain item was applicable to them: 1(no), 2 (sort of), and 3 (yes). Examples of items are “I lose track of time,” “I feel spaced out,” and “Things seem to happen automatically.” Following Brockmyer et al. (2009), all items were summed to form an index with a range from 19 to 57, which showed a good reliability in our sample (Cronbach’s  $\alpha = .90$ ;  $M = 29.19$ ,  $SD = 7.90$ ). Higher GEQ scores are an indication of higher engagement. Normality tests showed also the engagement measure was not normally distributed  $D(798) = 0.11$ ,  $p < .05$ . Table 1 provides an overview of all descriptive statistics for the variables in the present study.

**Table 1:** Means and standard deviations

	Min	Max	Mean	SD
BIS	1	4	2.40	0.59
BAS	1	4	2.41	0.51
Violent Gaming	0	6	1.61	1.49
Nonviolent Gaming	0	6	1.25	1.29
Game Engagement	19	57	29.19	7.90

*Note:* \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### **Data Analysis**

All analyses described in the current study were conducted with IBM’s SPSS 22.0. Violent game use, nonviolent game use, and game engagement were entered as dependent variables in three separate regression models using bootstrapping. The sample size of the current study is large and, according to Hayes (2013) and Field (2009), the validity of linear regression analyses should not be affected if the sample size is quite large even if the scores are not-normally distributed. Additionally, the bootstrapping method used in the analyses takes into account any problems with non-normality (Field, 2009). For all three regression models, gender was entered in the first step as a control variable given that previous research indicated that gender differences exist regarding video game play and preferences. Studies showed, for instance, that girls game less and prefer nonviolent, traditional games (e.g., card games and arcade games) above violent and highly competitive games (e.g., fighting, race, shooter games) compared to boys (Hartmann & Klimmt,

2006; Lucas & Sherry, 2004). BAS and BIS were successively entered in step 2 given that both systems are theorized to be responsible for differences in behavior (Corr & McNaughton, 2008). As such, the models can examine whether RST concepts are predictors of each of the three dependent variables studied in the present research. In addition, mediation analyses were conducted using Hayes' (2013) PROCESS macro for SPSS to uncover a possible indirect pathway from BAS to violent and nonviolent game use if the regression analyses would indicate an association between this concept and game engagement. The macro uses ordinary least squares regression to estimate model parameters. Direct and indirect effects are reported as unstandardized regression coefficients in the output rendered by the PROCESS macro. The total effects model reports the explained variance for the direct and indirect effect together. The unstandardized regression coefficients for indirect effects are calculated through a bootstrapping process determining 95% confidence intervals for the indirect effects. In the mediation models, BAS was entered as the independent predictor variable; violent and nonviolent game use as the dependent constructs in model 1 and model 2, respectively; game engagement as a mediator; and gender and BIS as control variables.

## RESULTS

### *Descriptive Analyses*

Correlation analyses (Table 2) showed no correlation between gender (boys are coded as 0, girls are coded as 1) and BAS ( $r_{pb} = .040, p > .05$ ). A positive correlation was found with BIS ( $r_{pb} = .41, p < .01$ ) and nonviolent gaming ( $r_{pb} = .33, p < .01$ ) indicating higher BIS scores and higher levels of nonviolent games played among girls compared to boys. Results showed a negative correlation between gender and violent game use ( $r_{pb} = -.56, p < .01$ ) and game engagement ( $r_{pb} = -.26, p < .01$ ), which gives an indication that boys play violent games more frequently and get more engaged during game play compared to the girls in our sample. Results showed a positive correlation between BAS and violent game use ( $r = .16, p < .01$ ), while a negative correlation was found between BIS and violent gaming ( $r = -.26, p < .01$ ). For nonviolent game use, a positive correlation was found with both BAS ( $r = .13, p < .001$ ) and BIS ( $r = .23, p < .01$ ). Furthermore, the analyses indicated that a positive correlation exists between game engagement and BAS ( $r = .35, p < .01$ ), but no association was found with BIS.

**Table 2:** Correlation analyses

	1	2	3	4	5	6
1. Gender	-					
2. BAS	,040	-				
3. BIS	,407**	,265**	-			
4. Nonviolent Gaming	,326**	,126**	,226**	-		
5. Violent Gaming	-,560**	,155**	-,260**	,099**	-	
6. Game Engagement	-,258**	,350**	,002	,104**	,440**	-

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### Regression Analyses

**Violent Games.** Results showed that the total model for the use of violent games is significant  $F(3,799) = 143.90, p < .001$ , and explains 34.8% of the variance. Gender was a strong predictor of the use of violent games ( $\beta = -.53, p < .001$ ) with boys having a higher likelihood to play these type of game genres. In line with Hypothesis 1, BAS ( $\beta = .20, p < .001$ ) was a significant positive predictor of violent gaming. Furthermore, a significant negative relationship was found between BIS and playing violent games ( $\beta = -.10, p < .01$ ), which is in agreement with Hypothesis 3. Additionally, a possible interaction of gender in the associations between the BAS and BIS concepts and violent gaming was examined. The results, however, showed no significant interaction effect for the association between BAS and violent games and BIS and violent games.

**Table 3:** Hierarchical regression model for violent games with bootstrapping

	<i>B</i>	<i>SE B</i>	$\beta$
<b>Step 1</b>			
Gender	-1.674	.085	-.560***
Change in $R^2 = .313^{***}$			
<b>Step 2</b>			
Gender	-1.574	.095	-.526***
BAS	.044	.007	.197***
BIS	-.037	.012	-.100**
Change in $R^2: .035^*$			
Final $R^2$ (= adjusted) = .348			
$F = 143.900$			
$df = 3/799$			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**Nonviolent games.** The model was significant  $F(3,840) = 38.92, p < .001$  and explains 11.9% of the variance. Gender was a predictor in the total model ( $\beta = .29, p < .001$ ). Contrary to the results for violent game use, girls have a higher likelihood to play these nonviolent games compared to boys which is consistent with previous studies. As proposed in Hypothesis 2, BAS was a significant predictor of playing nonviolent games ( $\beta = .09, p < .05$ ). Furthermore, Hypothesis 4 was supported with BIS being a significant positive predictor of nonviolent gaming ( $\beta = .08, p < .05$ ). Again, no interaction with gender was found regarding these associations.

**Table 4:** Hierarchical regression model for nonviolent games with bootstrapping

	<i>B</i>	<i>SE B</i>	$\beta$
<b>Step 1</b>			
Gender	.839	.084	.325***
Change in $R^2 = .105^{***}$			
<b>Step 2</b>			
Gender	.746	.092	.289***
BAS	.017	.007	.086*
BIS	.025	.012	.080*
Change in $R^2: .014^*$			
Final $R^2$ (= adjusted) = .119			
$F = 38.919$			
$df = 3/840$			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

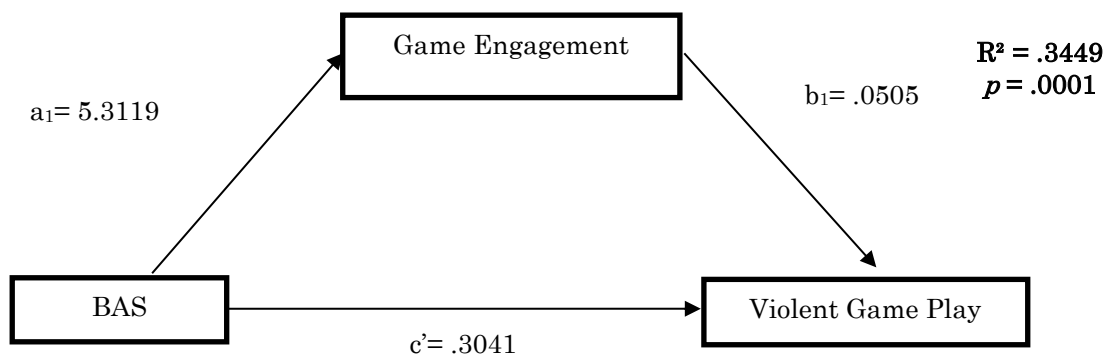
**Game engagement.** Hierarchical regression analyses showed that the model explained 19.3% of the variance in game engagement,  $F(3,868) = 70.60, p < .001$ . Gender was a significant predictor in the total model with boys reporting higher game engagement levels ( $\beta = -.28, p < .001$ ). Furthermore, BAS was a significant positive predictor ( $\beta = .35, p < .001$ ) of game engagement which is in line with Hypothesis 5. The regression analysis did not provide support for the assumption made in Hypothesis 6 that BIS would be negatively associated with game engagement ( $\beta = .018, p > .05$ ).

### **Mediation Analyses**

The present study presumes that the relationship between BAS and game use might be mediated by the extent to which gamers have the tendency to get engaged in both violent and nonviolent games.

**Violent games.** The results of the total effect model showed a significant total effect of BAS on violent game use (total effect coeff. = .57,  $p < .001$ , see Figure 1). The total variance explained by this model was 34.49% [ $F(3, 791) = 138.80, p < .001$ ]. Bias-corrected bootstrap intervals for the indirect effects showed that BAS was indirectly related with playing violent games through game engagement (coeff. = .27, 95% CI: .18/.37), but also a direct effect occurred (coeff. = .30,  $p < .01$ ). These results provided an answer to Research Question 1 and indicated that the BAS is associated with playing violent games and that this relationship is partially mediated by game engagement.

**Figure 1:** Mediation Model of BAS and Violent Game Play

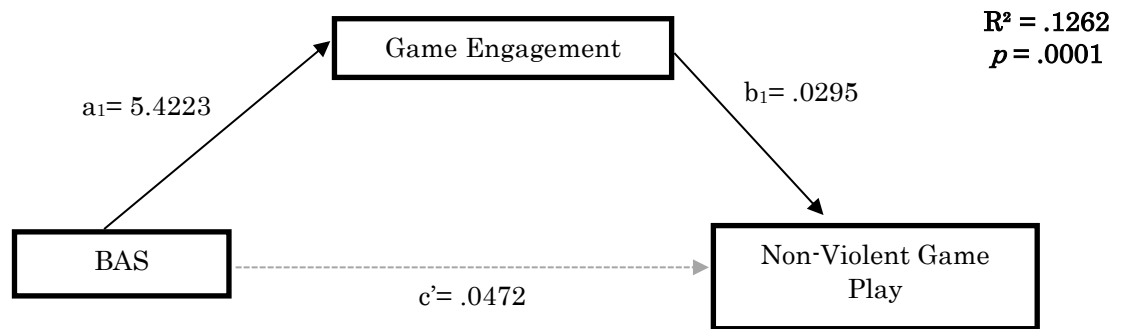


Indirect Effects	Unstandardized Beta	Bootstrap SE	Bootstrap 95% LLCI	Bootstrap 95% UICI
$a_1b_1$	.2683	.0483	.1823	.3674
Direct Effects	Unstandardized Beta	$t$	$p$	
$c'$	.3041	3.4106	.0007	

\*control variables: gender, BIS

**Nonviolent games.** The total effect model was significant for the effect of BAS on nonviolent games (total effect coeff. = .20,  $p < .05$ , see Figure 2). In total, this model explained 12.62% of the variance [ $F(3, 832) = 40.05, p < .001$ ]. The results showed that BAS was indirectly related with nonviolent game play through game engagement (coeff. = .16, 95% CI: .10/.23). A direct effect of BAS on nonviolent game use was not found (coeff. = .04,  $p > .05$ ). Thus, these results indicated that the relationship between BAS and nonviolent games, as hypothesized in Hypothesis 2, only occurred indirectly by the mediation with game engagement.

**Figure 2:** Mediation Model of BAS and Nonviolent Game Play



Indirect Effects	Unstandardized Beta	Bootstrap SE	Bootstrap 95% LLCI	Bootstrap 95% UICI
$a_1b_1$	.1599	.0354	.0966	.2321
Direct Effects	Unstandardized Beta	$t$	$p$	N = 836 # Bootstrap Samples = 1000
$c'$	.0472	0.5266	<u>.5986</u>	

\*control variables: gender, BIS

## DISCUSSION

The purpose of the present study was to explain game use and game engagement from a reinforcement sensitivity perspective by investigating possible associations between BAS and BIS, game use and engagement. According to Gray's (1970) RST, behavior is the result of the activity and reactivity of these neurobiological systems which also leads to differences in personality. Stemming from the uses and gratification perspective (Katz et al., 1973; McQuail, 2000), several studies have focused on the link between personality and media use (e.g., Andreassen et al., 2013; Chory & Goodboy, 2011; Orchard & Fullwood, 2009; Teng, 2008). Despite this need, little is known about the link between personality and media use from the perspective of RST. This theory allows to address behavior from a neuropsychological and learning psychology perspective. This framework might lead to new insights in media research. This chapter, therefore, wanted to contribute to this domain by investigating whether BAS and BIS are relevant concepts in explaining media use, and game use and game engagement, in particular, by using the adapted Dutch child version (Muris et al., 2005) of the validated BIS and BAS scales of Carver and White (1994) in a survey that was presented to a large representative sample of 1016 Flemish adolescents.

### ***Reinforcement Sensitivity and Game Use***

The results indicated that BAS is positively associated with both violent and nonviolent gaming which is in line with Hypotheses 1 and 2. BAS is an appetitive system that responds to the presentation of positive and rewarding signals. People with high BAS scores are responsive to rewarding stimuli and are therefore more likely to engage in reward-oriented behavior (Corr, 2008). Also, they develop reward conditioned behavior more rapidly compared to people who are less sensitive to rewards (Pickering & Smillie, 2008). Based on the associations found with both violent and nonviolent game use, it can be hypothesized that both types of games serve as a rewarding stimulus making them an attractive pastime for reward sensitive individuals. These results are partially in line with earlier research conducted by Potter et al. (2011), who found associations of the appetitive system with violent and competitive games (e.g., war games and fighting games), but not with traditional game genres (i.e., card games, puzzle games). The results are also in line with the findings of Koeppe et al. (1998) that dopaminergic brain regions by which BAS is driven are activated during game play. Furthermore, our results indicate that BAS explains more variance of the violent gaming model than of the nonviolent gaming model. This might be explained by the higher level of competition that is usually present in violent games (Adachi & Willoughby, 2011; Carnagey & Anderson, 2005). Individuals with high BAS levels are constantly searching for new rewards which might be offered by the heightened presence of competitive aspects in violent games compared to nonviolent games. Nevertheless, given the supported positive association between BAS and nonviolent games these games provide sufficient rewarding cues for them to be attractive to individuals with higher BAS levels. Based on the assumption that individuals with a sensitive BIS are more anxious and show more risk-avoidant behavior compared to individuals scoring low on BIS (Corr, 2008), we expected a negative association between BIS and violent game use (Hypothesis 3). Furthermore, a positive association was expected with nonviolent games (Hypothesis 4). Support for both Hypotheses 3 and 4 was found in the present study. BIS appeared to be a negative predictor of the use of violent games. The violence presented in these games can be regarded as an anxiety-related cue triggering avoidance behavior. Therefore, individuals with a high BIS appear to play more nonviolent games, which subject gamers to a lesser extent to anxiety-related cues such as violence, novelty and highly arousing stimuli.

### ***Reinforcement Sensitivity and Game Engagement***

The present study also aimed to explain game engagement from the perspective of the RST and to investigate the possible mediating role of the concept in the relationship between BAS and violent and nonviolent game use. The results supported the assumption made in Hypothesis 5 that



BAS is positively associated with engagement experienced during game play. Individuals scoring high on reward sensitivity or BAS appear to be more likely to get caught up in the virtual reality offered by a game. This is not surprising given that the higher an individual scores on reward sensitivity the more he will look for rewarding stimuli and the more he will be likely to conduct behavior that provides these rewarding cues (Pickering & Smillie, 2008). Furthermore, it was hypothesized that individuals with higher BIS scores would be less likely to get highly engaged during game play because of their need to scan the environment for possible danger and their tendency to be constantly aware of their surroundings (Gray & McNaughton, 2003). Despite these theoretical considerations, no support was found for the existence of a negative association between BIS and game engagement. Therefore, the link between BIS and game use might be explained by another mediator such as game motivations. Finally, the present study speculated whether game engagement could serve as a mediator in explaining the association between BAS and both the use of violent and nonviolent gaming. The results showed that game engagement indeed partially mediated the relationship between BAS and violent game use and even fully mediated the relationship between BAS and nonviolent game use. The hypothesis that higher reward sensitivity is correlated with higher game engagement, which, in turn, leads to more video game play, is, therefore, supported in the present study.

### ***Theoretical and Practical Implications***

The current findings provide evidence of the value of integrating two neuropsychological concepts, more specifically BAS and BIS, in media research. In the current study, BAS and BIS have been shown to be determinants of the use of both violent and nonviolent games and, additionally, BAS is positively associated with game engagement. The functioning of these systems, thus, appears to be related to the type of game that is played and also to the extent to which gamers get caught up in a virtual game reality during game play.

Playing games, violent games, in particular, has been linked to a variety of risk behaviors such as delinquency, risky driving, and aggressive behavior (i.e., Beullens, Roe, & Van den Bulck, 2008; DeLisi, Vaughn, Gentile, Anderson, & Shook, 2012; Sherry, 2001). As was shown by the results of the present study, reward sensitive individuals get more engaged during game play. Therefore, it could be argued that they are also more sensitive to the potential (negative) effects of games on their behavior. On the other hand, if people with higher BIS levels play fewer games that are violent in nature, it can be hypothesized that they will be less susceptible to this effect. The present study, therefore, argues to take into account the possible moderating role of BAS and BIS in future

research on media effects as well to investigate if BAS and BIS can explain susceptibility to certain media effects.

Finally, the findings can also be valuable for an educational and prevention context. Commercial games have been a success for many years, but the so called “serious games” are more often being used as an educational and prevention tool. Serious games have been used, for instance, for the prevention of diabetes and obesity (Thompson et al., 2010), and to enhance traffic safety skills and knowledge (Backlund, Engstrom, Johannesson, & Lebram, 2008). Previous studies have shown that individuals with higher BAS scores are more likely to engage in several types of negative health behaviors (Voigt et al., 2009), making them an important target group of serious games. Also, for these games to have a successful outcome, it is crucial that users play the game and continue to play it for as long as is necessary. Based on our findings, it was argued that game engagement is an important determinant of playing both violent and nonviolent gaming. Serious games are mostly nonviolent given that their main purpose is not to entertain but rather to transfer a certain message. The results of the present study point out that individuals with higher scores on reward sensitivity or BAS play nonviolent games, but this relationship appeared to be fully mediated by game engagement. Therefore, in order to maximize the likelihood that people play games, developers of serious games and prevention workers need to take into account the importance of game engagement as a determinant for game play for people with a high BAS, especially given that individuals with a high BAS have been shown to be more likely to engage in risky behavior.

### ***Limitations and directions for future research***

Despite the strengths of the study, particularly integrating BIS and BAS in research on game use and game engagement, testing mediational models, and focusing on two types of game genres, some limitations need to be addressed in future research. First, the cross-sectional design of the study does not allow for determining the temporal order of the associations nor the causality. Determining the temporal order would require a longitudinal design in which individuals are followed from the beginning of their experience with games. Such methods would allow for a better understanding of the role of BAS and BIS in the development of game preferences and the extent to which someone has the tendency to get engaged during game play. Second, research methods different from survey research can provide new and additional insights to this field of study. Given that BAS and BIS are neurobiological systems, follow-up research of Koepp et al. (1998) using brain scans can be of an added value and can provide researchers with important insights in the functioning of brain systems during the playing of different types of game genres.

Also, it can be argued that the concept of game engagement cannot be fully captured using self-report measures in a questionnaire given that only the subjective and not objective game experience is assessed. Experimental research in which the objective engagement during game use is measured by taking into account eye movement and task completion time (Jennett et al., 2008) might add to the understanding of the extent to which someone gets caught up in the virtual game world while playing and might help to determine the causal order of the associations. Furthermore, it should also be noted that the internal consistency of the BIS scale only showed to be acceptable in the present study with a Cronbach's alpha of .74. This could be explained by low inter-item correlations (mean-inter-item correlation = .29) or heterogeneity of constructs incorporated in the scale. Reliability indices of the BIS-scale have often been found to fluctuate around .75, so our alpha .74 is consistent with this (Cooper, Gomez, & Aucote, 2007; Muris, Merckelbach, Schmidt, Gadet, & Bogie, 2001). Additionally, following Cohen's guidelines for the interpretation of alpha coefficients in the social sciences (Cohen & Swerdlik, 2010), an alpha between .70 and .80 is acceptable in survey research. Therefore, we believe that the BIS scale is a reliable tool to include in survey research conducted among adolescents. Nevertheless, future research among adolescents should be conducted to further examine the validity and consistency of the BIS scale. In sum, the results of the present study provide interesting insights on the associations between the reinforcement sensitivity theory and violent and nonviolent gaming, supporting our thesis that these concepts are very useful to introduce in media research.

## REFERENCES

- Adachi, P. J. C., & Willoughby, T. (2011). The effect of video game competition and violence on aggressive behavior: Which characteristic has the greatest influence? *Psychology of Violence, 1*, 259–274. Retrieved from <http://doi.org/10.1037/a0024908>
- Aluja-Fabregat, A., & Torrubia-Beltri, R. (1998). Viewing of mass media violence, perception of violence, personality and academic achievement. *Personality and Individual Differences, 25*, 973–989. Retrieved from [http://doi.org/10.1016/S0191-8869\(98\)00122-6](http://doi.org/10.1016/S0191-8869(98)00122-6)
- Amodio, D. M., Master, S. L., Yee, C. M., & Taylor, S. E. (2008). Neurocognitive components of the behavioral inhibition and activation systems: implications for theories of self-regulation. *Psychophysiology, 45*, 11–9.
- Anderson, C. A., & Ford, C. M. (1986). Affect of the Game Player: Short-Term Effects of Highly and Mildly Aggressive Video Games. *Personality and Social Psychology Bulletin, 12*, 390–402.
- Andreassen, C. S., Griffiths, M. D., Gjertsen, S. R., Krossbakken, E., Kvam, S., & Pallesen, S. (2013). The relationships between behavioral addictions and the five-factor model of personality. *Journal of Behavioral Addictions, 2*, 90–99. Retrieved from <http://doi.org/10.1556/JBA.2.2013.003>
- Arriaga, P., & Esteves, F. (2006). Violent computer games and their effects on state hostility and physiological arousal. *Aggressive Behavior, 32*, 146–158.
- Backlund, P., Engstrom, H., Johannesson, M., & Lebram, M. (2008). Games for traffic education: An experimental study of a game-based driving simulator. *Simulation & Gaming, 41*, 145–169.
- Baldaro, B., Tuozzi, G., Codispoti, M., Montebanocci, O., Barbagli, F., Trombini, E., & Rossi, N. (2004). Aggressive and non-violent videogames: short-term psychological and cardiovascular effects on habitual players. *Stress and Health, 20*, 203–208.
- Baños, R. M., Botella, C., Alcañiz, M., Liaño, V., Guerrero, B., & Rey, B. (2004). Immersion and emotion: Their impact on the sense of presence. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society, 7*(6), 734–741. doi:10.1089/cpb.2004.7.734
- Beullens, K., Roe, K., & Van den Bulck, J. (2008). Video games and adolescents' intentions to take risks in traffic. *Journal of Adolescent Health, 43*, 87–90. Retrieved from <http://doi.org/10.1016/j.jadohealth.2007.12.002>
- Beullens, K., Roe, K., & Van den Bulck, J. (2011). Excellent gamer, excellent driver? the impact of adolescents' video game playing on driving behavior: A two-wave panel study. *Accident Analysis and Prevention, 43*, 58–65.

- Boyle, E. A., Connolly, T. M., Hailey, T., & Boyle, J. M. (2012). Engagement in digital entertainment games: A systematic review. *Computers in Human Behavior, 28*, 771–780.
- Brockmyer, J. H., Fox, C. M., Curtiss, K. A., McBroom, E., Burkhart, K. M., & Pidruzny, J. N. (2009). The development of the Game Engagement Questionnaire: A measure of engagement in video game-playing. *Journal of Experimental Social Psychology, 45*, 624–634.
- Brown, E., & Cairns, P. (2004). *A grounded investigation of game immersion*. In Extended abstracts of the 2004 conference on Human factors and computing systems. New York: ACM Press.
- Carnagey, N. L., & Anderson, C. A. (2005). The effects of reward and punishment in violent video games on aggressive affect, cognition, and behavior. *Psychological Science, 16*, 882–889. Retrieved from <http://doi.org/10.1111/j.1467-9280.2005.01632.x>
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67*, 319–333. Retrieved from <http://doi.org/10.1037/0022-3514.67.2.319>
- Chory, R. M., & Goodboy, A. K. (2011). Is basic personality related to violent and non-violent video game play and preferences? *Cyberpsychology, Behavior and Social Networking, 14*, 191–198. Retrieved from <http://doi.org/10.1089/cyber.2010.0076>
- Chumbley, J., & Griffiths, M. (2006). Gender, Personality, and Game Reinforcement Structure on Affective Responses to Computer Game-Play. *CyberPsychology & Behavior, 9*, 308–316.
- Cloninger, C. R. (1987). A systematic method for clinical description and classification of personality variants. A proposal. *Archives of General Psychiatry, 44*, 573–588. Retrieved from <http://doi.org/10.1001/archpsyc.1987.01800180093014>
- Cohen, R. J., & Swerdlik, M. E. (2010). *Psychological testing and assessment: An introduction to tests and measurements* (7th ed.). New York, NY: McGraw-Hill.
- Cooper, A., Gomez, R., & Aucote, H. (2007). The Behavioural Inhibition System and Behavioural Approach System (BIS/BAS) Scales: Measurement and structural invariance across adults and adolescents. *Personality and Individual Differences, 43*(2), 295–305. doi:10.1016/j.paid.2006.11.023
- Corr, P. J. (2008). *Reinforcement sensitivity theory (RST): Introduction*. In P. J. Corr (Ed.), *The reinforcement sensitivity theory of personality* (pp. 1–43). Cambridge, UK: Cambridge University Press.
- Corr, P. J., & McNaughton, N. (2008). *Reinforcement sensitivity theory and personality*. In P. J. Corr (Ed.), *The reinforcement sensitivity theory of personality* (pp. 155–187). Cambridge, UK: Cambridge University Press.

- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO personality inventory and NEO five-factor inventory professional manual*. Odessa, FL: Psychological Assessment Resources
- Csikszentmihalyi, M. (1988). *The flow experience and its significance for human psychology*. In M. Csikszentmihalyi, & I. S. Csikszentmihalyi (Eds.), *Optimal experience: Psychological studies of flow in consciousness* (pp. 15–35). Cambridge, UK: Cambridge University Press.
- DeLisi, M., Vaughn, M., Gentile, D., Anderson, C., & Shook, J. J. (2012). Violent video games, delinquency, and youth violence: New evidence. *Youth Violence and Juvenile Justice*, *11*, 132–142.
- Eysenck, H. J. (1963). Biological basis of personality. *Nature*, *199*, 1031–1034.
- Eysenck, H. J., & Eysenck, S. B. G. (1975). *Manual of the Eysenck personality questionnaire (junior and adult)*. Kent, UK: Hodder & Stoughton.
- Field, A. (2009). *Discovering statistics using SPSS*. Thousand Oaks, CA: Sage.
- Fowles, D. C. (1987). Application of a behavioral theory of motivation to the concepts of anxiety and impulsivity. *Journal of Research in Personality*, *21*, 417–435.
- Franken, I., Muris, P., & Rassin, E. (2005). Psychometric properties of the Dutch BIS/BAS scales. *Journal of Psychopathology and Behavioral Assessment*, *27*, 25–30.
- Gentile, D., Lynch, P., Linder, J., & Walsh, D. (2004). The effect of violent video game habits on adolescent hostility, aggressive behaviors, and school performances. *Journal of Adolescence*, *27*, 5–22.
- Ghani, J. A., & Deshpande, S. P. (1994). Task characteristics and the experience of optimal flow in human-computer interaction. *Journal of Psychology*, *128*, 381–391.
- Giles, G., & Price, I. R. (2008). Adolescent computer use: Approach, avoidance, and parental control. *Australian Journal of Psychology*, *60*, 63–71. Retrieved from <http://doi.org/10.1080/00049530701829896>
- Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, *4*, 26–42.
- Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy*, *8*, 249–266. Retrieved from [http://doi.org/10.1016/0005-7967\(70\)90069-0](http://doi.org/10.1016/0005-7967(70)90069-0)[CrossRef],
- Gray, J. A., & McNaughton, N. (2003). *The Neuropsychology of Anxiety: An enquiry into the function of the septo-hippocampal system*. New York, NY: Oxford University Press.
- Graybill, D., Strawniak, M., Hunter, T., & O’Leary, M. (1987). Effects of playing versus observing violent versus nonviolent video games on children’s aggression. *Psychology: A Journal of Human Behavior*, *24*, 1–8.

- Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, *79*, 701–721.
- Green, M., Brock, T., & Kaufman, G. (2004). Understanding media enjoyment: The role of transportation into narrative worlds. *Communication Theory*, *14*, 311–327.
- Griffiths, M. D., Davies, M. N. O., & Chappell, D. (2004). Online computer gaming : a comparison of adolescent and adult gamers. *Journal of Adolescence*, *27*, 87–96. Retrieved from <http://doi.org/10.1016/j.adolescence.2003.10.007>
- Hartmann, T., & Klimmt, C. (2006). Gender and computer games: Exploring females' dislikes. *Journal of Computer-Mediated Communication*, *11*, 910–931. Retrieved from <http://doi.org/10.1111/j.1083-6101.2006.00301.x>
- Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York, NY: Guilford Press.
- Hoefl, F., Watson, C. L., Kesler, S. R., Bettinger, K. E., & Reiss, A. L. (2008). Gender differences in the mesocorticolimbic system during computer game-play. *Journal of Psychiatric Research*, *42*, 253–258. Retrieved from <http://doi.org/10.1016/j.jpsychires.2007.11.010>
- Hoffner, C. A., & Levine, K. J. (2005). Enjoyment of mediated fright and violence: A meta-analysis. *Media Psychology*, *7*, 207–237. Retrieved from [http://doi.org/10.1207/S1532785XMEP0702\\_5](http://doi.org/10.1207/S1532785XMEP0702_5)
- Jansz, J., & Martens, L. (2005). Gaming at a LAN event: The social context of playing video games. *New Media & Society*, *7*, 333–355. Retrieved from <http://doi.org/10.1177/1461444805052280>
- Jegers, K. (2007). Pervasive game flow: Understanding player enjoyment in pervasive gaming. *Computers in Entertainment*, *5*, 9–17.
- Jennett, C., Cox, A. L., Cairns, P., Dhoparee, S., Epps, A., Tijs, T., & Walton, A. (2008). Measuring and defining the experience of immersion in games. *International Journal of Human-Computer Studies*, *66*, 641–661.
- John, O. P., & Srivastava, S. (1999). *The big five trait taxonomy: History, measurement, and theoretical perspectives*. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York, NY: Guilford Press.
- Jorm, A., Christensen, H., Henderson, A., Jacomb, P., Korten, A., & Rodgers, B. (1999). Using the BIS/BAS scales to measure behavioural inhibition and behavioural activation: Factor structure, validity and norms in a large community sample. *Personality and Individual Differences*, *26*, 49–58.
- Jung, C. G. (1960). Good and evil in analytical psychology. *Journal of Analytical Psychology*, *5*, 91–100.

- Kätsyri, J., Hari, R., Ravaja, N., & Nummenmaa, L. (2013). Just watching the game ain't enough: striatal fMRI reward responses to successes and failures in a video game during active and vicarious playing. *Frontiers in Human Neuroscience*, 7, 278. Retrieved from <http://doi.org/10.3389/fnhum.2013.00278>
- Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *Public Opinion Quarterly*, 37, 509–523.
- King, D., Delfabbro, P., & Griffiths, M. (2009). Video game structural characteristics: A new psychological taxonomy. *International Journal of Mental Health and Addiction*, 8, 90–106.
- Klein, A., De Cock, R., Rosas, O., Vangeel, J., Minotte, P., & Meerkerk, G.-J. (2014). *Compulsive computer use and knowledge needs in Belgium: A multimethod approach*. Ghent, Belgium: Academia Press.
- Koepp, M. J., Gunn, R. N., Lawrence, a D., Cunningham, V. J., Dagher, A., Jones, T.,...Grasby, P. M. (1998). Evidence for striatal dopamine release during a video game. *Nature*, 393, 266–268.
- Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication*, 50, 46–70. Retrieved from <http://doi.org/10.1111/j.1460-2466.2000.tb02833.x>
- Lang, A., Sanders-Jackson, A., Wang, Z., & Rubenking, B. (2013). Motivated message processing: How motivational activation influences resource allocation, encoding, and storage of TV messages. *Motivation and Emotion*, 37, 508–517.
- Lee, D., & LaRose, R. (2007). A socio-cognitive model of video game usage. *Journal of Broadcasting & Electronic Media*, 51, 632–651.
- Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication*, 3. Retrieved from <http://doi.org/10.1111/j.1083-6101.1997.tb00072.x>
- Loxton, N. J., & Dawe, S. (2001). Alcohol abuse and dysfunctional eating in adolescent girls: the influence of individual differences in sensitivity to reward and punishment. *International Journal of Eating Disorders*, 29, 455–462. Retrieved from <http://doi.org/10.1002/eat.1042>
- Lucas, K., & Sherry, J. L. (2004). Sex Differences in Video Game Play : A communication-based explanation. *Communication Research*, 31, 499–523. Retrieved from <http://doi.org/10.1177/0093650204267930>
- Mathiak, K., Klasen, M., Weber, R., Ackermann, H., Shergill, S. S., & Mathiak, K. (2011). Reward system and temporal pole contributions to affective evaluation during a first person shooter video game. *BMC Neuroscience*, 12, 66.



- McQuail, D. (2000). *McQuail's Mass communication theory* (Vol. 4). Thousand Oaks, CA: Sage.
- Muris, P., Meesters, C., de Kanter, E., & Timmerman, P. E. (2005). Behavioural inhibition and behavioural activation system scales for children: Relationships with Eysenck's personality traits and psychopathological symptoms. *Personality and Individual Differences, 38*, 831–841. Retrieved from <http://doi.org/10.1016/j.paid.2004.06.007>
- Muris, P., Merckelbach, H., Schmidt, H., Gadet, B., & Bogie, N. (2001). Anxiety and depression as correlates of self-reported behavioural inhibition in normal adolescents. *Behaviour Research and Therapy, 39*(9), 1051–1061. doi:10.1016/S0005-7967(00)00081-4
- Murray, C. D., Fox, J., & Pettifer, S. (2007). Absorption, dissociation, locus of control and presence in virtual reality. *Computers in Human Behavior, 23*, 1347–1354. Retrieved from <http://doi.org/10.1016/j.chb.2004.12.010>
- Nacke, L., & Lindley, C. (2008). *Flow and immersion in first-person shooters: measuring the player's gameplay experience*. Paper presented at the FuturePlay 2008 Academic Games Conference, Toronto, Ontario, Canada, November 3–5, 2008.
- Nakamura, J., & Csikszentmihalyi, M. (2002). *The concept of flow*. In C. R. Snyder & S. J. Lopez (Eds.), *The handbook of positive psychology* (pp. 89–105). Oxford, UK: Oxford University Press.
- Novak, T. P., Hoffman, D. L., & Yung, Y.-F. (2000). Measuring the customer experience in online environments: A structural modeling approach. *Marketing Science, 19*, 22–42.
- Orchard, L. J., & Fullwood, C. (2009). Current perspectives on personality and internet use. *Social Science Computer Review, 28*, 155–169. Retrieved from <http://doi.org/10.1177/0894439309335115>
- Park, S. M., Park, Y. A., Lee, H. W., Jung, H. Y., Lee, J. Y., & Choi, J. S. (2013). The effects of behavioral inhibition/approach system as predictors of Internet addiction in adolescents. *Personality and Individual Differences, 54*, 7–11. Retrieved from <http://doi.org/10.1016/j.paid.2012.07.033>
- Persky, S., & Blascovich, J. (2007). Immersive virtual environments versus traditional platforms: Effects of violent and nonviolent video game play. *Media Psychology, 10*, 135–156. Retrieved from <http://doi.org/10.108/15213260701301236>
- Pickering, A. D., & Gray, J. A. (1999). *The neuroscience of personality*. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 277–299). New York, NY: Guilford Press.
- Pickering, A. D., & Smillie, L. D. (2008). *The behavioral activation system: challenges and opportunities*. In P. J. Corr (Ed.), *The reinforcement sensitivity theory of personality* (pp. 120–154).

- Cambridge, UK: Cambridge University Press. Retrieved from <http://doi.org/10.1017/CBO9780511819384>
- Potter, R. F., Lee, S., & Rubenking, B. E. (2011). Correlating a motivation-activation measure with media preference. *Journal of Broadcasting & Electronic Media*, 55, 400–418. Retrieved from <http://doi.org/10.1080/08838151.2011.597468>
- Potts, G. F., George, M. R. M., Martin, L. E., & Barratt, E. S. (2006). Reduced punishment sensitivity in neural systems of behavior monitoring in impulsive individuals. *Neuroscience Letters*, 397, 130–134.
- Procci, K., James, N., & Bowers, C. (2013). The effects of gender, age, and experience on game engagement. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 57, 2132–2136.
- Ravaja, N., Salminen, M., Holopainen, J., Saari, T., Laarni, J., & Järvinen, A. (2004). *Emotional response patterns and sense of presence during video games: Potential criterion variables for game design*. Proceedings of the Third Nordic Conference on Human-Computer Interaction, October 23–27 (pp. 339–347). Retrieved from <http://doi.org/10.1145/1028014.1028068>
- Reuter, J., Raedler, T., Rose, M., Hand, I., Gläscher, J., & Büchel, C. (2005). Pathological gambling is linked to reduced activation of the mesolimbic reward system. *Nature Neuroscience*, 8, 147–148.
- Revelle, W. (2008). *The contribution of reinforcement sensitivity theory to personality theory*. In P. J. Corr (Ed.), *The reinforcement sensitivity theory of personality* (pp. 508–527). Cambridge, UK: Cambridge University Press.
- Roberts, C., Currie, C., Samdal, O., Currie, D., Smith, R., & Maes, L. (2007). Measuring the health and health behaviours of adolescents through cross-national survey research: Recent developments in the health behaviour in school-aged children (HBSC) study. *Journal of Public Health*, 15, 179–186. Retrieved from <http://doi.org/10.1007/s10389-007-0100-x>
- Rosengren, K. E. (1974). *Uses and gratifications: A paradigm outline*. In J. G. Blumler & E. Katz (Eds.), *The uses of mass communications: Current perspectives on gratifications research* (Vol. III, pp. 269–286). Beverley Hills, CA: Sage publications.
- Seger, J., & Potts, R. (2012). Personality correlates of psychological flow states in videogame play. *Current Psychology*, 31, 103–121. Retrieved from <http://doi.org/10.1007/s12144-012-9134-5>
- Sherry, J. (2001). The effects of violent video games on aggression. *Human Communication Research*, 27, 409–431. Retrieved from <http://doi.org/10.1111/j.1468-2958.2001.tb00787.x>

- Slater, M. D. (2003). Alienation, aggression, and sensation seeking as predictors of adolescent use of violent film, computer, and website content. *Journal of Communication, 53*, 105–121.
- Smillie, L., Pickering, A., & Jackson, C. (2006). The new reinforcement sensitivity theory: Implications for personality measurement. *Personality and Social Psychology Review, 10*, 320–335. Retrieved from <http://doi.org/10.1207/s15327957pspr1004>
- Tanis, M., & Jansz, J. (2008). *Gaming for different reasons: What motivates people to play a specific video game?* Paper presented at the annual meeting of the International Communication Association, TBA, Montreal, Quebec, Canada, May 21, 2008.
- Teng, C.-I. (2008). Personality differences between online game players and nonplayers in a student sample. *CyberPsychology & Behavior, 11*, 232–4. Retrieved from <http://doi.org/10.1089/cpb.2007.0064>
- Thompson, D., Baranowski, T., Buday, R., Baranowski, J., Thompson, V., Jago, R., & Griffith, M. J. (2010). Serious video games for health how behavioral science guided the development of a serious video game. *Simulation & Gaming, 41*, 587–606.
- Valkenburg, P. M., & Peter, J. (2013). The differential susceptibility to media effects model. *Journal of Communication, 63*(2), 221–243. doi:10.1111/jcom.12024
- Vervoort, L., Verbeken, S., Vandeweghe, L., De Decker, A., Vangeel, J., De Cock, N.,...Van Lippevelde, W. (2014). An innovative approach to the study and promotion of healthy food choices in infants, children and adolescents: The REWARD-project's conceptual framework and design. Manuscript in preparation.
- Vervoort, L., Wolters, L. H., Hogendoorn, S. M., de Haan, E., Boer, F., & Prins, P. J. M. (2010). Sensitivity of Gray's behavioral inhibition system in clinically anxious and non-anxious children and adolescents. *Personality and Individual Differences, 48*, 629–633. Retrieved from <http://doi.org/10.1016/j.paid.2009.12.021>
- Voigt, D. C., Dillard, J. P., Braddock, K. H., Anderson, J. W., Sopory, P., & Stephenson, M. T. (2009). Carver and White's BIS/BAS scales and their relationship to risky health behaviours. *Personality and Individual Differences, 47*(2), 89–93. doi:10.1016/j.paid.2009.02.003
- Vorderer, P., & Bryant, J. (2006). *Playing video games: Motives, responses, and consequences*. Mahwah, NJ: Erlbaum. Retrieved from <http://doi.org/10.1139/h2012-043>
- Wang, G. J., Volkow, N. D., Logan, J., Pappas, N. R., Wong, C. T., Zhu, W.,...Fowler, J. S. (2001). Brain dopamine and obesity. *Lancet, 357*, 354–357.
- Webster, J., Trevino, L. K., & Ryan, L. (1993). The dimensionality and correlates of flow in human-computer interactions. *Computers in Human Behavior, 9*, 411–426.

- Weibel, D., Wissmath, B., Habegger, S., Steiner, Y., & Groner, R. (2008). Playing online games against computer- vs. human-controlled opponents: Effects on presence, flow, and enjoyment. *Computers in Human Behavior, 24*, 2274–2291.
- Weibel, D., Wissmath, B., & Mast, F. (2010). Immersion in mediated environments: The role of personality traits. *Cyberpsychology, Behavior and Social Networking, 13*, 251–256.
- Wilt, J., Condon, D. M., Brown-Riddell, A., & Revelle, W. (2012). Fundamental questions in personality. *European Journal of Personality, 26*, 629–631. Retrieved from <http://doi.org/10.1002/per.1905>
- Wirth, W., Hartmann, T., Böcking, S., Vorderer, P., Klimmt, C., Schramm, H.,...Jäncke, P. (2007). A Process Model of the Formation of Spatial Presence Experiences. *Media Psychology, 9*, 493–525.
- Yen, J. Y., Cheng-Fang, Y., Chen, C. S., Chang, Y. H., Yeh, Y. C., & Ko, C. H. (2012). The bidirectional interactions between addiction, behaviour approach and behaviour inhibition systems among adolescents in a prospective study. *Psychiatry Research, 200*, 588–592.

## PART 2

# Exploring BIS and BAS as moderators of media effects

## CHAPTER 3: A Reinforcement Sensitivity Perspective on Adolescents' Susceptibility to the Influence of Soap Opera Viewing on Alcohol Attitudes<sup>2</sup>

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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 toward alcohol use. Moderation analyses indicated that BAS did not moderate this relationship, while BIS did; the relationship between soap opera viewing and positive attitudes toward alcohol was only significant for adolescents with a low BIS-profile. These results provide support for the premise that an elevated BIS protects adolescents from the effect of soap opera viewing frequency on their alcohol attitudes.*

### INTRODUCTION

Adolescence is often characterized by an increase in experimentation behaviors 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, 2013), adolescents still drink their first glass of alcohol on average around the age of 14, which is 2 years before the legal drinking age (VAD, 2014). Over the years, research has attempted to identify the predictors of alcohol use and 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 television (e.g., Diener, 1993; Verma, Adams, & White, 2007). As a response, a substantial body of research has focused on whether and to what 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

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<sup>2</sup> Based on Vangeel, J., Beullens, K., De Cock, N., Van Lippevelde, W., Goossens, L., Vervoort, L., Eggermont, S. (2016). A reinforcement sensitivity perspective on adolescents' susceptibility to the influence of soap opera viewing on alcohol attitudes. *Mass Communication & Society*, 19, 452-475. doi: 10.1080/15205436.2015.1111388

(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 & Rekke, 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 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 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). An increasing number of studies have 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 is proposed in Gray's (1970) reinforcement sensitivity theory (RST), can help clarify 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: behavioral activation (BAS), an approach or appetitive system, and behavioral inhibition (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 scan the environment for possible rewarding stimuli (Corr, 2008b). The functioning of BAS is believed to be related to personality differences especially with regard to an individual's

sensitivity to rewards (Corr, 2004). The functioning of this system is associated with impulsiveness, a personality trait 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 to avoid negative cues and aversive stimuli (Carver & White, 1994). In addition, 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, whereas low activation of BIS is assumed to be associated with more proneness toward 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 both positive outcomes (e.g., improved mood, relaxation) and negative outcomes (e.g., hangover, sickness), it is assumed that both BAS and BIS might play a role in explaining an individual's attitude toward alcohol use (Wardell, Read, & Colder, 2013). Individuals with a highly active BAS are by definition sensitive to rewarding cues and have an inclination toward 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 scale. 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), whereas others found a positive or 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 toward 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 individuals' beliefs (Fishbein & Ajzen, 2010). An application of Bandura's (1986) social cognitive theory of 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 modeling in particular. Symbolic modeling is a form of observational learning that occurs through the observation of a real or fictional character in books, television programs, and so on (Bandura, 2001). In addition, 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, modeling 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, Ingle, Gunter, & McClelland, 1997; van Hoof et al., 2009; Verma et al., 2007). Alcohol use in soap 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, whereas 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 affects individuals' real-life behavior. Elson and Ferguson (2014), for instance, claimed that media effects research using social cognitive theory 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 vs. watching parents drink). In addition, 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 started to examine the biological basis of communication by means of a trait perspective. Following neuropsychological 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 effects research, therefore, can add to a better comprehension of the systems underlying both the intended and

unintended effects of media messages (Lang, 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 (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, the main aim of which is to promote survival either through approach or aversive behavior, increasing the attention and memory for these cues (Lang, 2006a; Lang & Yegiyan, 2011). As 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 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 potential 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 of a possible negative cue might be sufficient for the occurrence of aversive, avoidance behavior based on the retrieval of previously stored information (Lang, 2006a; Lang & Yegiyan, 2011).

In sum, the LC4MP states that the appetitive and aversive systems are important mechanisms in 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 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 focusing on 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 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, 2016; Koordeman et al., 2012).

Social cognitive theory emphasizes the role of reward and punishment in explaining why some behavior is more likely to be modelled, and the LC4MP describes 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 an 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 toward risky driving and showed that BIS but not BAS was a moderator of this association. More specifically, the relationship existed only 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 previously indicated, social cognitive theory (Bandura, 1986, 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). In addition, 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 toward alcohol use given their heightened responsiveness toward 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:

Hypothesis 1: BAS is a moderator of the association between soap opera viewing and attitudes toward 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, 2000; Lang & Yeghyan, 2011), 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 toward risk assessment (Gray & McNaughton, 2003; Lang & Yeghyan, 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 toward the susceptibility to the effect of the media on attitudes toward risk behavior (Voigt et al., 2009). The aversive system can also anticipate 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.

Hypothesis 2: BIS is a moderator of the association between soap opera viewing and attitudes toward 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 Belgian adolescents ( $M = 14.96$  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 times during the completion of the questionnaire to answer questions if needed. Confidentiality was assured both in the questionnaire and orally before and after the completion of the survey. Participants were informed that they could stop their participation at any time without any justification.

### **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 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 are 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 (seven items,  $\alpha = .73$ ,  $M = 17.92$ ,  $SD = 3.99$ ) 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 toward 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 toward alcohol use. Cronbach's alpha showed that the factor had a good internal consistency ( $\alpha = .71$ ,  $M = 7.42$ ,  $SD = 2.28$ ). The two items were summed, with higher scores indicating more positive attitudes toward 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), and 6 (almost every day) ( $M = 3.69$ ,  $SD = 2.54$ ). 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 consume more alcoholic beverages (World Health Organization, 2014) and that men have more favorable attitudes toward alcohol consumption compared to women. 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 with alcohol and that age has been shown to be positively related to 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 to 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). To ensure that the hypothesized link between soap opera viewing and attitudes toward alcohol use can be attributed to this specific genre only 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 time line 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 used frequently 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 toward alcohol use were entered as the dependent construct in a 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's (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 the non-normality were handled by the bootstrapping method used in the analyses (Field, 2009). In addition, the sample size of the current study is large, and therefore the validity of the linear regression analyses should not be affected non-normally distributed scores.

## RESULTS

### *Descriptive Analyses*

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

**Table 1.** Descriptives and zero-order correlations

	1	2	3	4	5	6	7	8
1. Gender	-							
2. Age	-.05	-						$M=14.96, SD=.85, Range=6$
3. Going out behavior	-.71*	.29**	-					$M=1.45, SD=1.26, Range=6$
4. Total TV Viewing	-.18	.06	-.03	-				$M=1469.83, SD=828.93, Range=4530$
5. Soap Opera Viewing	.28**	-.09**	.01	.11**	-			$M=3.69, SD=2.54, Range=6$
6. BAS	-.02	.01	.18	.08*	.01	-		$M=32.60, SD=.668, Range=39$
7. BIS	.35**	-.03	-.08*	.01	.15**	.17**	-	$M=17.92, SD=3.99, Range=21$
8. Attitude Alcohol	-.03	-.02	.23**	-.02	.17**	.15**	.05	$M=7.42, SD=2.28, Range=12$

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### *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 toward alcohol use compared to boys ( $\beta = -.08, p < .05$ ). Age is negatively associated with alcohol attitudes, indicating more positive alcohol attitudes among younger adolescents ( $\beta = -.09, p < .05$ ), whereas 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 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 toward 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:** Hierarchical regression model for alcohol attitudes

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

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

**Table 3:** Regression model predicting alcohol attitudes and the moderating role of BIS

	<i>Coeff</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
					<i>LL</i>	<i>UL</i>
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.

### **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's PROCESS Macro for SPSS. The results showed no support for a moderating role of BAS in the association between soap opera viewing and attitudes toward 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 toward 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, H1 could not be supported.

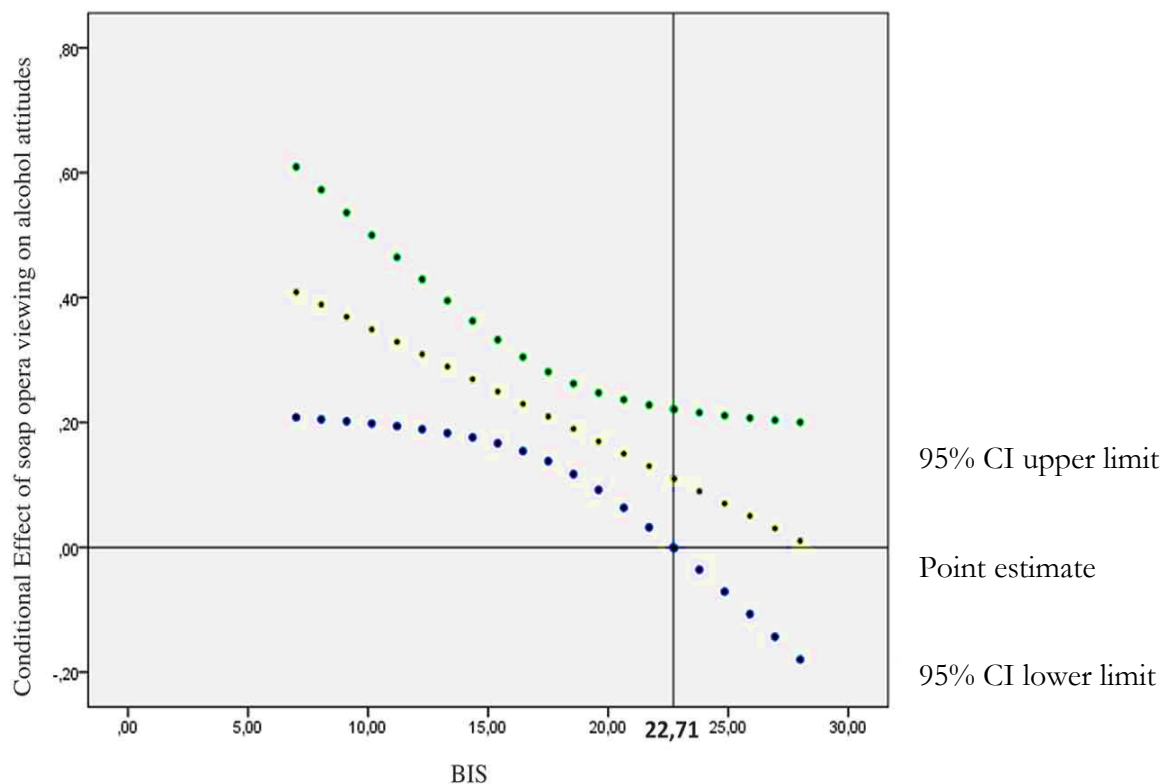
### ***BIS as a Moderator***

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 (see Table 3) was estimated for the BIS construct by integrating it as a moderator in PROCESS Model 1 to examine if the relationship 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 H2. 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. =  $.04$ ,  $SE = .01$ ,  $t = -2.62$ ,  $p < .01$ ) and soap opera viewing (coeff. =  $.54$ ,  $SE = .16$ ,  $t = -3.36$ ,  $p < .001$ ) are significantly associated with adolescents' attitudes toward alcohol use.

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, whereas this association gets weaker when BIS increases. In addition, 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 analyses indicated a significant relationship between soap opera viewing and attitudes toward alcohol 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 of 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:** The conditional effect of soap opera viewing on adolescents' alcohol attitudes as a function of behavioral inhibition



## DISCUSSION

Over the years, 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 focused mainly 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. BAS and BIS were hypothesized to act as moderators of that relationship following the LC4MP in which the role of these types of systems in the way information is processed is described. Both BAS and BIS have been extensively linked 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 & Muris, 2006; O'Connor et al., 2009), whereas 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) 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 nonmedia moderators (e.g., personality) in media effects research was extensively advocated in the differential susceptibility to media effects model (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. In addition, the LC4MP (Lang, 2006b) emphasized the role of an appetitive and aversive system in the way mediated information is processed. Following these models that stress 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 generally showed that alcohol is mostly depicted in a positive context, whereas less attention is paid to the possible negative consequences of alcohol use (e.g., Furnham et al., 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 toward alcohol use compared to less frequent soap viewers. It was surprising, however, that total television viewing was not at all associated with attitudes toward alcohol use. Several content analyses have shown that alcohol use is often portrayed 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 toward 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, whereas 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, whereas 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.

In addition, 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, 2006b; Lang & Yeghyan, 2011). 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 from 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 the 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 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, 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 to 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 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 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 measured only 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 toward risk behavior, whereas 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.

## REFERENCES

- Ajzen, I. (1988). *Attitudes, personality and behavior. Mapping social psychology*. Berkshire, UK: Open University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211.
- Aluja-Fabregat, A., & Torrubia-Beltri, R. (1998). Viewing of mass media violence, perception of violence, personality and academic achievement. *Personality and Individual Differences*, *25*, 973–989. doi:10.1016/S0191-8869(98)00122-6
- Anderson, P., de Bruijn, A., Angus, K., Gordon, R., & Hastings, G. (2009). Impact of alcohol advertising and media exposure on adolescent alcohol use: A systematic review of longitudinal studies. *Alcohol and Alcoholism*, *44*, 229–243. doi:10.1093/alcalc/agn115
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *The American Psychologist*, *55*, 469–480. doi:10.1037/0003-066X.55.5.469
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. In Prentice Hall series in social learning theory. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology*, *3*, 265–299. doi:10.1207/S1532785XMEP0303\_03
- Beullens, K., Rhodes, N., & Eggermont, S. (2016). Behavioral activation and inhibition as moderators of the relationship between music video-viewing and joyriding attitudes. *Media Psychology*, *19*(2), 181–202. doi:10.1080/15213269.2014.950756
- Beyens, I., & Eggermont, S. (2014). Putting young children in front of the television: Antecedents and outcomes of parents' use of television as a babysitter. *Communication Quarterly*, *62*, 57–74. doi:10.1080/01463373.2013.860904
- Bijttebier, P., Beck, I., Claes, L., & Vandereycken, W. (2009). Gray's reinforcement sensitivity theory as a framework for research on personality-psychopathology associations. *Clinical Psychology Review*, *29*, 421–430. doi:10.1016/j.cpr.2009.04.002
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology*, *67*, 319–333. doi:10.1037/0022-3514.67.2.319
- Corr, P. J. (2002). J. A. Gray's reinforcement sensitivity theory: Tests of the joint subsystems hypothesis of anxiety and impulsivity. *Personality and Individual Differences*, *33*, 511–532. doi:10.1016/S0191-8869(01)00170-2
- Corr, P. J. (2004). Reinforcement sensitivity theory and personality. *Neuroscience & Biobehavioral Reviews*, *28*, 317–332.



- Corr, P. J. (2008a). *The Reinforcement Sensitivity Theory (RST): Introduction*. In *The reinforcement sensitivity theory of personality* (pp. 1–43). Cambridge, UK: Cambridge University Press.
- Corr, P. J. (2008b). *The reinforcement sensitivity theory of personality*. Cambridge, UK: Cambridge University Press.
- Diener, B. (1993). The frequency and context of alcohol and tobacco cues in daytime soap opera programs: Fall 1986 and fall 1991. *Journal of Public Policy & Marketing*, *12*, 252–257. Retrieved from <http://www.jstor.org/stable/30000095>
- Eggermont, S. (2005). Young adolescents' perceptions of peer sexual behaviours: The role of television viewing. *Child: Care, Health and Development*, *31*, 459–468. doi:/10.1111/j.1365-2214.2005.00525.x
- Elson, M., & Ferguson, C. J. (2014). Does doing media violence research make one aggressive? The ideological rigidity of social cognitive theories of media violence and response to Bushman and Huesmann (2013), Krahé (2013), and Warburton (2013). *European Psychologist*, *19*(1), 68–75. doi:10.1027/1016-9040/a000185
- Engels, R. C. M. E., Hermans, R., van Baaren, R. B., Hollenstein, T., & Bot, S. M. (2009). Alcohol portrayal on television affects actual drinking behaviour. *Alcohol and Alcoholism*, *44*, 244–249. doi:10.1093/alcalc/aggp003
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Los Angeles, CA: Sage.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behaviour: The reasoned action approach*. New York, NY: Psychology Press.
- Franken, I. (2002). Behavioral approach system (BAS) sensitivity predicts alcohol craving. *Personality and Individual Differences*, *32*, 349–355. doi:10.1016/S0191-8869(01)00030-7
- Franken, I., & Muris, P. (2006). BIS/BAS personality characteristics and college students' substance use. *Personality and Individual Differences*, *40*, 1497–1503. doi:10.1016/j.paid.2005.12.005
- Furnham, A., Ingle, H., Gunter, B., & McClelland, A. (1997). A content analysis of alcohol portrayal and drinking in British television soap operas. *Health Education Research*, *12*, 519–529. doi:10.1093/her/12.4.519
- Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy*, *8*, 249–266. doi:10.1016/0005-7967(70)90069-0
- Gray, J. A., & McNaughton, N. (2003). *The neuropsychology of anxiety: An enquiry into the function of the septo-hippocampal system*. New York, NY: Oxford University Press.

- Hanewinkel, R., Sargent, J. D., Poelen, E., Scholte, R., Florek, E., Sweeting, H. ... Morgenstern, M. (2012). Alcohol consumption in movies and adolescent binge drinking in 6 European countries. *Pediatrics*, *129*, 709–720. doi:10.1542/peds.2011-2809
- Hanewinkel, R., Tanski, S. E., & Sargent, J. D. (2007). Exposure to alcohol use in motion pictures and teen drinking in Germany. *International Journal of Epidemiology*, *36*, 1068–1077. doi:10.1093/ije/dym128
- Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York, NY: Guilford Press.
- Hayes, A., & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods*, *41*, 924–936. doi:10.3758/BRM.41.3.924
- Heubeck, B. G., Wilkinson, R. B., & Cologon, J. (1998). A second look at Carver and White's (1994) BIS/BAS scales. *Personality and Individual Differences*, *25*, 785–800. doi:10.1016/S0191-8869(98)00124-X
- Kingsbury, A., Coplan, R. J., Weeks, M., & Rose-Krasnor, L. (2013). Covering all the BAS's: A closer look at the links between BIS, BAS, and socio-emotional functioning in childhood. *Personality and Individual Differences*, *55*, 521–526.
- Koordeman, R., Anschutz, D. J., & Engels, R. C. M. E. (2012). Alcohol portrayals in movies, music videos and soap operas and alcohol use of young people: Current status and future challenges. *Alcohol and Alcoholism*, *47*, 612–623. doi:10.1093/alcalc/ags073
- Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication*, *50*, 46–70. doi:10.1111/j.1460-2466.2000.tb02833.x
- Lang, A. (2006a). *Motivated cognition (LC4MP): The influence of appetitive and aversive activation on the processing of video games*. In P. Messaris & L. Humphreys (Eds.), *Digital media: Transformation in human communication* (pp. 237–256). New York, NY: Peter Lang.
- Lang, A. (2006b). Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages. *Journal of Communication*, *56*, S57–S80. doi:10.1111/j.1460-2466.2006.00283.x
- Lang, A., & Ewoldsen, D. (2010). *Beyond effects: Conceptualizing communication as dynamic, complex, nonlinear, and fundamental*. In S. Allan (Ed.), *Rethinking communication: Keywords in communication research* (pp. 109–120). New York, NY: Hampton Press.
- Lang, A., & Yeghyan, N. (2011). Individual differences in motivational activation influence responses to pictures of taboo products. *Journal of Health Communication*, *16*, 1072–1087. doi:10.1080/10810730.2011.571336

- Loxton, N. J., & Dawe, S. (2001). Alcohol abuse and dysfunctional eating in adolescent girls: The influence of individual differences in sensitivity to reward and punishment. *The International Journal of Eating Disorders*, *29*, 455–462. doi:10.1002/eat.1042
- McGee, R., Ketchel, J., & Reeder, A. (2007). Alcohol imagery on New Zealand television. *Substance Abuse Treatment, Prevention and Policy*, *5*, 1–5. doi:10.1186/1747-597X-2-6
- Melis, S., Bernaert, I., Rosiers, J., & Geirnaert, M. (2013). *VAD-leerlingenbevraging in het kader van een drugbeleid op school*. Brussels, Belgium: VAD. Available from [http://www.vad.be/media/844525/syntheserapport\\_llb\\_vad\\_2011-2012.pdf](http://www.vad.be/media/844525/syntheserapport_llb_vad_2011-2012.pdf)
- Muris, P., Meesters, C., de Kanter, E., & Timmerman, P. E. (2005). Behavioural inhibition and behavioural activation system scales for children: Relationships with Eysenck's personality traits and psychopathological symptoms. *Personality and Individual Differences*, *38*, 831–841. doi:10.1016/j.paid.2004.06.007
- O'Connor, R. M., & Colder, C. R. (2005). Predicting alcohol patterns in first-year college students through motivational systems and reasons for drinking. *Psychology of Addictive Behaviors: Journal of the Society of Psychologists in Addictive Behaviors*, *19*, 10–20. doi:10.1037/0893-164X.19.1.10
- O'Connor, R. M., Stewart, S. H., & Watt, M. C. (2009). Distinguishing BAS risk for university students' drinking, smoking, and gambling behaviors. *Personality and Individual Differences*, *46*, 514–519. doi:10.1016/j.paid.2008.12.002
- Pardo, Y., Aguilar, R., Molinuevo, B., & Torrubia, R. (2007). Alcohol use as a behavioural sign of disinhibition: Evidence from J.A. Gray's model of personality. *Addictive Behaviors*, *32*, 2398–2403. doi:10.1016/j.addbeh.2007.02.010
- Potter, R. F., Lee, S., & Rubenking, B. E. (2011). Correlating a motivation-activation measure with media preference. *Journal of Broadcasting & Electronic Media*, *55*, 400–418. doi:10.1080/08838151.2011.597468
- Rosiers, J. (2013). *Partijwise. Kwantitatief onderzoek naar trends in druggebruik in het uitgaansleven-2012*. Brussels, Belgium: VAD.
- Sherry, J. L. (2004). Media effects theory and the nature/nurture debate: A historical overview and implications for future research. *Media Psychology*, *6*, 83–109.
- Spoth, R., Greenberg, M., & Turrissi, R. (2008). Preventive interventions addressing underage drinking: State of the evidence and steps toward public health impact. *Pediatrics*, *121*, S311–S336. doi:10.1542/peds.2007-2243E

- Swahn, M. H., Simon, T. R., Hammig, B. J., & Guerrero, J. L. (2004). Alcohol-consumption behaviors and risk for physical fighting and injuries among adolescent drinkers. *Addictive Behaviors, 29*, 959–963. doi:10.1016/j.addbeh.2004.02.043
- Tanski, S., Cin, S. D., Stoolmiller, M., & Sargent, J. D. (2010). Parental R-rated movie restriction and early-onset alcohol use. *Journal of Studies on Alcohol and Drugs, 71*, 452–459.
- Thomsen, S. R., & Rekve, D. (2006). The relationship between viewing US-produced television programs and intentions to drink alcohol among a group of Norwegian adolescents. *Scandinavian Journal of Psychology, 47*, 33–41.
- VAD. (2014). *Factsheet alcohol*. Brussels, Belgium. Retrieved from [http://www.vad.be/media/782427/vad\\_factsheet\\_alcohol\\_april\\_2014.pdf](http://www.vad.be/media/782427/vad_factsheet_alcohol_april_2014.pdf)
- Valkenburg, P. M., & Peter, J. (2013). The differential susceptibility to media effects model. *Journal of Communication, 63*, 221–243. doi:10.1111/jcom.12024
- Vandenbosch, L., & Eggermont, S. (2011). Temptation Island, The Bachelor, Joe Millionaire: A prospective cohort study on the role of romantically themed reality television in adolescents' sexual development. *Journal of Broadcasting & Electronic Media, 55*, 563–580. doi:10.1080/08838151.2011.620663
- Van den Bulck, J., & Beullens, K. (2005). Television and music video exposure and adolescent alcohol use while going out. *Alcohol and Alcoholism, 40*, 249–253. doi:10.1093/alcalc/agh139
- van Hoof, J. J., de Jong, M. D. T., Fennis, B. M., & Gosselt, J. F. (2009). There's alcohol in my soap: Portrayal and effects of alcohol use in a popular television series. *Health Education Research, 24*, 421–429. doi:10.1093/her/cyn037
- Verma, T., Adams, J., & White, M. (2007). Portrayal of health-related behaviours in popular UK television soap operas. *Journal of Epidemiology & Community Health, 61*, 575–577. doi:10.1136/jech.2006.050757
- Vervoort, L., Wolters, L. H., Hogendoorn, S. M., De Haan, E., Boer, F., & Prins, P. J. M. (2010). Sensitivity of Gray's behavioral inhibition system in clinically anxious and non-anxious children and adolescents. *Personality and Individual Differences, 48*, 629–633. doi:10.1016/j.paid.2009.12.021
- Voigt, D. C., Dillard, J. P., Braddock, K. H., Anderson, J. W., Sopory, P., & Stephenson, M. T. (2009). Carver and White's (1994) BIS/BAS scales and their relationship to risky health behaviours. *Personality and Individual Differences, 47*, 89–93. doi:10.1016/j.paid.2009.02.003
- Wakefield, M. A., Loken, B., & Hornik, R. C. (2010). Use of mass media campaigns to change health behaviour. *The Lancet, 376*, 1261–1271. doi:10.1016/S0140-6736(10)60809-4

- Wang, Z., Lang, A., & Busemeyer, J. R. (2011). Motivational processing and choice behavior during television viewing: an integrative dynamic approach. *Journal of Communication, 61*, 71–93. doi:10.1111/j.1460-2466.2010.01527.x
- Wardell, J. D., Read, J. P., & Colder, C. R. (2013). The role of behavioral inhibition and behavioral approach systems in the associations between mood and alcohol consequences in college: A longitudinal multilevel analysis. *Addictive Behaviors, 38*, 2772–2781. doi:10.1016/j.addbeh.2013.07.012
- Windle, M., & Windle, R. (2005). Alcohol consumption and its consequences among adolescents and young adults. *Recent Developments in Alcoholism, 3*(14), 67–83.
- World Health Organization. (2014). *Gender, health and alcohol use*. Geneva, Switzerland: Author. Retrieved from <http://www.who.int/gender/documents/Alcoholfinal.pdf?ua=1>
- Zisseron, R. N., & Palfai, T. P. (2007). Behavioral Activation System (BAS) sensitivity and reactivity to alcohol cues among hazardous drinkers. *Addictive Behaviors, 32*, 2178–2186. doi:10.1016/j.addbeh.2007.02.016

## CHAPTER 4: Exploring game engagement and behavioral activation and inhibition as moderators of the association between game use and unhealthy snack intake<sup>3</sup>

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### ABSTRACT

*Previous research examining the association between screen time and unhealthy snack intake mainly focused on the role of television viewing. Adolescents, however, also spend a significant amount of time on playing games. Research examining game use and snack intake is limited. The present study investigated this association among adolescents and explored the role of game engagement, the behavioral activation (BAS) and inhibition system (BIS) as possible moderators. A cross-sectional survey study was conducted among 1104 adolescents (M=14.7 years, 51% boys) in Flanders (Belgium), representative for gender and education level. The results showed a positive association between game use and unhealthy snacking even after incorporating important control variables (e.g., BIS and BAS). Game engagement moderated this association. Higher engagement scores weakened the association between game play and unhealthy snack intake. BAS and BIS, on the other hand, did not moderate the association.*

### INTRODUCTION

The high prevalence of overweight and obesity is widely acknowledged as a threat to public health (Wang & Lobstein, 2006). Overweight and obesity have been related to a variety of unhealthy lifestyle behaviors such as sedentary behavior (Must & Tybor, 2005), physical inactivity (Kushner & Choi, 2009; Swallen, Reithner, Haas, & Meier, 2005) and unhealthy eating patterns (Berkey et al., 2000). Snacking behavior (i.e., food intake between traditional meals), and unhealthy snacking in particular, plays an important role in the development of overweight and obesity among both children and adolescents (Sebastian, Cleveland, & Goldman, 2008; Serdula et al., 1993). Previous research also showed that snack intake differs between boys and girls, with boys consuming more snacks and soft drinks than girls (De Cock et al., 2015; Wouters, Larsen, Kremers, Dagnelie, & Geenen, 2010).

Energy-dense snacks are often consumed in the absence of hunger and consumption usually depends on social and environmental cues (Fisher & Birch, 2002). An important environmental factor in this respect is involvement in sedentary screen time activities such as television viewing and game use (e.g., Snoek et al., 2006; Temple & Giacomelli, 2007; Van den Bulck & Van Mierlo, 2004). These media activities are assumed to be related to weight gain by

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<sup>3</sup> Based on Vangeel, J., De Cock, N., Van Lippevelde, W., Vervoort, L., Goossens, L., Lachat, C., Huybregts, L., Maes, L., Deforche, B., Van Camp, J., Braet, C., Eggermont, S., & Beullens, K. (submitted). Exploring game engagement and behavioral activation and inhibition as moderators of the association between game use and unhealthy snack intake.

their encouragement of a sedentary lifestyle (Marshall, Biddle, Gorely, Cameron, & Murdey, 2004; Nelson, Neumark-Stzainer, Hannan, Sirard, & Story, 2015) and by the increased energy intake during or as a response to screen time (Epstein, Paluch, Consalvi, Riordan, & Scholl, 2000). In most research focusing on this association screen time is operationalized in terms of habitual television viewing (e.g., Snoek et al., 2006; Temple & Giacomelli, 2007; Van den Bulck & Van Mierlo, 2004). These studies found a link between frequent television viewing and higher overall energy intake (Phillips et al., 2004) and increased consumption of energy-dense foods (Vereecken & Maes, 2006) such as soft drinks, fast food and unhealthy snacks (Börnhorst et al., 2015; Pearson & Biddle, 2011; Van den Bulck & Van Mierlo, 2004). Less attention, however, has been attributed to the potential influence of game use. A limited number of studies, however, did find support for a positive association between game use and Body Mass Index (BMI) (Ballard, Gray, Reilly, & Noggle, 2009), obesity (Stettler, Signer, & Suter, 2004) and unhealthy snack intake (Cessna, Raudenbush, Reed, & Hunker, 2007). Additionally, these studies mainly focused on children and adults, and less on adolescents which is an important target group as snacking habits developed during adolescence often track into adulthood. The current study adds to the existing literature in a number of ways. First, by specifically focusing on the association between game use and unhealthy snacking patterns and thus adding to the limited amount of information that is available on the link between this type of screen time and snacking. Second, this association is examined in an adolescent sample addressing the need for more studies in this important age group. Third, the current study also integrated individual characteristics such as game engagement and reward sensitivity as a possible moderating factors of the link between game use and unhealthy snacking from a differential susceptibility perspective.

### **THE ROLE OF SCREEN TIME IN SNACKING BEHAVIOR**

Two important explanations for the association between media use and snacking behavior have been suggested in the literature that support the assumption that gaming can be an important indicator of unhealthy snack intake besides or in addition to television viewing. First, it has been suggested that individuals might be conditioned to eat during screen time (Falbe et al., 2014) and that the two behaviors, screen time and eating, have thus become paired in such way that the occurrence of one event triggers the need for the other to occur as well (Clark, Pamnani, & Wadden, 2010). A second explanation for the link between screen time and snacking behavior is exposure to food advertisements. Content analyses showed that food ads make up for on average 25% to 35% of all ads on television (Guran et al., 2010; Powell, Szczypka, & Chaloupka, 2007). The majority of the products presented in these food ads were shown to be high in either fat,

sodium or sugar (Powell, Szczypka, Chaloupka, & Braunschweig, 2007). Over the last decade, interactive food and beverage marketing has more and more been incorporated in a game context as well (Montgomery & Chester, 2009). Advertisements have been integrated in games by means of brand placement techniques (Lee & Faber, 2007; Winkler, Dörsing, Rief, Shen, & Glombiewski, 2013). Additionally, food marketers have started to create free online advergames in which their product is promoted (Folkvord, Anschutz, Buijzen, & Valkenburg, 2013; Winkler & Buckner, 2006). Advergames can be defined as “computer games specifically created to function as advertisements to promote brands, where the entertainment content mimics traditional game forms” (Kretchmer, 2005, p. 7). Research examining the effect of these advergames on food intake among children found positive associations with preference for and recognition of the advertised product (Mallinckrodt & Mizerski, 2007; van Reijmersdal, Rozendaal, & Buijzen, 2012) and overall energy intake (Folkvord et al., 2013). Although most research on the topic of screen time and snacking has focused on the role of television viewing, there are thus several reasons for assuming a relationship with gaming as well. It should be noted, however, that television viewing is a handsfree activity compared to non-handsfree game use which makes it easier to snack during television viewing than during gaming (Falbe et al., 2014). Nevertheless, it is possible that game-associated snacking occurs between game sessions or before and/or after gameplay. A previous study already found support for increased food intake after gameplay (Chaput et al., 2011). Therefore, this study substantially adds to the scientific literature on this topic by examining the following hypothesis:

Hypothesis 1: Game use is positively associated with adolescents’ unhealthy snack intake

### **SCREEN TIME AS A DISTRACTOR: THE ROLE OF ENGAGEMENT**

Media have the ability to distract individuals in such a way that they start to eat and even overeat at an unconscious level during screen time (Falbe et al., 2014; Lyons, Tate, & Ward, 2013). Television viewing and game use are assumed to distract viewers from satiety signals of previously consumed foods due to an increase in individuals’ allocated attentional resources toward the media content (Bellissimo, Pencharz, Thomas, & Anderson, 2007; Lyons et al., 2013). This distraction is assumed to increase food intake because people are not or less aware of their state of satiety (Lyons et al., 2013). During media use, people would thus be less capable of accurately estimating their food intake (Moray, Fu, Brill, & Mayoral, 2007). According to Lyons et al. (2013), an important type of distraction is the extent to which someone is engaged in the mediated, digital environment. High levels of engagement are characterized by the psychological feeling of being an actual part of



the digital, alternative world. As a response to this engagement, the actual environment and the stimuli presented in this real-life environment are not or hardly noticed (Brockmyer et al., 2009; Lyons et al., 2013). It is important to notice in this respect that television and games differ in the level of cognitive and physical involvement. Television, on the one hand, can be used just by sitting in the couch and turning on the television screen. Gaming, on the other hand, is more interactive in nature and requires gamers to interact with game features and storylines as well does it offer the opportunity to play together or against others. Additionally, gaming requires some level of physical activity as well given that the game needs to be controlled by using hands or fingers. Television viewers and gamers can thus be assumed to have a different position based on these differences in activity and involvement, which can be hypothesized to have an influence on the effects of each type of medium (Van Mierlo & Van den Bulck, 2004). Research examining the distinct influence of game use on snack intake as well as the integration of game related variables such as game engagement is thus of great importance.

Yet, to the best of our knowledge only one study has taken into account the role of engagement when examining the association between screen time and food intake. Lyons et al., (2013) looked at the direct association between engagement and caloric intake from beverages and unhealthy snacks in an experimental study in a television and game condition, but found no support for the hypothesized positive association between engagement and increased caloric intake. This absence of an association between engagement and snack intake might be explained by the possibility that game engagement acts as a moderator of the association between game use and snack intake rather than a direct predictor of snacking behavior. According to the literature, both television and games have a great distracting potential (Bellissimo et al., 2007; Lyons et al., 2013). Additionally, the extent to which users are prone to get engaged during media use depends from individual to individual (Brockmyer et al., 2009; Jegers, 2007). Therefore, it can be argued that the effect that media use has on food intake depends on the level of engagement that is achieved by the media consumer. More specifically, individuals with high levels of engagement are characterized by their immersion in the virtual world causing them to be rather inattentive for real-life cues (Brockmyer et al., 2009). Both satiety signals and cues eliciting an urge to snack during screen time (e.g., food advertisements) can be regarded as such real-life factors for which individuals with high engagement levels are unaware. Therefore, the present study suggests two possible pathways through which engagement in games might moderate the association between game use and unhealthy snacking. First, individuals can be assumed to be unaware of cues of satiety and in turn have an increased snack intake as a response to game play. Second, high levels of engagement make people inattentive for food advertisements and the need to snack as a

response to screen time and they will, therefore, snack less. Based on these two arguments the current study investigated as the first study game engagement as a moderator of the association between game use and snacking. In order to test the two possible roles (enhancing and protecting) two potential hypotheses (2a and 2b) are proposed:

Hypothesis 2: Game engagement is a moderator of the association between adolescent game use and unhealthy snack intake (a) the association will be stronger for adolescents with high levels of engagement or (b) the association will be weaker for adolescents with high levels of engagement.

## **THE ROLE OF NEUROLOGICAL CHARACTERISTICS**

In addition to environmental factors related to media use, individual characteristics such as reward sensitivity have been found to be important determinants of snack intake as well (Verbeken, Braet, Lammertyn, Goossens, & Moens, 2012). A valuable framework that has been used to examine the association between reward sensitivity and food intake is the reinforcement sensitivity theory (RST) (Gray, 1970; Pickering & Gray, 1999). According to this perspective, variations in the sensitivity of two neuropsychological motivational systems are the foundation of individual differences in behavior, personality and emotion (Corr, 2008; Pickering & Gray, 1999; Wilt, Condon, Brown-Riddell, & Revelle, 2012). The first system is the behavioral approach system (BAS) which is activated by appetitive, rewarding cues. Approach behavior in the direction of rewards is, therefore, driven by the (re)activity of the BAS. Given its responsiveness to rewarding stimuli, this system is often labelled with the personality trait ‘reward sensitivity’ (Harrison, Treasure, & Smillie, 2011; Verbeken et al., 2012). The second system is the behavioral inhibition system (BIS), which is sensitive to negative stimuli that are associated with punishment, anxiety and threat (Gray, 1970). When one of these cues is presented, the BIS is activated and avoidance behavior is conducted. Behavior that is likely to lead to negative consequences will be inhibited in order to avoid the occurrence of negative situations and feelings (Gray, 1970; Pickering & Gray, 1999). Given that the BIS is activated by cues that are perceived as punishing, the system is often labelled as ‘punishment sensitivity’ (Loxton & Dawe, 2001).

There is evidence in adolescents for a positive association between BAS and energy-dense snacks (Davis et al., 2007), sugar-sweetened beverages (De Cock et al., 2015a) and a higher chance of being overweight (Verbeken et al., 2012). Moreover, associations have been found between BIS and eating disorders (Davis, 2013; Harrison et al., 2011). Furthermore, BAS and BIS have been shown to act as important predictors of media use in general as well as of different types of game

use in particular (Potter, Lee, & Rubenking, 2011; Vangeel et al., 2016). BAS has been positively associated with playing both violent and nonviolent games, while BIS was found to be positively related to playing nonviolent game genres (Vangeel et al., 2016). To test whether the initial hypothesized association between game use and unhealthy snacking persists and is nonspurious, it is argued that BAS and BIS need to be integrated in research examining this association. Therefore, the present study examined whether game use remains a predictor of unhealthy snack intake when taking BAS and BIS into account as control variables.

Furthermore, the current study looked into a second role that might be applicable to BAS and BIS given that they can also be hypothesized to act as moderators of the association between game use and unhealthy snacking. Investigating the role of individual characteristics such as personality traits in media effects research is considered to be of great importance. Especially, research on the role of moderators of media effects is needed in order to gain more insight into which people are more or less susceptible than others for the influence of media use (Valkenburg & Peter, 2013).

Adolescents with higher BAS scores are theorized to have a higher responsiveness toward rewarding stimuli, while those with lower BAS scores respond less to cues related to rewards (Corr, 2008). Therefore, individuals with high BAS scores are less attentive for the long-term consequences of engaging in a certain behavior (Corr, 2008). Previous research indicated that exposure to foods ads is an important explanation for the link between media use and unhealthy snacking behavior (e.g., Folkvord et al., 2013; Powell, Szczypka, & Chaloupka, 2010). It can be argued that individuals with high BAS levels will be more likely to snack as a response to exposure to these ads due to their responsiveness to rewarding cues of which energy-dense snacks are an example (Epstein, Dearing, Temple, & Cavanaugh, 2008). The consequences of unhealthy snack intake such as a heightened chance of becoming overweight will be more likely to be ignored among individuals with high BAS levels. Therefore, the present study substantially extends this line of research by hypothesizing that adolescents with high BAS scores will be more likely to be responsive to eating as a response to game use.

Hypothesis 3: BAS is a moderator of the association between adolescents game use and unhealthy snack intake: the association will be stronger for adolescents with high BAS levels.

High BIS scores, on the other hand, have been associated with an inclination toward the assessment of the possible consequences of risky behavior (Gray & McNaughton, 2003). Therefore, it can be argued that adolescents with high BIS levels compared to those with lower

BIS levels will be more likely to avoid unhealthy snacking during game use given that they might be more attentive for the long-term consequences (Voigt et al., 2009) on their weight and health. It can be assumed that individuals with a high BIS are also less vulnerable for exposure to food-related ads in a game context. In that respect BIS might serve as a protective system and inhibit unhealthy snack intake during game use among those with high BIS levels. Previous research already found support for a protective role of BIS when examining the association between media use and attitudes toward both alcohol use (Vangeel et al., 2016) and joyriding attitudes (Beullens, Rhodes, & Eggermont, 2016). Therefore, the current study proposes the following hypothesis regarding the role of BIS in the association between game use and unhealthy snacking:

Hypothesis 4: BIS is a moderator of the association between adolescents game use and unhealthy snack intake: The association will be weaker for adolescents with high BIS levels.

Summing up, the present study adds significantly to the existing scientific literature on the topic of screen time and snacking in several ways. First of all, by exploring the direct association between game use and unhealthy snack intake in an adolescent sample. Furthermore, it is examined whether the hypothesized association between games and unhealthy snacking is modified when adding the RST concepts, BAS and BIS. A final important contribution is the incorporation of moderation analyses in order to gain more insight in a potential differential susceptibility toward the influence of gaming on unhealthy snacking patterns. More specifically, the moderating role of game engagement, BAS and BIS is examined in order to explore whether individual differences in these variables make adolescents more or less susceptible for the associations examined in the current study.

## **METHODOLOGY**

### ***Study procedure and participants***

Data were collected using a representative cross-sectional survey from September to December 2013 in 14- to 16-year-old adolescents (3rd and 4th grade) from 20 schools in Flanders (Belgium). To estimate the variance in BAS score with a relative error of 10%, 95% Confidence Interval (CI) and an anticipated drop-out of 25% a minimum sample size of 1000 adolescents was needed. Taking into account the clustered design of the study (design effect=1.2), the final sample size was set to 1200 adolescents. The design effect was calculated using a cluster size of 60 students per school and an intra-cluster correlation coefficient of 0.003, estimated from the pilot test of the

study in 5 schools not belonging to the study sample. Sample size calculation was completed using the PASS software package (NCSS, Kaysville, UT).

A two-step sampling procedure was applied. First as previous experience indicated that the response rate of secondary schools is often low (Roberts et al., 2007), schools were oversampled by 50% and 40 schools were selected from a list of all secondary schools Flanders (Belgium). The schools were selected using a probability proportionate to the number of students in the 3rd and 4th grade, stratified by different education networks (public and private). The principals of the 40 selected schools were contacted by e-mail for participation, followed by a personal call. The 20 schools that agreed to participate provided a list of all students in the 3rd and 4th grade. In each school a sample of  $\pm 60$  students was selected from these lists, again using a probability proportional to size sampling. Information letters and passive informed consent forms were sent to the legal guardians of the selected adolescents. The completion of the pencil-and-paper survey by adolescents took place in the classroom in the presence of two researchers to provide clarification when necessary. Confidentiality and anonymity was assured by the researchers both before and after the completion of the survey. The adolescents were also informed that they could stop their participation at any time. The study protocol was approved by the Social and Societal Ethics Committee (KU Leuven).

### ***Measures***

The questionnaire assessed demographics, BAS, BIS, unhealthy snack intake, duration of game play and game engagement. In addition height and weight were measured.

**Demographics.** Age and sex were assessed by single item questions, “what is your date of birth?” and “are you a boy or a girl?”. The education type of each adolescent (general/technical/vocational) was obtained from the schools.

**BIS and BAS.** BIS and BAS were assessed by the Dutch child version (Muris, Meesters, de Kanter, & Timmerman, 2005) of the BIS/BAS scale (Carver & White, 1994). The BIS/BAS scales consists of 20 items scored on a four-point scale ranging from absolute disagreement (=1) to absolute agreement (=4). Examples of BAS items are ‘I go out of my way to get things I want’, ‘I often act on the spur of the moment’ and ‘When good things happen to me, it affects me strongly’. Examples of BIS items are ‘I feel worried when I think I have done poorly at something important’ and ‘I worry about making mistakes’. Following Carver and White (1994) the items are allocated to two scales: the BIS scale (7 items) and the BAS scale (13 items). In the present sample the Cronbach’s Alphas were 0.75 for BIS and 0.83 for BAS, an exploratory factor analysis was also performed in STATA showing the two factor solution explained 97% of the total variation. Factor

1 had an eigenvalue of 4.18 and factor 2 had an eigenvalue of 2.10. The average score for both scales was calculated by summing the item scores and dividing it by the number of items.

**Unhealthy snack intake.** Unhealthy snack intake was assessed by using a Food Frequency Questionnaire (FFQ) designed to measure snack and drink intake of adolescents. The FFQ probed usual food intake with a reference period of one month and was found valid and reliable to measure unhealthy snack intake on a group level for the purpose of analyzing epidemiological associations (De Cock et al., 2015b). Respondents were first asked to indicate for a variety of snacks (e.g., candybars, icecream, fruit, vegetables) how frequent they consumed these snacks. The six frequency categories applied were: (a) never or seldom; (b) 1-3 days/month; (c) 1 days/week; (d) 2-4 days/week; (e) 5-6 days/week; (f) every day. Respondents were consequently asked to indicate the portion of these snacks that is consumed. Depending on the item, four to six possible portion size categories were provided together with a list of common standard measures as examples. The daily intake of each FFQ item was obtained by multiplying the frequency of consumption with the quantity of consumption per week (in gram) divided by 7.

In the current study, snacks are defined as all food items that are consumed outside (>30 min) of breakfast, lunch and dinner (Rodríguez & Moreno, 2006). Snacks were classified as either healthy or unhealthy using the UK Ofcom nutrient profiling model (Department of Health, 2009). This nutrient profile model provides a continuous score that represents the ‘unhealthiness’ of a beverage or food product. This score is based on the nutritional content of food products [negative elements: saturated fat (g), Na (mg), total sugar (g) and energy (kJ); positive elements: protein (g), fiber (g) and fruit, vegetables and nuts (%)]. Food items that scored more than 4 points were considered to be unhealthy. The daily intakes of the FFQ items considered as unhealthy were summed to obtain the daily intakes of unhealthy snacks (in gram) (Department of Health, 2009).

**Duration of game play.** Based on previous media research on television viewing (Eggermont, 2005), the duration of game play on any device (e.g. computer, console, smartphone and tablet) was measured by means of a separate timeline for each day of an average school week. This timeline consisted of check boxes, each representing 30 min. Participants were asked to indicate when they usually played games for that particular day. In order to calculate the number of minutes gaming per week the total of checked boxed was multiplied by 30 (minutes).

**Game engagement.** To assess the extent of game involvement of adolescents or the extent by which adolescents get carried away while playing, the Game Engagement Questionnaire (GEQ) developed by Brockmyer et al. (2009) was used. The GEQ consists of 19 items for each of which respondents had three options to indicate whether or not a certain item was applicable to them: (1) no, (2) sort of and (3) yes. Examples of items are ‘I lose track of time’, ‘I feel spaced

out', and 'Things seem to happen automatically'. All items were summed to form an index with a range from 19 to 57, the higher the GEQ scores, the higher the engagement.

**Height and weight.** Body height and weight were measured by two trained research assistants using a standardized protocol (van Stralen et al., 2011). Adolescents were allowed to wear light clothing, but instructed to take off their shoes. Body height was measured with a SECA Leicester Portable Stadiometer with an accuracy of 1 mm. Weight was measured with a calibrated electronic scale SECA 861 with an accuracy of 100 g. The measurements were repeated, if the two readings differed more than 1%, a third measurement was taken. In the case of three measurements the outlying value was excluded and the average of the two retained measurements was used for analysis. Age and sex-specific Body Mass Index z-scores (zBMI) were calculated using Flemish 2004 growth reference data (Roelants, Hauspie, & Hoppenbrouwers, 2009). Using the International Obesity Task Force cut-off points, adolescents were classified as either underweight (thinness grade I, II and III), normal weight, overweight, obese and morbid obese (Cole & Lobstein, 2012). The latter categories were then further recoded into an ordinal variable with three categories 0=non-overweight, 1= overweight and 2= obese.

### ***Statistical analyses***

For continuous variables Pearson's' correlation coefficients are displayed, for categorical predictors Pearson's'  $\chi^2$  and for the combination of categorical and continuous variables point biserial correlation coefficients. Multilevel linear regression analyses were conducted with a three level structure (adolescents within classes within schools) to account for clustering of the data in five steps. Pairwise deletion was used for the missing data. First, an intercept-only model is fitted, without any level 1, level 2 or level 3 predictors (Model 0). Second in model 1 the covariates (gender, education type and zBMI) were added. Third in model 2 the associations of the gaming variables (hours of game play per day and game engagement) with unhealthy snack intake were evaluated. Fourth in model 3 two more predictors, namely BIS and BAS were added. And fifth in model 4 through 6 moderation of game engagement, BAS or BIS was examined and therefore the respective interactions terms duration of game play x game engagement (model 4), duration of game play x BAS (model 5) and duration of game play x BIS (model 6) were added. In the case an interaction effect was found a simple slope plot was constructed. In all models continuous parameters were mean centered, outliers were removed, unstandardized coefficients and their standard errors were displayed and associations with p-values <0.05 were considered statistically significant. As some of the variables showed a skewed distribution, all analyses were bootstrapped using 100 replications (Field, 2009). The explained variance of the different models was evaluated

compared to a null model with no predictors. For all models also the log likelihood and the log likelihood test compared to the previous model, except for model 5 and 6, was presented. For models 4 through 6 the log likelihood was compared with model 3. The predictors gender and the education type dummies were defined as ordinal variable with zero equal to boys in the case of gender and in the case of education type equal to general education and one equal to girls in the case of gender and equal to technical or vocational education in the case of education type. The other predictors variables zBMI, duration of game play, game engagement, BAS and BIS are operationalized as continuous variables. All multilevel analyses were conducted using STATA version 13 SE (Stata Corporation, Texas, USA).

## RESULTS

### *Descriptive statistics and correlations*

Of the 1210 selected adolescents, 106 adolescents were either absent due to illness, not allowed to participate by the parents or returned a questionnaire of unsatisfactory quality for further use (namely, a questionnaire in which less than one-third of the questionnaire was completed or the same answer was filled in for a full page or more). The final study sample consisted of 1104 adolescents with a mean (*SD*) age of 14.7 (0.8) years; 51 % were boys and 18.0% was overweight (see table 1). The adolescents consumed on average 190 grams of unhealthy snacks and played games for 2.5 hours per day.

**Table 1:** Descriptives of the participants

N=1104	Percentage	
Boys	51%	
Education type		
General	46%	
Technical	34%	
Vocational	20%	
Overweight	18%	
	<b>Mean</b>	<b>SE</b>
Age (y)	14.7	0.8
zBMI	0.3	1.0
Unhealthy snack intake (g)	190.0	141.2
Duration of game play (h)	2.5	2.2
Game engagement [range 19-57]	29.3	7.9
BAS [range 13-52]	31.5	6.6
BIS [range 7-28]	16.8	4.2



Duration of game play ( $r = .16, p < .001$ ), game engagement ( $r = .15, p < .001$ ) and BAS ( $r = .14, p < .001$ ) were positively correlated with unhealthy snack intake, while gender (boys are coded as 0, girls are coded as 1) ( $r = -.19, p < .001$ ) and *zbmi* ( $r = -.08, p < .05$ ) were negatively associated with unhealthy snack intake. Education type and BIS were not correlated with unhealthy snack intake. Significant correlations were also observed between game engagement and duration of game play ( $r = .38, p < .001$ ), BAS ( $r = .36, p < .001$ ) and gender ( $r = -.26, p < .001$ ). Duration of game was associated with gender ( $r = -.30, p < .001$ ), BAS ( $r = .14, p < .001$ ) and BIS ( $r = -.14, p < .001$ ). A complete overview of the correlations between the variables studied is presented in Table 2.

**Table 2:** Correlation Analyses

	Unhealthy snack intake	gender	Technical education	Vocational education	Zbmi	Duration of game play	Game engagement	BAS	BIS
Unhealthy snack intake	1,00	<sup>a</sup> -0.19***	<sup>a</sup> 0.06	<sup>a</sup> 0.02	<sup>b</sup> -0.08*	<sup>b</sup> 0.16***	<sup>b</sup> 0.15***	<sup>b</sup> 0.14***	<sup>b</sup> -0.03
Girls		1,00	<sup>c</sup> 20.87***	<sup>c</sup> 0.08	<sup>a</sup> 0.03	<sup>a</sup> -0.3***	<sup>a</sup> -0.26***	<sup>a</sup> 0.04	<sup>a</sup> 0.39***
Technical education			1,00	<sup>c</sup> 141.33***	<sup>a</sup> 0.01	<sup>a</sup> 0.08*	<sup>a</sup> -0.00	<sup>a</sup> -0.05	<sup>a</sup> -0.10***
Vocational education				1,00	<sup>a</sup> 0.15***	<sup>a</sup> 0.12***	<sup>a</sup> 0.05	<sup>a</sup> 0.06*	<sup>a</sup> -0.02
Zbmi					1,00	<sup>b</sup> 0.02	<sup>b</sup> 0.03	<sup>b</sup> 0.06*	<sup>b</sup> -0.03
Duration of game play						1,00	<sup>b</sup> 0.38***	<sup>b</sup> 0.14***	<sup>b</sup> -0.14***
Game engagement							1,00	<sup>b</sup> 0.36***	<sup>b</sup> 0.03
BAS								1,00	<sup>b</sup> 0.28***
BIS									1,00

Note:  $p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$ , *a* point biserial correlation coefficients, *b* pearsons' correlation coefficients, *c* Pearsons'  $\chi^2$

### ***Game duration as a predictor of unhealthy snacking***

The results of the multilevel linear regression analyses are shown in Table 3. For model 0, the intraclass correlation coefficients are respectively 0.23 and 0.74, indicating that 23% of the variance in unhealthy snack intake is at school level and 74% at class level. The constant of model 0 indicates that the overall mean unhealthy snack intake is 190.4g for all adolescents within all classes and all schools. Model 1 (covariates only) shows that gender ( $\beta = -54.2, p < 0.001$ ) and zBMI ( $\beta = -12.3, p < 0.01$ ) are both significantly negatively related to unhealthy snack intake and explain 8.6% of the variance in unhealthy snack intake. Girls eat less unhealthy snacks and the higher the zBMI of an adolescent the lower his/her unhealthy snack intake. Model 2, with game engagement and duration of game play added as predictors, explained an additional 3.1% of the variance in unhealthy snack intake. The model showed that the duration of game play ( $\beta = 5.8, p < 0.01$ ) is positively associated with unhealthy snack intake supporting hypothesis 1. The more adolescents play games, the higher their intake of unhealthy snacks. Game engagement however was not significantly associated ( $\beta = 1.3, p > 0.05$ ) with unhealthy snack intake. Adding BAS and BIS to the model (see model 3) explained an additional 1% of the variance (total explained variance 12.7%) and showed that hours of game play ( $\beta = 5.7, p < 0.05$ ) remained a significant predictor, when important personality characteristics were taken into account. Model 3 also indicated that in contrast to BIS, BAS was positively associated with intake of unhealthy snacks ( $\beta = 2.1, p < 0.01$ ). In sum, these results provide support for H1 and indicate that game duration is positively associated with unhealthy snack intake. The results also showed that the association remains positive and significant after entering BAS and BIS in the next step, two concepts which have been shown to be strongly related to unhealthy snack intake as well as to game use.

### ***Game engagement as a moderator***

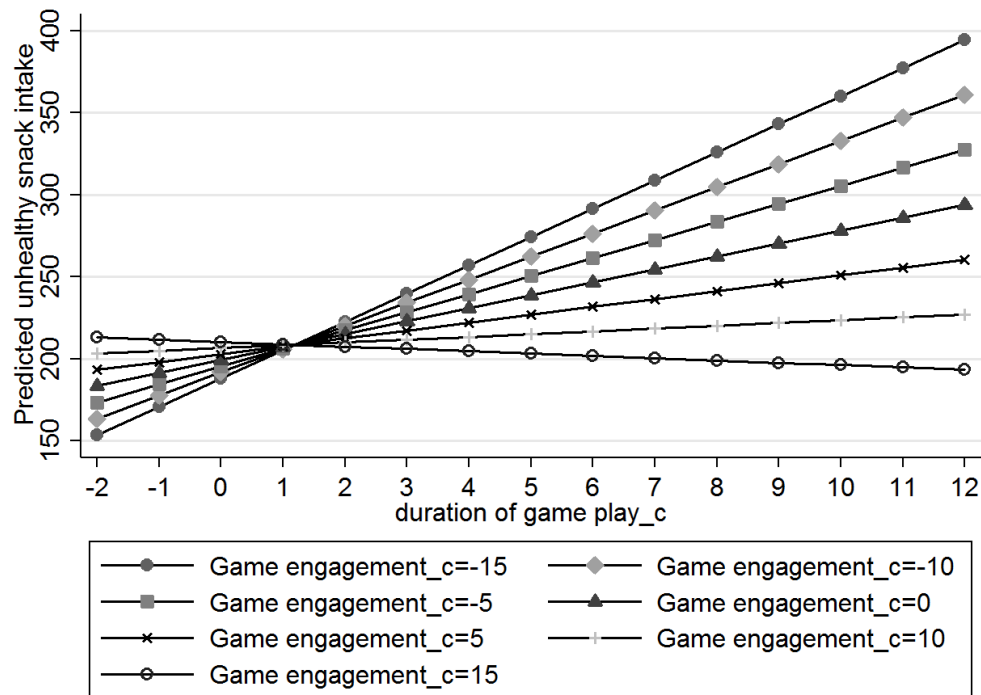
The interaction effect between game engagement and duration of play in Model 4 was significant but in the negative direction ( $\beta = -0.6, p < 0.05$ ). If game engagement increased by one unit, the association of duration of game play with unhealthy snack intake decreased with 0.6 (see Table 3). The positive association between duration of game play and unhealthy snack intake thus became smaller with increasing engagement (Figure 1). At the highest end of the game engagement range, the association between the duration of game play and unhealthy snack even becomes slightly negative (RQ1). These results provide support for hypothesis 2b and reject the alternative hypothesis 2a regarding the possible strengthening role of engagement.

**Table 3:** Results of the multilevel hierarchical regression for the intake of unhealthy snacks

	<b>Model 0</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>	<b>Model 6</b>
	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)	b(SE)
<i>Fixed effects</i>							
<b>Constant</b>	190.4(5.4)***	207.0(9.0)***	205.1(9.6)***	206.8(9.9)***	209.4(10.1)***	206.9(10.0)***	206.9(9.6)***
<i>Level 1</i>							
<b>gender</b>							
<b>Girls</b>		-54.2(10.2)***	-37.1(11.5)**	-42.6(12.4)**	-40.6(12.3)**	-41.2(12.3)**	-42.6(11.1)***
<b>Education type</b>							
<b>Technical</b>		17.0(9.7)	12.6(11.0)	14.4(11.0)	15.2(10.8)	14.7(11.1)	14.4(10.9)
<b>Vocational</b>		17.5(14.7)	9.0(16.0)	7.0(16.1)	8.1(16.1)	8.1(16.3)	6.9(13.6)
<b>Zbmi</b>		-12.3(4.4)**	-12.7(4.6)	-13.2(4.6)**	-13.4(4.6)**	-13.6(4.6)**	-13.2(4.6)
<b>Duration of gameplay</b>			5.8(2.6)**	5.7(2.6)*	7.9(2.8)**	6.5(2.5)**	5.7(2.9)*
<b>Game engagement</b>			1.3(0.74)	0.6(0.8)	0.7(0.8)	0.6(0.8)	0.6(0.6)
<b>BAS</b>				2.1(0.8)**	2.1(0.8)**	2.2(0.8)**	2.1(0.7)**
<b>BIS</b>				0.6(1.2)	0.7(1.2)	0.7(1.3)	0.6(1.1)
<b>Duration of game play x game engagement</b>					-0.6(0.3)*		
<b>Duration of game play x BAS</b>						-0.6(0.3)	
<b>Duration of game play x BIS</b>							0.0(0.6)
<b>Log likelihood</b>	-7017.5	-6313.8	-5188.8	-5184.3	-5181.7	-5182.5	-5184.3
<b>Δ Log likelihood (Δdf)</b>	/	1407.4***	2250***	9*	5.2*	-1.6 (compared to model 4)	-5.2 (compared to model 4)
<b>(compared to the previous model)</b>							
<b>Explained variance (compared to the null model)Δ</b>	/	8.6%	11.7%	12.7%	13.2%	13.1%	12.7%

Note:  $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , all estimates were obtained after 100 bootstraps calculations to account for the skewed distributions of the variables

**Figure 1:** Simple slopes of game play for different values game engagement



***BAS and BIS as moderators***

It was hypothesized that the association between game use and unhealthy snacking would be stronger for adolescents with a sensitive BAS while for those with a sensitive BIS the association was expected to be weaker. Model 5 and 6 indicate the game use x BAS interaction ( $\beta = -0.6, p > 0.5$ ) and the game use x BIS interaction ( $\beta = 0.0, p > 0.5$ ) were not significant. Therefore, the current study was not able to find support for H3 and H4 in which BAS and BIS are regarded as moderators of the association between game use and unhealthy snacking.

**DISCUSSION**

A first important goal of the present study was to examine the association between game duration and unhealthy snacking in adolescents. Although it has been argued that snacking is more convenient in combination with handsfree screen activities such as television viewing (Falbe et al., 2014), our findings support the hypothesized positive association between game duration and unhealthy snack intake indicating that the more time adolescents spend on games, the higher their intake of unhealthy snacks. Furthermore, our findings indicated that the association between gaming and unhealthy becomes less strong as engagement increases and even becomes negative for adolescents with the highest levels of engagement. The latter seems to indicate that high engagement in games overrules the need for snacking that adolescents experience in response to sedentary screen time in terms of game use. Although high engagement in games has been found

to have negative consequences such as problems controlling the time spend on games and even game addiction (Klein et al., 2014), the present study shows that the highest levels of engagement have a protective function in terms of decreased unhealthy snack intake in relation to game play. Additionally, the current research indicated that the association between game use and snacking remains stable after adding BAS and BIS to the analyses. BAS was found to be an important indicator of unhealthy snacking in addition to game use, while BIS was not associated with the dependent variable in the current research. These findings stress the importance of integrating BAS in research on the relation between game use and snacking behavior. Finally, our analyses showed no moderation effect of BAS and BIS. This might be explained by the fact that wanting to eat during game use rather emerges at an unconscious level. Adolescents are, therefore, not aware of the consequences of that behavior. It is assumable that BAS and BIS for that reason do not play a role in reinforcing or decreasing the association between game use and snack intake.

### ***Limitations and directions for future research***

The exploratory nature of this study generates opportunities and directions for future research on this topic. The results showed that game use, which is in most cases sedentary behavior, and unhealthy snacking are associated. Based on the results of the current research, however, it could not be determined when adolescents eat these snacks given that habitual and not game-related snacking was assessed. The use of an habitual measure is in line with previous studies that have focused on the association between screen time and snacking (e.g., Cessna et al., 2007; Vandewater, Shim, & Caplovitz, 2004). Nevertheless, it is possible that gamers don't eat during game use given that gaming is not handsfree activity, but rather between, after or before game sessions. Therefore, an habitual measure also has advantages given that it is not limited to snacking during game time only. Future research should additionally examine when game-related snacking occurs in order to provide more clarity on how these behaviors are entangled and to disclose potential underlying mechanisms.

In line with this limitation, the use of a general measure of game use does not allow for an examination of the impact of game genres and game platforms on snack intake. Previous studies focusing on the role of type of game in the association between gameplay and energy expenditure are still limited. Graves, Stratton, Ridgers, and Cable (2008) did find that new generation game devices that acquire more physical activity such as Wii and XBOX 360 consoles lead to more energy expenditure than sedentary types of gaming. However, when snacks and beverages are available during gameplay it has been found that energy balance is positive among participants in both a television watching, sedentary gameplay and active gameplay condition. Nevertheless,

energy balance in the active game condition was significantly lower compared to the television and sedentary gaming condition (Lyons, Tate, Ward, & Wang, 2012). Future (experimental) research should further look into differences in snack intake depending on the use of certain types of games and examine what the role of engagement is in these associations.

Additionally, the current study did not assess and thus also did not control for general screen time exposure. Therefore, the results of the current study should be interpreted with caution. The results provide support for the association between game use and unhealthy snacking and provide insight in the role of game engagement in this respect which has never been examined in previous research. In future research, other sedentary media behaviors such as television use and internet use should also be taken into account. It could be argued that adolescents who engage in several sedentary media activities to a great extent will have a heightened chance of engaging in unhealthy snacking as well. Therefore, follow-up research needs to be conducted in order to examine whether the combination of different types of sedentary activities has a reinforcing or cumulative effect on unhealthy snack intake.

More research is also needed on the effect of game advertisements related to food in order to establish the validity of these ads as an explanatory mechanism for the link between games and snacking. Given that the current research was cross-sectional in nature causal inferences cannot be made based on the results and the direction of the association cannot be determined. Experimental studies and longitudinal study designs are needed to come to a better understanding of the causal direction of the game use and unhealthy snacking association as well as the underlying mechanisms explaining this relationship. Also, the data were collected in an adolescent sample and can thus not be extrapolated to other populations (e.g., children and adults). Research examining the influence of game use on snack intake and the role of BIS/BAS and game engagement should, therefore, be examined in other samples as well.

### ***Recommendations and implications***

Despite the fact that game duration was found to be positively associated with unhealthy snack intake, this medium can also be used as an important tool in promoting and improving dietary behaviors among adolescents. It is widely acknowledged that games are a popular pastime among both adolescent boys and girls and that they spend high amounts of time playing games (Klein et al., 2014; Vangeel et al., 2016). Additionally, games are intrinsically motivating and rewarding which can be helpful to increase engagement in a health promoting program compared to more traditional promotion campaigns (Annetta, 2010; Peng, 2009). The use of serious games in an intervention context also allows to more easily tailor a message to a specific audience by

focusing on individual characteristics and needs in order to increase and facilitate learning possibilities (Peng, 2009; Thompson et al., 2010). Following the results of the present research, it can be argued that especially adolescents with high BAS levels should be targeted by serious games promoting healthy eating. High BAS sensitivity was found in the present research and previous studies as well to be positively associated with unhealthy eating habits (e.g., De Cock et al., 2015a; Matton et al., 2013). Additionally, research also showed that BAS is an important indicator of playing games (Vangeel et al., 2016). Therefore, adolescents with an active BAS might not only be the most motivated audience for a health promoting game, they are also the ones that should be targeted when trying to improve snacking habits. Future health promoting games targeting adolescents with a sensitive BAS are needed in order to assess the value and contribution of this new type of tailored health intervention.



## REFERENCES

- Annetta, L. A. (2010). The “T’s” have it: A framework for serious educational game design. *Review of General Psychology, 14*(2), 105–112.
- Ballard, M., Gray, M., Reilly, J., & Noggle, M. (2009). Correlates of video game screen time among males: body mass, physical activity, and other media use. *Eating Behaviors, 10*(3), 161–7.
- Bellissimo, N., Pencharz, P. B., Thomas, S. G., & Anderson, G. H. (2007). Effect of Television Viewing at Mealtime on Food Intake After a Glucose Preload in Boys. *Pediatric Research, 61*(6), 745–749. <http://doi.org/10.1203/pdr.0b013e3180536591>
- Berkey, C. S., Rockett, H. R. H., Field, A. E., Gillman, M. W., Frazier, A. L., Camargo, C. A., & Colditz, G. A. (2000). Activity, Dietary Intake, and Weight Changes in a Longitudinal Study of preadolescent boys and girls. *Pediatrics, 105*(4), 1–9.
- Beullens, K., Rhodes, N., & Eggermont, S. (2016). Behavioral activation and inhibition as moderators of the relationship between music video-viewing and joyriding attitudes. *Media Psychology, 19*(2), 181-202. doi:10.1080/15213269.2014.950756
- Börnhorst, C., Wijnhoven, T. M., Kunešová, M., Yngve, A., Rito, A. I., Lissner, L., ... Breda, J. (2015). WHO European Childhood Obesity Surveillance Initiative: associations between sleep duration, screen time and food consumption frequencies. *BMC Public Health, 15*(1), 442. <http://doi.org/10.1186/s12889-015-1793-3>
- Brockmyer, J. H., Fox, C. M., Curtiss, K. A., McBroom, E., Burkhart, K. M., & Pidruzny, J. N. (2009). The development of the Game Engagement Questionnaire: A measure of engagement in video game-playing. *Journal of Experimental Social Psychology, 45*(4), 624–634.
- Carver, C. S., & White, T. L. (1994). Behavioral Inhibition , Behavioral Activation , and Affective Responses to Impending Reward and Punishment : The BIS / BAS Scales. *Journal of Personality and Social Psychology, 67*(2), 319–333. <http://doi.org/10.1037/0022-3514.67.2.319>
- Cessna, T., Raudenbush, B., Reed, A., & Hunker, R. (2007). Effects of video game play on snacking behavior. *Appetite, 49*(1), 282.
- Chaput, J.-P., Visby, T., Nyby, S., Klingenberg, L., Gregersen, N. T., Tremblay, A., ... Sjödin, A. (2011). Video game playing increases food intake in adolescents: a randomized crossover study. *The American Journal of Clinical Nutrition, 93*, 1196–1203. <http://doi.org/10.3945/ajcn.110.008680.1196>
- Clark, V. L., Pamnani, D., & Wadden, T. A. (2010). Behavioral Treatment of Obesity. In P. G. Kopelman, I. D. Caterson, & W. Dietz (Eds.), *Clinical Obesity in Adults and Children* (pp. 301–312). Oxford: Wiley-Blackwell. <http://doi.org/10.1002/9781444307627.ch22>

- Cole, T. J., & Lobstein, T. (2012). Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. *Pediatric Obesity*, 7(4), 284–94. <http://doi.org/10.1111/j.2047-6310.2012.00064.x>
- Corr, P. J. (2008). The Reinforcement Sensitivity Theory (RST): introduction. In *The Reinforcement Sensitivity Theory of Personality* (pp. 1–43). Cambridge: Cambridge University Press.
- Davis, C. (2013). A narrative review of binge eating and addictive behaviors: shared associations with seasonality and personality factors. *Frontiers in Psychiatry*, 4, 183. <http://doi.org/10.3389/fpsy.2013.00183>
- Davis, C., Patte, K., Levitan, R., Reid, C., Tweed, S., & Curtis, C. (2007). From motivation to behaviour: a model of reward sensitivity, overeating, and food preferences in the risk profile for obesity. *Appetite*, 48(1), 12–9.
- De Cock, N., Van Camp, J., Lachat, C., Huybrechts, L., Maes, L., Verstraeten, R., & Van Lippvelde, W. (2015). *Validity and reliability of a Food Frequency Questionnaire to evaluate snacking and SSB intake in Flemish adolescents [internal report]*. Gent.
- De Cock, N., Van Lippvelde, W., Vervoort, L., Vangeel, J., Maes, L., Eggermont, S., ... Van Camp, J. (2015). Sensitivity to reward is associated with snack and sugar-sweetened beverage consumption in adolescents. *European Journal of Nutrition*. <http://doi.org/10.1007/s00394-015-0981-3>
- Department of Health. (2009). *Nutrient Profiling Technical Guidance*. Retrieved from [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/216094/dh\\_123492.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216094/dh_123492.pdf)
- Eggermont, S. (2005). Young adolescents' perceptions of peer sexual behaviours: the role of television viewing. *Child: Care, Health and Development*, 31(4), 459–68. <http://doi.org/10.1111/j.1365-2214.2005.00525.x>
- Epstein, L. H., Dearing, K. K., Temple, J. L., & Cavanaugh, M. D. (2008). Food reinforcement and impulsivity in overweight children and their parents. *Eating Behaviors*, 9(3), 319–27. <http://doi.org/10.1016/j.eatbeh.2007.10.007>
- Epstein, L. H., Paluch, R. A., Consalvi, A., Riordan, K., & Scholl, T. (2000). Effects of manipulating sedentary behavior on physical activity and food intake. *The Journal of Pediatrics*, 140(3), 334–339. <http://doi.org/10.1067/mpd.2002.122395>
- Falbe, J., Willett, W. C., Rosner, B., Gortmaker, S. L., Sonnevile, K. R., & Field, A. E. (2014). Longitudinal relations of television, electronic games, and digital versatile discs with changes in diet in adolescents. *American Journal of Clinical Nutrition*, 100, 1173–1181. <http://doi.org/10.3945/ajcn.114.088500.1>

- Field, A. (2009). *Discovering Statistics Using SPSS*. Thousand Oaks: Sage Publications, Inc.
- Fisher, J. O., & Birch, L. L. (2002). Eating in the absence of hunger and overweight in girls from 5 to 7 years of age. *American Journal of Clinical Nutrition*, *76*, 226–231.
- Folkvord, F., Anschütz, D. J., Buijzen, M., & Valkenburg, P. M. (2013). The effect of playing advergames that promote energy-dense snacks or fruit on actual food intake among children. *The American Journal of Clinical Nutrition*, *97*(2), 239–245. <http://doi.org/10.3945/ajcn.112.047126>
- Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy*, *8*(3), 249–266. [http://doi.org/10.1016/0005-7967\(70\)90069-0](http://doi.org/10.1016/0005-7967(70)90069-0)
- Gray, J. A., & McNaughton, N. (2003). *The Neuropsychology of Anxiety: An Enquiry Into the Function of the Septo-hippocampal System*. New York: Oxford University Press.
- Guran, T., Turan, S., Akcay, T., Degirmenci, F., Avci, O., Asan, A., ... Bereket, A. (2010). Content analysis of food advertising in Turkish television. *Journal of Paediatrics and Child Health*, *46*(7-8), 427–430. <http://doi.org/10.1111/j.1440-1754.2010.01753.x>
- Harrison, A., Treasure, J., & Smillie, L. D. (2011). Approach and avoidance motivation in eating disorders. *Psychiatry Research*, *188*(3), 396–401. <http://doi.org/10.1016/j.psychres.2011.04.022>
- Jegers, K. (2007). Pervasive game flow: understanding player enjoyment in pervasive gaming. *Computers in Entertainment*, *5*(1), 9–17.
- Klein, A., De Cock, R., Rosas, O., Vangeel, J., Minotte, P., & Meerkerk, G.-J. (2014). *Compulsive Computer use and Knowledge needs in Belgium : A multimethod approach*. Gent: Academia Press.
- Kushner, R. F., & Choi, S. W. (2009). Prevalence of Unhealthy Lifestyle Patterns Among Overweight and Obese Adults. *Obesity*, *18*(6), 1160–1167. <http://doi.org/10.1038/oby.2009.376>
- Lee, M., & Faber, R. J. (2007). Effects of Product Placement in On-Line Games on Brand Memory: A Perspective of the Limited-Capacity Model of Attention. *Journal of Advertising*, *36*(4), 75–90. <http://doi.org/10.2753/JOA0091-3367360406>
- Loxton, N. J., & Dawe, S. (2001). Alcohol abuse and dysfunctional eating in adolescent girls: the influence of individual differences in sensitivity to reward and punishment. *The International Journal of Eating Disorders*, *29*(4), 455–62. <http://doi.org/10.1002/eat.1042>
- Lyons, E. J., Tate, D. F., & Ward, D. S. (2013). The better the story , the bigger the serving : narrative transportation increases snacking during screen time in a randomized trial. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1). <http://doi.org/10.1186/1479-5868-10-60>

- Lyons, E. J., Tate, D. F., Ward, D. S., & Wang, X. (2012). Energy intake and expenditure during sedentary screen time and motion-controlled video gaming. *The American Journal of Clinical Nutrition*, *96*, 234–239. <http://doi.org/10.3945/ajcn.111.028423.234>
- Mallinckrodt, V., & Mizerski, D. (2007). The Effects of Playing an Advergame on Young Children's Perceptions, Preferences, and Requests. *Journal of Advertising*, *36*(2), 87–100. <http://doi.org/10.2753/JOA0091-3367360206>
- Marshall, S. J., Biddle, S. J. H., Gorely, T., Cameron, N., & Murdey, I. (2004). Relationships between media use, body fatness and physical activity in children and youth : a meta-analysis. *International Journal of Obesity*, *28*, 1238–1246. <http://doi.org/10.1038/sj.ijo.0802706>
- Matton, A., Goossens, L., Braet, C., & Vervaet, M. (2013). Punishment and reward sensitivity: Are naturally occurring clusters in these traits related to eating and weight problems in adolescents? *European Eating Disorders Review*, *21*(3), 184–194.
- Montgomery, K. C., & Chester, J. (2009). Interactive food and beverage marketing: targeting adolescents in the digital age. *Journal of Adolescent Health*, *45*, S18–29. <http://doi.org/10.1016/j.jadohealth.2009.04.006>
- Moray, J., Fu, A., Brill, K., & Mayoral, M. S. (2007). Viewing Television While Eating Impairs the Ability to Accurately Estimate Total Amount of Food Consumed. *Bariatric Nursing and Surgical Patient Care*, *2*(1), 71–76. <http://doi.org/10.1089/bar.2006.9991>
- Muris, P., Meesters, C., de Kanter, E., & Timmerman, P. E. (2005). Behavioural inhibition and behavioural activation system scales for children: relationships with Eysenck's personality traits and psychopathological symptoms. *Personality and Individual Differences*, *38*(4), 831–841. <http://doi.org/10.1016/j.paid.2004.06.007>
- Must, A., & Tybor, D. J. (2005). Physical activity and sedentary behavior : a review of longitudinal studies of weight and adiposity in youth. *International Journal of Obesity*, *29*, S84–S96. <http://doi.org/10.1038/sj.ijo.0803064>
- Nelson, M. C., Neumark-Stzainer, D., Hannan, P. J., Sirard, J. R., & Story, M. (2015). Longitudinal and Secular Trends in Physical Activity and Sedentary Behavior During Adolescence, *118*(6). <http://doi.org/10.1542/peds.2006-0926>
- Pearson, N., & Biddle, S. J. H. (2011). Sedentary Behavior and Dietary Intake in Children, Adolescents, and Adults. *American Journal of Preventive Medicine*, *41*(2), 178–188. <http://doi.org/10.1016/j.amepre.2011.05.002>
- Peng, W. (2009). Design and Evaluation of a Computer Game to Promote a Healthy Diet for Young Adults. *Health Communication*, *24*(2), 115–127.

- Phillips, S. M., Bandini, L. G., Naumova, E. N., Cyr, H., Colclough, S., Dietz, W. H., & Must, A. (2004). Energy-Dense Snack Food Intake in Adolescence: Longitudinal Relationship to Weight and Fatness. *Obesity Research*, *12*(3), 461–472.
- Pickering, A. D., & Gray, J. A. (1999). The neuroscience of personality. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research (2nd ed.)* (pp. 277–299). New York: Guilford Press.
- Potter, R. F., Lee, S., & Rubenking, B. E. (2011). Correlating a Motivation-Activation Measure With Media Preference. *Journal of Broadcasting & Electronic Media*, *55*(3), 400–418. <http://doi.org/10.1080/08838151.2011.597468>
- Powell, L. M., Szczypka, G., & Chaloupka, F. J. (2007). Adolescent Exposure to Food Advertising on Television. *American Journal of Preventive Medicine*, *33*, 251–256. <http://doi.org/10.1016/j.amepre.2007.07.009>
- Powell, L. M., Szczypka, G., & Chaloupka, F. J. (2010). Trends in exposure to television food advertisements among children and adolescents in the United States. *Archives of Pediatrics & Adolescent Medicine*, *164*(9), 794–802. <http://doi.org/10.1001/archpediatrics.2010.139>
- Powell, L. M., Szczypka, G., Chaloupka, F. J., & Braunschweig, C. L. (2007). Nutritional Content of Television Food Advertisements Seen by Children and Adolescents in the United States. *Pediatrics*, *120*(3), 576–583. <http://doi.org/10.1542/peds.2006-3595>
- Roberts, C., Currie, C., Samdal, O., Currie, D., Smith, R., & Maes, L. (2007). Measuring the health and health behaviours of adolescents through cross-national survey research: recent developments in the Health Behaviour in School-aged Children (HBSC) study. *Journal of Public Health*, *15*(3), 179–186. <http://doi.org/10.1007/s10389-007-0100-x>
- Rodríguez, G., & Moreno, L. a. (2006). Is dietary intake able to explain differences in body fatness in children and adolescents? *Nutrition, Metabolism and Cardiovascular Diseases*, *16*(4), 294–301. <http://doi.org/10.1016/j.numecd.2005.08.005>
- Roelants, M., Hauspie, R., & Hoppenbrouwers, K. (2009). References for growth and pubertal development from birth to 21 years in Flanders, Belgium. *Annals of Human Biology*, *36*(6), 680–694. <http://doi.org/10.3109/03014460903049074>
- Sebastian, R. S., Cleveland, L. E., & Goldman, J. D. (2008). Effect of Snacking Frequency on Adolescents' Dietary Intakes and Meeting National Recommendations. *Journal of Adolescent Health*, *42*, 503–511. <http://doi.org/10.1016/j.jadohealth.2007.10.002>
- Serdula, M., Ivery, D., Coates, R., Freedman, D., Williamson, D., & Byers, T. (1993). Do obese children become obese adults? A review of the literature. *Preventive Medicine*, *22*, 167–177.

- Snoek, H. M., Van Strien, T., & Janssens, J. M. (2006). The Effect of Television Viewing on Adolescents' Snacking: Individual Differences Explained by External, Restrained and Emotional Eating. *Journal of Adolescent Health, 39*, 448–451. <http://doi.org/10.1016/j.jadohealth.2005.12.020>
- Stettler, N., Signer, T. M., & Suter, P. M. (2004). Electronic games and environmental factors associated with childhood obesity in Switzerland. *Obesity Research, 12*(6), 896–903. <http://doi.org/10.1038/oby.2004.109>
- Swallen, K., Reithner, E., Haas, S. A., & Meier, A. (2005). Overweight, Obesity, and Health-Related Quality of Life Among Adolescents: The National Longitudinal Study of Adolescent Health. *Pediatrics, 115*(2), 340–347.
- Temple, J., & Giacomelli, A. (2007). Television watching increases motivated responding for food and energy intake in children. *American Journal of Clinical Nutrition, 85*, 355–361. Retrieved from <http://ajcn.nutrition.org/content/85/2/355.short>
- Thompson, D., Baranowski, T., Buday, R., Baranowski, J., Thompson, V., Jago, R., & Griffith, M. J. (2010). Serious Video Games for Health How Behavioral Science Guided the Development of a Serious Video Game. *Simulation & Gaming, 41*(4), 587–606.
- Valkenburg, P. M., & Peter, J. (2013). The Differential Susceptibility to Media Effects Model. *Journal of Communication, 63*(2), 221–243. <http://doi.org/10.1111/jcom.12024>
- Van den Bulck, J., & Van Mierlo, J. (2004). Energy intake associated with television viewing in adolescents, a cross sectional study. *Appetite, 43*, 181–184.
- Van Mierlo, J., & Van den Bulck, J. (2004). Benchmarking the cultivation approach to video game effects: a comparison of the correlates of TV viewing and game play. *Journal of Adolescence, 27*(1), 97–111. <http://doi.org/10.1016/j.adolescence.2003.10.008>
- Van Reijmersdal, E., Rozendaal, E., & Buijzen, M. (2012). Effects of Prominence, Involvement, and Persuasion Knowledge on Children's Cognitive and Affective Responses to Advergaming. *Journal of Interactive Marketing, 26*(1), 33–42. <http://doi.org/10.1016/j.intmar.2011.04.005>
- Van Stralen, M. M., te Velde, S. J., Singh, A. S., De Bourdeaudhuij, I., Martens, M. K., van der Sluis, M., ... Brug, J. (2011). European Energy balance Research to prevent excessive weight Gain among Youth (ENERGY) project: Design and methodology of the ENERGY cross-sectional survey. *BMC Public Health, 11*(1), 65. <http://doi.org/10.1186/1471-2458-11-65>
- Vandewater, E. A., Shim, M., & Caplovitz, A. G. (2004). Linking obesity and activity level with children's television and video game use. *Journal of Adolescence, 27*(1), 71–85.

- Vangeel, J., Beullens, K., Vervoort, L., De Cock, N., Van Lippevelde, W., Goossens, L., & Eggermont, S. (2016). The Role of Behavioral Activation and Inhibition in explaining adolescents' game use and game engagement levels. *Media Psychology*.
- Verbeken, S., Braet, C., Lammertyn, J., Goossens, L., & Moens, E. (2012). How is reward sensitivity related to bodyweight in children? *Appetite*, *58*(2), 478–483.
- Vereecken, C. A., & Maes, L. (2006). Television viewing and food consumption in Flemish adolescents in Belgium. *Sozial- Und Präventivmedizin*, *51*(5), 311–317. <http://doi.org/10.1007/s00038-006-5092-8>
- Voigt, D. C., Dillard, J. P., Braddock, K. H., Anderson, J. W., Sopory, P., & Stephenson, M. T. (2009). Carver and White's (1994) BIS/BAS scales and their relationship to risky health behaviours. *Personality and Individual Differences*, *47*(2), 89–93. <http://doi.org/10.1016/j.paid.2009.02.003>
- Wang, Y., & Lobstein, T. (2006). Worldwide trends in childhood overweight and obesity. *International Journal of Pediatric Obesity: IJPO: An Official Journal of the International Association for the Study of Obesity*, *1*(1), 11–25.
- Wilt, J., Condon, D. M., Brown-Riddell, A., & Revelle, W. (2012). Fundamental Questions in Personality. *European Journal of Personality*, *26*(6), 629–631. <http://doi.org/10.1002/per.1905>
- Winkler, A., Dörsing, B., Rief, W., Shen, Y., & Glombiewski, J. (2013). Treatment of internet addiction: a meta-analysis. *Clinical Psychology Review*, *33*(2), 317–29. <http://doi.org/10.1016/j.cpr.2012.12.005>
- Winkler, T., & Buckner, K. (2006). Receptiveness of Gamers to Embedded Brand Messages in Advergaming: Attitudes toward Product Placement. *Journal of Interactive Advertising*, *7*(1), 37–46. <http://doi.org/10.1080/15252019.2006.10722123>
- Wouters, E. J., Larsen, J. K., Kremers, S. P., Dagnelie, P. C., & Geenen, R. (2010). Peer influence on snacking behavior in adolescence. *Appetite*, *55*(1), 11–17. <http://doi.org/10.1016/j.appet.2010.03.002>

## PART 3

# Exploring the dual role of BIS and BAS in media use and effects



# CHAPTER 5: MTV Reality Shows and Adolescents' smoking and alcohol use intentions: a reinforcement sensitivity and norms perspective<sup>4</sup>

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## ABSTRACT

*Previous research provided support for an association between media use and negative health behaviors such as smoking and alcohol use. Nevertheless, research on the influence of MTV reality shows on these behaviors is lacking. The current study examined the influence of this genre from a normative viewpoint and explored the role of neuropsychological systems, BAS and BIS. A cross-sectional survey was carried out among 922 adolescents ( $M_{age}=14.96$  years, 56% girls). The results indicated that BAS is positively related to the viewing of MTV shows, while BIS is not. Support was found for a positive association between MTV shows and intentions toward getting drunk, binge-drinking and smoking. Furthermore, these associations are partially mediated by descriptive peer norms. Friends injunctive norms, and disapproval of the risk behaviors in particular, was found to weaken the association between descriptive norms and behavioral intentions. Injunctive family norms, however, did not moderate this relationship. No moderation of BAS and BIS was found.*

## INTRODUCTION

Adolescence is characterized by a strong peer identification, an emotional separation from parents (Christie & Viner, 2005) and becoming more and more involved with friends (Cook, Deng, & Morgano, 2007). Additionally, adolescence is associated with an increase in thrill-seeking and experimentation behavior (Arnett, 2000) which puts adolescents at an increased risk for the possible negative outcomes of health-compromising behaviors (Christie & Viner, 2005), such as a heightened chance of adult smoking (Flay et al., 1994) and binge-drinking (Melis, Ilse, Rosiers, & Marijs, 2013). Drinking and smoking behaviors among adolescents are, therefore, considered to be important health concerns (WHO, 2014).

As a response, previous research has focused on identifying predictors of risk behaviors among adolescents (e.g., De Vries, Engels, Kremers, Wetzels, & Mudde, 2003; Maggs, Patrick, & Feinstein, 2008). The effects of exposure to different types of risk behavior in the media, for instance, have received a lot of attention over the past decades (e.g., Beullens, Roe, & Van den Bulck, 2008; Bond & Drogos, 2014). Content analyses showed that for instance smoking (e.g.,

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<sup>4</sup> Based on Vangeel, J., Rhodes, N., Beullens, K., Goossens, L., Vervoort, L., De Cock, N., Van Lippevelde, W., Eggermont, S. (submitted). MTV Reality Shows and Adolescents' Intentions toward Smoking and Alcohol Use: BIS/BAS and Social Norms.

Dalton et al., 2002; Sargent et al., 2002) and alcohol use (e.g., Koordeman, Anschutz, & Engels, 2012; Verma, Adams, & White, 2007) are often portrayed in a rather positive way on the television screen. A large body of studies examined the associations between exposure to different types of media, tobacco and alcohol use. Overall, these studies found support for an association between media genres in which references to risk behavior (e.g., smoking and drinking) are highly prevalent on the one hand and (indicators and precursors) of engagement in these risk behaviors on the other hand (e.g., Hanewinkel et al., 2012; Verma et al., 2007).

### ***Risk behavior in MTV reality shows***

In recent years, MTV has broadcasted several reality shows which are very popular among adolescents and emerging adults (Bond & Drogos, 2014). These shows expose their viewers to a variety of health-related risk behaviors such as sexual promiscuity, excessive alcohol use and smoking (Flynn, Morin, Park, & Stana, 2015; Smith, 2005). In particular sexual behavior and alcohol use are very prevalent in these shows, while smoking is present but less visible (Flynn et al., 2015). The content of the shows has received criticism in several news media claiming that they might send a bad message to the audience and specifically to young viewers (e.g., Kells, 2010). As a genre, reality shows differ from fictional media genres such as movies and soaps by their focus on the life of non-fictional characters in a real-life setting. The storylines are (supposedly) non-scripted, making it more likely for viewers to perceive the content as realistic (Papacharissi & Mendelson, 2007). This perceived realism has been found to, in some cases, strengthen the effect of media use on behavior (Peter & Valkenburg, 2010), stressing the need to examine the effect of reality TV on behavior. Several studies already indicated that the viewing of reality TV is associated with an increase in permissive sexual attitudes among young people (Bond & Drogos, 2014; Wright, Randall, & Arroyo, 2013). In line with these results, the present study focused on the association between MTV reality shows and adolescents' intentions toward other prevalent types of risk behavior in these shows (i.e., getting drunk, binge-drinking and smoking) and extends the existing literature in a number of ways. First, consistent with the uses and gratification theory (Katz, Blumler, & Gurevitch, 1973), the link between personality traits and the viewing of MTV reality shows was examined by integrating the behavioral activation (BAS) and inhibition system (BIS) (Gray, 1970) as neuropsychological explanations of MTV reality show viewing. Second, several authors emphasized the need for more research on individuals' differential susceptibility toward media effects (Lang & Ewoldsen, 2010; Valkenburg & Peter, 2013). Therefore, the present study examined whether differences in approach and avoidance motivation moderated the associations between MTV shows and risk behavior. Finally, the association between MTV shows

and risky intentions was investigated by taking into account the mediating and moderating role of descriptive and injunctive norms toward these behaviors in line with the theory of planned behavior (TPB).

### ***Examining RST concepts as predictors of MTV reality show viewing***

The reinforcement sensitivity theory (RST) can be regarded as a valuable framework to examine the choice for the viewing of MTV reality shows given its value for explaining media use and preferences (Aluja-Fabregat & Torrubia-Beltri, 1998). According to the RST, individual differences in emotion, motivation and behavior are the result of the activity of two neuropsychological systems: the behavioral activation (BAS) and inhibition system (BIS) (Gray, 1970). Individuals with a sensitive BAS are very responsive to positive and rewarding cues in the environment (Corr, 2008). The occurrence of such stimuli will lead to activation and approach behavior toward that particular stimulus among individuals with a sensitive BAS. BIS, on the other hand, is sensitive for negative cues related to threat, fear and punishment. If such a cue is presented, BIS will be activated resulting in avoidance and inhibition behavior away from the stimulus (Corr, 2008). The reward seeking behavior and the sensitivity toward rewarding cues of people with a sensitive BAS makes them more prone to engagement in alcohol use and smoking given their susceptibility toward the rewarding effects of these behaviors (Franken, 2002). Individuals with a sensitive BIS, on the other hand, are mainly attentive for negative outcomes (Gray & McNaughton, 2003; Vervoort et al., 2010). If a certain behavior is regarded as risky, inhibition and avoidance behavior will occur (Corr, 2008) and a more sensitive BIS in that sense might rather serve as a protector toward engagement in these behaviors (Voigt et al., 2009).

Research focusing on the activation and inhibition system as predictors of media use is very limited. So far, previous studies showed that higher levels of BAS are associated with increased interest in arousing and exciting media genres (Potter, Lee, & Rubenking, 2011). BIS, on the other hand, has been shown to be negatively correlated with adults-only programs and violent games, but positively to more predictable genres such as soap operas, talk shows, and news magazines (Potter et al., 2011). Given that individuals with a sensitive BAS are constantly looking for rewarding stimuli that are for instance novel or arousing, the present study argues that MTV reality shows might provide such stimuli given their focus on a group of people having fun while they are engaging in behavior that can be considered as risky such as smoking and (excessive) drinking.

Hypothesis 1: BAS is positively associated with watching MTV reality shows

Individuals with an active BIS, on the other hand, will be more likely to avoid a

confrontation with risk behavior. These people engage in risk assessment in order to anticipate the negative consequences of engaging in a certain behavior (Gray & McNaughton, 2003). Although MTV reality shows rarely portray the actual negative effects of excessive alcohol use and smoking, individuals with high BIS levels are theorized to rely on previously stored information regarding these risky behaviors as well (Lang & Yegiyan, 2011). By anticipating that watching MTV reality shows is associated with exposure to risk behavior, it can be hypothesized that an active BIS is negatively related to the viewing of MTV reality shows. Individuals with high BIS levels are thus assumed to avoid exposure to MTV reality show in view of avoiding exposure to risky behaviors.

Hypothesis 2: BIS is negatively associated with watching MTV reality shows

### ***A TPB perspective on media exposure and risky intentions***

In addition to the RST and its neuropsychological view on personality, this study approaches the link between media use and risk behavior from a TPB perspective as well. Over the years TPB has emerged as one of the most influential theories in explaining human behavior (Ajzen, 1991). Previous studies showed that the TPB framework is especially valuable and applicable to predicting individuals' intentions toward a variety of health-related risk behaviors (Webb & Sheeran, 2006). Behavioral intentions are important indicators of the extent to which individuals are planning to engage in a certain behavior and are assumed to capture motivational factors that influence behavior (Ajzen, 1991). Therefore, they are regarded as the immediate antecedents of any type of behavior (Fishbein & Ajzen, 2010). Intentions can thus be regarded as important predictors of engaging in risk behaviors such as smoking and alcohol use (Armitage & Conner, 2001). Furthermore, TPB distinguishes several intrapersonal factors such as age, gender, personality traits but also more environmental factors such as exposure to media as possible predictors of behavioral, normative and control beliefs and in turn of behavioral intentions (Ajzen, 2011).

As was shown from previous content analyses of media portrayals of smoking and drinking (Koordeman et al., 2012), such behaviors are in most cases depicted as positive and rewarding rather than resulting in negative consequences and punishment. Therefore, it can be expected that the observation of risky behavior in the media will have an influence on adolescents' behavioral intentions to perform these behaviors.

Following TPB, background factors such as media exposure are likely to have an influence on behavior and intentions in an indirect way through their effect on individuals' attitudes and normative beliefs (Ajzen, 2011). When discussing the role of normative beliefs it is necessary to

differentiate between injunctive and descriptive norms given that each refer to another source of human motivation (Ajzen, 2011). Injunctive norms are defined as “socially transmitted codes of behavior that carry with them implied social rewards and punishments” (Rhodes, Ewoldsen, Shen, Monahan, & Eno, 2014) and refer to beliefs about the extent to which behavior is approved or disapproved of by certain groups or people (Cialdini, Reno, & Kallgren, 1990). The subjective norm, which has a prominent place in the TPB of Fishbein and Ajzen (2010), can be regarded as an example of an injunctive norm given its referral to the perceived desires of people important to the individual such as family and friends (Rhodes et al., 2014). Previous research showed associations between this type of norm and smoking for instance (Zaleski & Aloise-Young, 2013) and alcohol intentions (Larimer, Turner, Mallett, & Geisner, 2010), stressing the need to take into account injunctive norms in research on these health-related risk behaviors. Descriptive norms, on the other hand, are defined as the awareness of what is typical or normal in a particular social group (Cialdini et al., 1990; Rhodes et al., 2014). Descriptive norms are often used as a guide for human behavior by adapting behavior in accordance with these norms (Göckeritz et al., 2010).

Perceived descriptive peer norms have been found to reflect an overestimation of risk behavior among peers in populations of adolescents and emerging adults (Borsari & Carey, 2003; Riou Franca, Dautzenberg, Falissard, & Reynaud, 2010). This exaggerated perception of peers’ engagement in risky behaviors is used as the norm against which the own behavior is compared (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). One possible cause of the overestimation of peers’ risk behavior might be the influence of the media on these descriptive norms (Gunther, Bolt, Borzekowski, Liebhart, & Dillard, 2006). The media provide adolescents with a large amount of attractive role models who are engaging in risky behaviors such as smoking and excessive drinking (Borzekowski & Strasburger, 2009). This high prevalence of risk behavior can lead to an overestimation among adolescents regarding the number of friends and peers that are engaging in these behaviors and can, consequently, have impact on their perceptions and behavior by making them think that what they see on television is the norm (Strasburger, Jordan, & Donnerstein, 2012). Previous studies found, for instance, that media exposure is associated with higher estimates of peer smoking (Gunther et al., 2006) and peer binge-drinking (Yanovitzky & Stryker, 2001). This overestimation of peer norms has in turn been linked to drunkenness (Lintonen & Konu, 2004) and intention to smoke for instance (Lai, Ho, & Lam, 2004). Based on the TPB framework and the high amount of risk behavior portrayed in MTV reality shows the current study proposes the following hypothesis:

Hypothesis 3: The association between MTV Reality Show exposure and adolescents' intentions to smoke (H3a), get drunk (H3b) and engage in binge-drinking (H3c) is (at least partially) mediated by descriptive peer norms.

In order to come to a better understanding and explanation of these associations (Göckeritz et al., 2010), studies have recently started to explore possible moderators of the association between descriptive norms and behavioral intentions, for instance, such as injunctive norms regarding a certain behavior (Göckeritz et al., 2010; Rimal & Real, 2005). Although descriptive and injunctive norms are usually mutually congruent, it is possible that individuals have the perception that many of their peers are engaging in a certain behavior, while at the same time believing that conducting this behavior would be disapproved of by significant social referents such as their friends and parents (Rimal & Real, 2005). According to the TPB, descriptive norms can exert their influence on behavioral intentions in a direct way (Ajzen, 1991). The question is whether the association between descriptive norms and intentions is such a straightforward and unmoderated process (Göckeritz et al., 2010). Individuals are sensitive to social approval by people who are important to them. Therefore, they attempt to behave consistently with the expectations of those important others in order to gain and maintain approval (Rimal & Real, 2005). It can thus be hypothesized that the influence of the descriptive norm on behavioral intentions as described in the TPB is moderated by the injunctive norm (Göckeritz et al., 2010; Rimal & Real, 2005). More specifically, believing that other people engage in a highly approved behavior therefore increases the likelihood of engaging in that behavior (Göckeritz et al., 2010; Rimal & Real, 2005). This stresses the need to take into account both descriptive and injunctive norms when trying to explain human behavior and behavioral intentions (Göckeritz et al., 2010).

Research examining this moderating role of injunctive norms is limited, but has shown that the association between perceived prevalence of friends' alcohol use on drinking behavior was moderated by approval of heavy drinking by friends among college students (Lee, Geisner, Lewis, Neighbors, & Larimer, 2007). Furthermore, it has been shown that injunctive norms moderate the association between descriptive norms and ecological conservation behavior (Göckeritz et al., 2010). The present study will examine whether this moderation of injunctive norms is applicable to the association between descriptive peer norms and different risky intentions among adolescents as well.

Hypothesis 4: The association between descriptive peer norms and intentions is moderated by the injunctive norm for smoking (H4a), getting drunk (H4b) and binge-drinking (H4c).

***BIS and BAS as moderators of the examined associations***

In addition to descriptive and injunctive norms, personality traits are believed to explain the underlying processes of the effect of exposure to media content and indicators of behavior (Lang & Ewoldsen, 2010; Valkenburg & Peter, 2013). BAS is directed at the processing information about the environment in which mediated stimuli are presented. Given that the system is responsive to positive, rewarding and arousing stimuli, exposure to this type of cues will lead to an increase in the mental resources available for the processing of this information (Lang, 2006). MTV reality shows expose viewers to a large amount of stimuli related to health-related risk behavior which are mostly presented in a rewarding and positive way. It can, therefore, be assumed that individuals with higher BAS levels will be likely to pay a lot of attention to these stimuli and process them more easily compared to individuals with lower BAS scores.

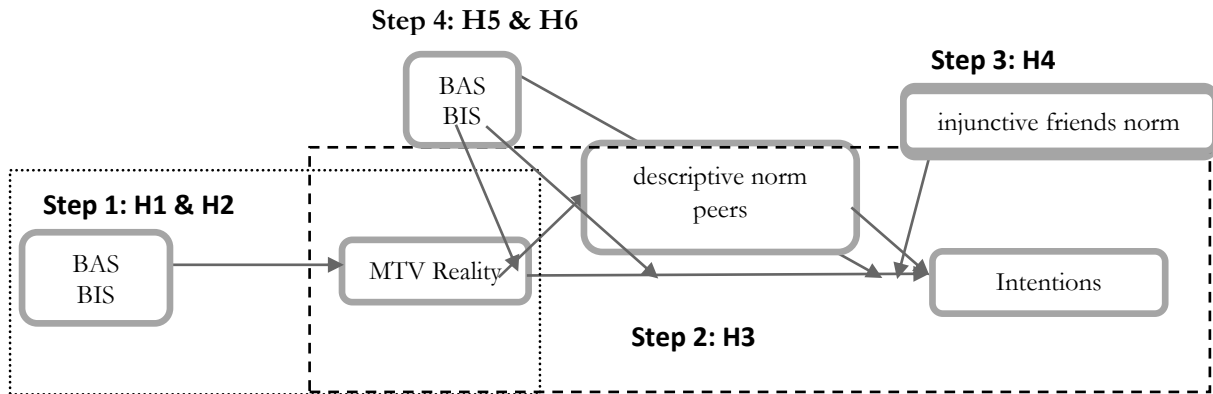
Hypothesis 5: The association between MTV reality show viewing and intentions toward risk behavior is stronger for adolescents with higher BAS scores.

The aversive system, on the other hand, is aimed at the protection of the individual from negative and possible harmful stimuli (Gray & McNaughton, 2003). Additionally, a sensitive BIS is associated with scanning the environment for these stimuli which in turn leads to inhibition and avoidance behavior of situations and environments in which they might occur (Corr, 2008). Even though MTV reality shows rarely depict these negative consequences, individuals with a sensitive inhibition system will turn to existing mental resources related to the stimulus that is shown (Wang & Lang, 2012). Therefore, mere exposure to risk behavior in these shows might be sufficient to result in avoidance behavior. A previous study already showed that the association between music television viewing and risky driving attitudes is absent for individuals with a higher BIS scores, while the association was significant for individuals with lower scores on BIS (Beullens, Rhodes, & Eggermont, 2016).

Hypothesis 6: The association between MTV reality show viewing and intentions toward risk behavior is weaker or absent for adolescents with higher BIS scores.

In sum, the current study aims to examine the pathways and hypotheses presented in the following model (figure 1) step by step in a systematic way.

**Figure 1:** Overview of the examined associations and hypotheses



## METHOD

### *Participant selection*

The current study collected data in 15 secondary schools among a total sample of 922 Flemish adolescents ( $M=14.96$  years,  $SD=.85$ , 56% girls) from different education levels. The legal guardians of the participants gave their informed consent for the participation in the study. The respondents were asked to fill in a paper-and-pencil survey during one hour of class in the presence of at least one research collaborator. Questions could be asked both before, during and after the completion of the survey. Participants were informed both orally as in the survey that their answers were completely confidential and that they could stop their participation at any time without consequences. All ethical guidelines applicable in the country where the study was conducted were followed.

### *Measures*

**MTV reality show viewing.** MTV reality show viewing was assessed by means of the question “How often do you watch MTV reality shows [examples of MTV reality shows 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 ( $M=2.32$ ,  $SD=2.2$ ).

**BIS/BAS.** Variations in the activity and reactivity of BIS and BAS were assessed with the validated Dutch version of the BIS/BAS questionnaire (Carver & White, 1994). The scale consists



of 20 items with response categories ranging from (1) absolute disagreement to (4) absolute agreement. The scores for both scales were computed by summing the item scores. Higher scores indicated a higher activity and reactivity of BIS and BAS. Both BIS (7 items,  $\alpha=.73$ ,  $M=17.92$ ,  $SD=3.99$ ) and BAS (13 items,  $\alpha=.83$ ,  $M=32.60$ ,  $SD=6.68$ ) had a good internal consistency in the present sample.

**Descriptive peer norms.** Adolescents' perception of the smoking and drinking behavior of their peers was assessed by using the questions "In your opinion, how many of your peers (Q1) smoke, (Q2) have been drunk, (Q3) have engaged in binge-drinking"? Response categories were (0) none, (1) very few, (2) a couple, (3) about half, (4) most of them, (5) almost everyone and (6) everyone (smoking:  $M=2.75$ ,  $SD=.96$ , being drunk:  $M=2.35$ ,  $SD=1.18$ , binge-drinking  $M=1.87$ ,  $SD=1.17$ ).

**Injunctive norms.** Adolescents' injunctive family and friends norms were measured by means of the subjective norm measure proposed in the TPB questionnaire (Ajzen, 1991) for smoking, getting drunk and binge-drinking. Respondents were asked separately for mother, father and friends to indicate their agreement with the following sentence: "My mother/father/friends would disapprove if I would engage in (a) smoking, (b) getting drunk, (c) binge-drinking" on a 7-point scale from (1) completely agree to (7) completely disagree. The items for the mother and father were summed and averaged to form a family norms variable with higher scores indicating more family disapproval toward smoking ( $\alpha=.83$ ,  $M=6.21$ ,  $SD=1.51$ ), getting drunk ( $\alpha=.85$ ,  $M=5.88$ ,  $SD=1.57$ ) and binge-drinking ( $\alpha=.89$ ,  $M=6.28$ ,  $SD=1.43$ ). The single items for friends was used for the injunctive norm for friends (smoking:  $M=4.42$ ,  $SD=1.96$ , getting drunk:  $M=3.97$ ,  $SD=2.04$ , binge-drinking  $M=4.71$ ,  $SD=2.11$ ).

**Control variables.** In order to fully assess the value of the specific MTV reality show genre in our analyses total television viewing was entered as a control variable. A frequently used measure in media effects (Beyens & Eggermont, 2014; Vandebosch & Eggermont, 2011) was integrated in the survey consisting of a timeline of boxes each representing 30 minutes of television viewing was used to assess television viewing for each day separately (Eggermont, 2005). The checked boxes were summed and multiplied by 30 (minutes) resulting in the total television viewing time per week in minutes ( $M=1469.83$ ,  $SD=828.93$ ). Also, a previous study showed that Flemish adolescent boys are more likely to start smoking and to consume alcoholic beverages compared to girls (Melis et al., 2013). Gender was, therefore, integrated as a control variable in the analyses (boys = 0, girls = 1) as well as age which has been positively related to higher engagement in smoking, more frequent alcohol use and the number of alcoholic consumptions (Beullens &

Van den Bulck, 2014). Table 1 provides a complete overview of the means and standard deviations of all the variables studied.

### ***Data analyses***

The analyses were conducted using IBM's SPSS 22.0. First, descriptive and correlation analyses were performed (Table 1). Second, hierarchical linear regression analyses were used to examine personality as a predictor of MTV reality show viewing (H1 and H2, step 1 in Figure 1). Third, it was examined whether descriptive peer norms mediated the association between MTV reality show viewing and intentions toward smoking, getting drunk and binge-drinking. Three separate mediation models were estimated, one for each dependent construct (H3a, H3b, H3c, step 2 in Figure 1), using model 4 of Hayes' (2013) PROCESS macro for SPSS. In this macro model parameters are estimated by using OLS regression. The PROCESS output renders unstandardized regression coefficients for the direct, indirect and total effect. The latter model represents the variance explained by the combination of the direct and the indirect effect. A bootstrapping process determining 95% confidence intervals was conducted for the calculation of the unstandardized regression coefficients for the indirect effects (1000 samples). Fourth, moderated mediation models were tested using model 16 of the macro in which injunctive family and friends norms were integrated as moderators of the association between descriptive peer norms and the three risky intentions in order to provide an answer to H4a, b and c (step 3 in Figure 1). Fifth, model 59 was used to test the moderating role of BAS and BIS in the association between media use and indicators of risk behavior as proposed in H5 and H6 (step 4 in Figure 1). Gender, age, total television viewing, BAS and BIS were integrated as covariates in each of these models.

## **RESULTS**

### ***Descriptive analyses***

Descriptive analyses indicated that MTV reality show viewing was positively associated with intentions toward smoking ( $r = .24, p < .01$ ), getting drunk ( $r = .26, p < .01$ ) and binge-drinking ( $r = .20, p < .01$ ). Additionally, viewing MTV reality shows was positively associated with the descriptive peers norms of all three behaviors: smoking ( $r = .24, p < .01$ ), getting drunk ( $r = .23, p < .01$ ) and binge-drinking ( $r = .21, p < .01$ ). Table 1 provides an overview of the zero-order correlations between all variables examined in the present study.

**Table 1: Zero-order correlations and descriptives**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1. Gender	-																		
2. Age	-0,051	-	M=14.96 SD=0.85																
3. MTV reality shows	,167**	0,042	-	M=2.32 SD=2.20															
4. Total TV viewing	-0,018	0,057	,193**	-	M=1469.83 SD=828.93														
5. Intention smoking	0,012	,131**	,235**	-0,007	-	M=2.11 SD=1.88													
6. Intention getting drunk	-0,051	,206**	,264**	0,019	,497**	-	M=2.91 SD=2.07												
7. Intention binge-drinking	-0,003	,130**	,195**	0,006	,431**	,655**	-	M=2.03 SD=1.60											
8. DN peers smoking	,111**	,188**	,243**	,117**	,280**	,192**	,179**	-	M=2.75 SD=0.96										
9. IN friends smoking	,085*	-,135**	-,147**	-,067*	-,383**	-,306**	-,232**	-,223**	-	M=4.42 SD=1.96									
10. IN family smoking	0,028	-,128**	-0,038	-0,001	-,339**	-,132**	-,125**	-,147**	,318**	-	M=6.21 SD=1.51								
11. DN peers getting drunk	,105**	,142**	,227**	0,017	,278**	,391**	,267**	,390**	-,139**	-,082*	-	M=2.35 SD=1.18							
12. IN friends getting drunk	,133**	-,176**	-,157**	-0,044	-,327**	-,465**	-,329**	-,173**	,433**	,271**	-,311**	-	M=3.97 SD=2.04						
13. IN family getting drunk	0,005	-,168**	-,125**	0,005	-,153**	-,304**	-,253**	-,147**	,246**	,435**	-,181**	,444**	-	M=5.88 SD=1.57					
14. DN peers binge-drinking	,125**	,128**	,210**	0,037	,195**	,285**	,234**	,369**	-,096**	-,117**	,641**	-,214**	-,096**	-	M=1.87 SD=1.17				
15. IN friends binge-drinking	,136**	-,192**	-,169**	-0,055	-,300**	-,400**	-,373**	-,175**	,426**	,279**	-,211**	,649**	,382**	-,220**	-	M=4.71 SD=2.09			
16. IN family binge-drinking	0,014	-,203**	-,096**	0,015	-,134**	-,191**	-,227**	-,161**	,234**	,461**	-,086**	,328**	,661**	-,099**	,425**	-	M=6.28 SD=1.43		
17. BAS	-0,017	0,008	,197**	,083*	,192**	,226**	,152**	,205**	-,101**	-0,049	,193**	-,160**	-0,063	,171**	-,112**	-0,035	-	M=32.60 SD=6.68	
18. BIS	,347**	-0,029	,072*	0,014	-0,024	-,065*	-0,064	0,017	0,061	0,063	,081*	,086**	,068*	,080*	,150**	,097**	,167**	-	M=17.92 SD=3.99

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### ***BAS and BIS as predictors of media use***

An hierarchical regression analysis was conducted in which the predictive value of BAS and BIS was examined with MTV reality show viewing as the dependent variable (step 1, Figure 1). The results of this analysis are presented in Table 2 and indicated that the total model for the viewing of MTV reality shows was significant  $F(4,887)=16.57, p < .001$  and explains 6.5% of the variance. Gender and age were entered in step 1 and explained 3.0% of the variance in watching MTV reality shows. Age was not a significant predictor in the model ( $\beta = .05, p > .05$ ), but the results did show that girls are more likely to watch these programs ( $\beta = .19, p < .001$ ) compared to boys. BAS and BIS were entered in the second step of the model. The results provided support for **H1** and showed that BAS is a significant positive predictor of watching MTV reality shows ( $\beta = .20, p < .001$ ). Adolescents who are more sensitive to rewards are thus more likely to view these programs compared to those who are less sensitive toward rewards. The results, however, did not provide support for the hypothesized negative association between BIS and MTV reality shows (**H2**) ( $\beta = -.02, p > .05$ ).

**Table 2:** Hierarchical regression model for MTV Reality Show viewing

	<i>B</i>	<i>SE B</i>	$\beta$
Step 1			
Gender	.823	.154	.185***
Age	.125	.084	.048
		Change in R <sup>2</sup> = .030***	
Step 2			
BAS	.064	.011	.195***
BIS	-.010	.019	-.018
		Change in R <sup>2</sup> : .035***	
Final R <sup>2</sup> (= adjusted) = .065			
F = 16.57			
df = 4/887			

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

### ***Predicting adolescents' intentions toward risk behavior***

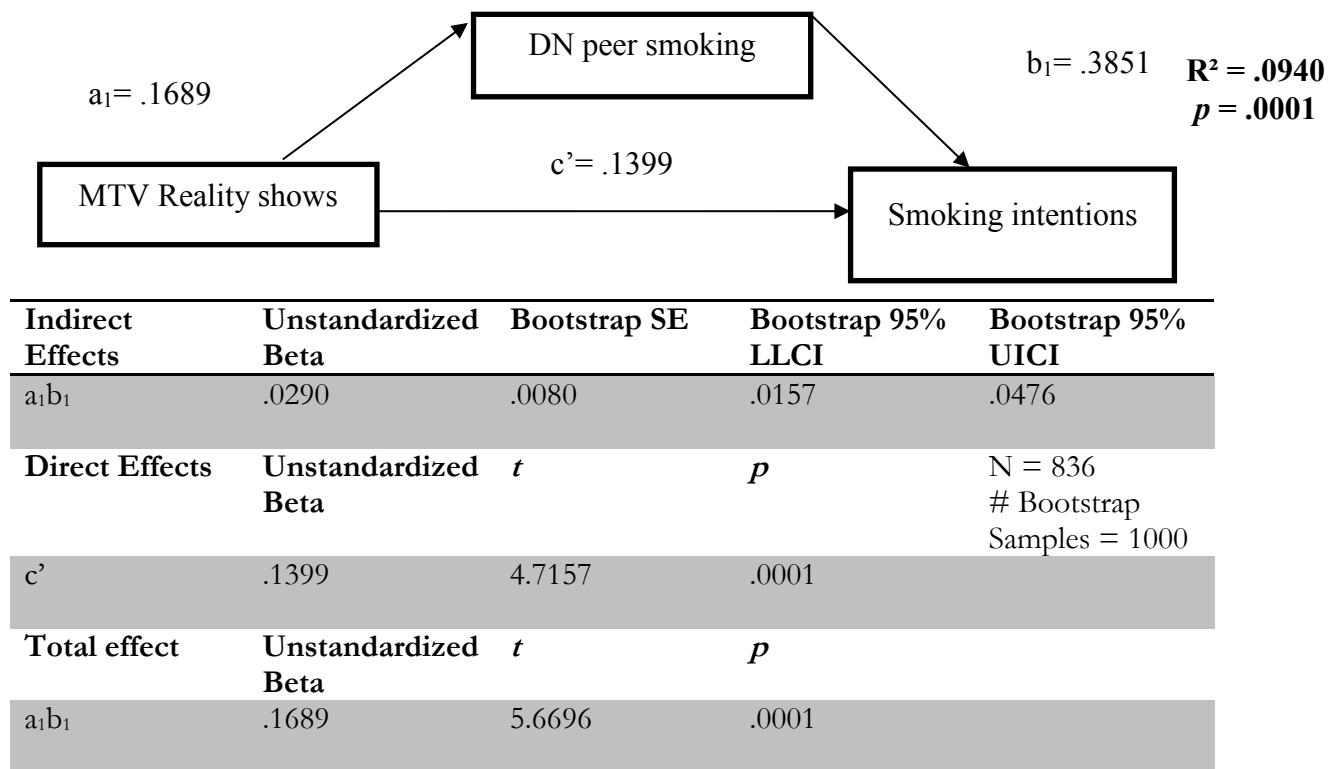
The current study hypothesized that a significant positive association exists between MTV reality show viewing and intentions toward three types of risk behavior: intention toward smoking, intention to get drunk and intention toward binge-drinking (step 2, Figure 1). Additionally, it was expected that the association between MTV reality show viewing and risky intentions would be mediated by the descriptive peer norms (step 2, Figure 1). Furthermore, the current study hypothesized that the association between the descriptive peer norm and the risky intentions

would be moderated by the injunctive family and friend norms (step 3, Figure 1). These steps were carried out for each of the risky intentions separately.

*Adolescents' intentions toward smoking*

The total effect model (Figure 2) showed a significant effect of MTV reality show viewing on adolescents' intentions to use tobacco in the next 6 months (total effect coeff. = .17,  $p < .001$ ). In total, the model explained 9.4% of the variance in smoking intentions ( $F(6, 829) = 14.68, p < .001$ ). Bias-corrected bootstrapped confidence intervals showed a direct effect (coeff. = .14,  $p < .01$ ) supporting **H3a**, as well as an indirect effect through descriptive peer norms (coeff. = .03, CI95%: .02/.05) providing support for the mediating role of descriptive peer norms. Regarding the other variables entered in the model it was found that age is positively associated with smoking intentions (coeff. = .26,  $p < .01$ ), showing that these intentions increase as adolescents get older. Also, BAS was found to be positively associated with intentions toward smoking (coeff. = .04,  $p < .01$ ). BIS, on the other hand, was negatively associated with the dependent variable in this model (coeff. = -.05,  $p < .05$ ).

**Figure 2:** Mediation Model of MTV reality shows and smoking intentions



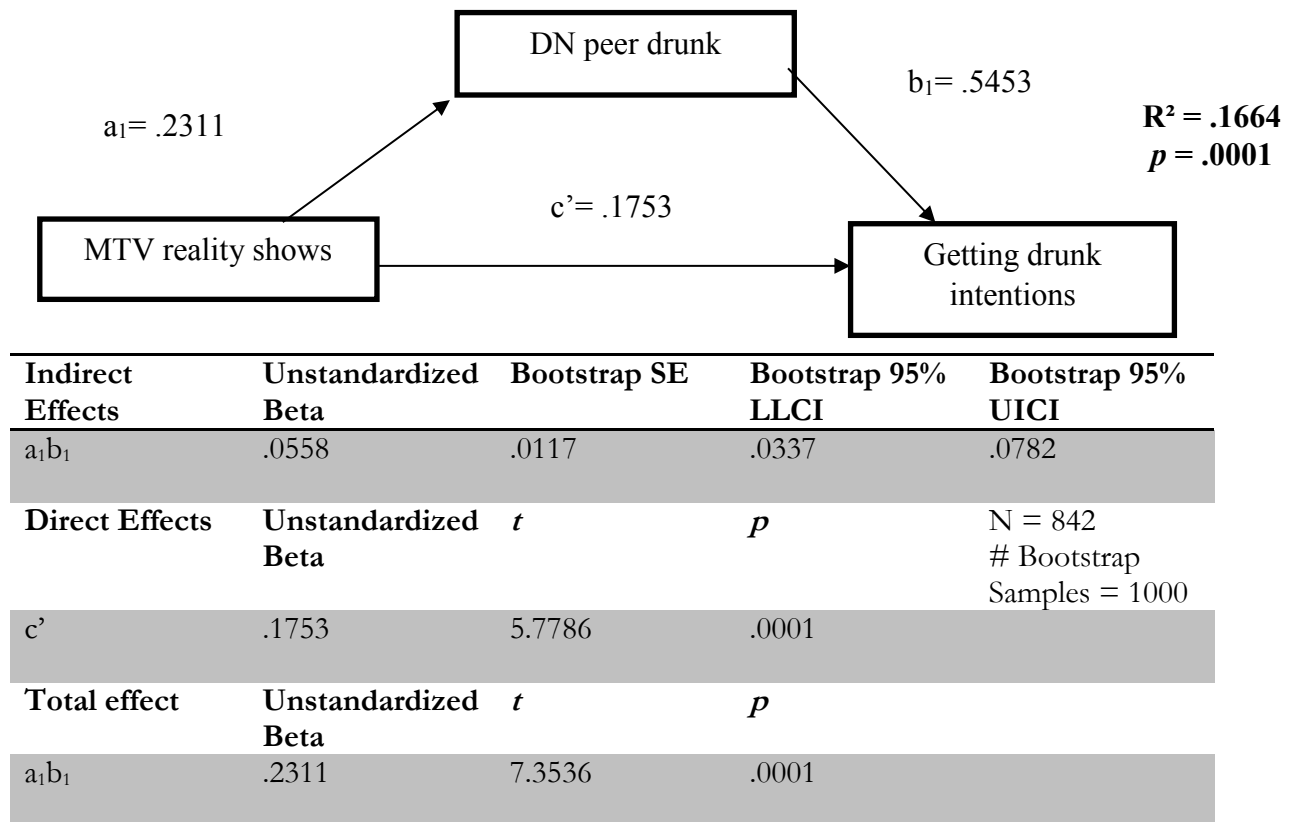
\*control variables: gender, age, BIS, BAS, total TV viewing

In a next step, the possible moderating role of injunctive friends and family norms in explaining the association between descriptive norms and intentions was examined using model 16 of Hayes' PROCESS macro. The results showed no significant interaction effect of descriptive norms and injunctive family norms on smoking intentions (coeff. =  $-.04$ ,  $p > .05$ ). A significant interaction effect was found with injunctive friend norms (coeff. =  $-.12$ ,  $p < .01$ ) showing that the more friends disapprove of smoking, the weaker the association between descriptive norms and intentions providing partial support for **H4a**.

#### *Adolescents' intentions toward getting drunk*

A significant total effect (figure 3) was found for the link between MTV reality show viewing and intentions to get drunk (total effect coeff. =  $.23$ ,  $p < .001$ ) explaining 16.64% of the variance ( $F(6, 835) = 27.78$ ,  $p < .001$ ). This total effect consists of a significant direct effect of MTV reality shows on intentions as proposed by **H3b** (coeff. =  $.18$ ,  $p < .01$ ) and an indirect effect through the mediation of descriptive peers norms (coeff. =  $.06$ , CI95%:  $.03/.08$ ). Additionally, the model showed that age is positively associated with intentions (coeff. =  $.45$ ,  $p < .01$ ). A negative association was found with gender (coeff. =  $-.19$ ,  $p < .05$ ) indicating that boys have a higher intentions toward getting drunk. Furthermore, BAS was positively related to intentions toward getting drunk (coeff. =  $.07$ ,  $p < .01$ ), while BIS was negatively associated with intentions to perform this behavior (coeff. =  $-.06$ ,  $p < .05$ ).

**Figure 3:** Mediation Model of MTV reality shows and getting drunk intentions



\*control variables: gender, age, BIS, BAS, total TV viewing

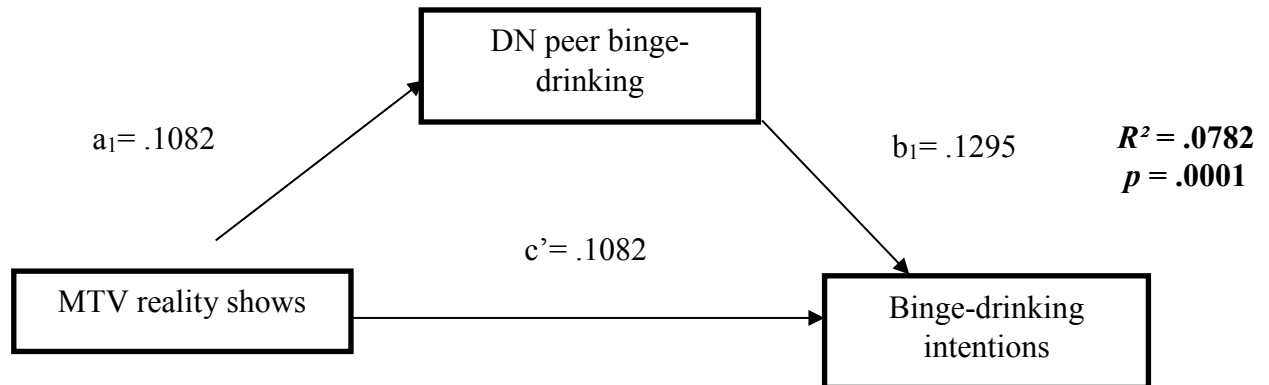
Consequently, injunctive friend and family norms were examined as moderators of the link between descriptive peer norms and intentions toward getting drunk. No significant interaction effect of descriptive norms and injunctive family norms was found on intentions (coeff. =  $-.01$ ,  $p > .05$ ). The interaction effect was significant for injunctive friend norms (coeff. =  $-.09$ ,  $p < .01$ ) supporting the hypothesis (**H4b**) that higher disapproval by friends is associated with a weaker association between descriptive norms and intentions.

#### *Adolescents' intentions toward binge-drinking*

MTV reality show viewing has a significant total effect on adolescents' intentions toward binge drinking (total effect coeff. =  $.13$ ,  $p < .001$ ). The model presented in Figure 4 explained 7.82% of the variance in binge-drinking intentions ( $F(6, 827) = 14.46$ ,  $p < .001$ ). The results showed a significant direct effect on binge-drinking intention in line with **H3c** (coeff. =  $.11$ ,  $p < .01$ ). Furthermore, also an indirect effect through descriptive peer norms was found (coeff. =  $.02$ , CI95%:  $.01/.04$ ). In line with the model for smoking and getting drunk, age was positively related to binge-drinking intentions (coeff. =  $.20$ ,  $p < .01$ ). Support was found for a positive association

between BAS and these intentions (coeff. = .03,  $p < .01$ ) as well as for BIS being negatively associated with intentions to binge-drink (coeff. = -.05,  $p < .01$ ).

**Figure 4:** Mediation Model of MTV reality shows and binge-drinking intentions



Indirect Effects	Unstandardized Beta	Bootstrap SE	Bootstrap 95% LLCI	Bootstrap 95% UICI
$a_1b_1$	.0213	.0066	.0112	.0394
Direct Effects	Unstandardized Beta	$t$	$p$	N = 834 # Bootstrap Samples = 1000
$c'$	.1082	4.2572	.0001	
Total effect	Unstandardized Beta	$t$	$p$	
$a_1b_1$	.1295	5.0853	.0001	

\*control variables: gender, age, BIS, BAS, total TV viewing

Again, no significant interaction effect of descriptive norms and injunctive family norms was found (coeff. = -.03,  $p > .05$ ). The interaction effect for injunctive friend norms (coeff. = -.04,  $p < .05$ ) did support **H4c** showing that higher disapproval of binge-drinking by friends is associated with a weaker association between descriptive norms and intentions.

### **BAS and BIS as moderators**

It was hypothesized that BAS and BIS would serve as moderators of the associations between MTV reality shows and descriptive norms and behavioral intentions (see figure 1). The results, however, showed that the association between this media genre and descriptive norms toward smoking (coeff = -.0001,  $p > .05$ ), getting drunk (coeff = -.0019,  $p > .05$ ) and binge-drinking (coeff = -.0029,  $p > .05$ ) was not stronger for individuals with a sensitive BAS compared to those



with a less active BAS. The same result was found for the association between MTV reality shows and behavioral intentions toward these behaviors (smoking:  $\text{coeff} = -.0023, p > .05$ , getting drunk:  $\text{coeff} = .0052, p > .05$  and binge-drinking:  $\text{coeff} = -.0001, p > .05$ ). Therefore, the results did not provide support for H5.

The same analyses were conducted to examine the potential moderating role of BIS. Again, no moderation was found for the association between MTV reality shows and descriptive norms regarding smoking ( $\text{coeff} = -.0019, p > .05$ ), getting drunk ( $\text{coeff} = .0010, p > .05$ ) and binge-drinking ( $\text{coeff} = -.0085, p > .05$ ). Also, the association between this genre and behavioral intentions was not weaker for individuals with a sensitive BIS (smoking:  $\text{coeff} = -.0013, p > .05$ , getting drunk:  $\text{coeff} = -.0056, p > .05$  and binge-drinking:  $\text{coeff} = .0029, p > .05$ ). These results did not support H6 regarding the assumed moderation of BIS.

## DISCUSSION

Previous research showed that MTV reality shows contain high amounts of references to smoking and alcohol use (Bond & Drogos, 2014; Flynn et al., 2015). For that reason, the shows have received the critique that they promote negative health behaviors and set a bad example especially for young viewers (e.g., Kells, 2010; Villarreal, 2013). To the best of our knowledge, no research has examined which adolescents are most likely to watch these shows. A **first goal** of the current study was, therefore, to examine the predicting role of BAS and BIS. The results provided support the positive association between BAS and this genre in line with hypothesis 1. No support was found, however, for the second hypothesis in which a negative association between BIS and MTV reality shows was expected based on the theoretical foundation of BIS. The absence of an association with BIS might indicate that the behavior portrayed in MTV shows is not regarded as a negative cue that should be avoided. The behavior shown in these shows might be perceived as too far from the own life and, therefore, no need exists to inhibit exposure to these behaviors. Nevertheless, more research on the association between BAS and BIS as predictors of media genres containing references to risk behavior remains necessary in order examine approach and inhibition behavior toward these genres in terms of BAS and BIS more in depth.

Following social cognitive theory (SCT) (Bandura, 2001), the current study argued that exposure to this media genre is associated with higher intentions toward getting drunk, binge-drinking and smoking, especially given that these behaviors are generally portrayed in a positive context in MTV reality shows (Flynn et al., 2015). Therefore, a **second goal** of the present study was to examine whether the viewing of MTV reality shows is associated with intentions toward smoking, getting drunk and binge-drinking in adolescents. Support was found for hypothesis 3a,

3b and 3c showing that MTV reality show viewing is positively associated with adolescents' intentions to smoke, get drunk and binge-drink. These associations are in line with SCT that states that behavior that is portrayed in the media as rewarding and positive will be more likely to be modelled especially if it is conducted by individuals who can be regarded as role models (Bandura, 2001).

As a **third goal**, the present study focused on the association between MTV reality show viewing and negative health intentions by exploring social norms as one of the important underlying pathways of this association. Recently, a new perspective on the role of descriptive and injunctive norms has been proposed in the literature for instance in the research of Göckeritz et al. (2010). It is suggested that descriptive norms should be regarded as mediators of the association between media and risk behavior and injunctive norms as moderators of the association between descriptive norms and risky intentions. Our results provide support for the mediating role of descriptive norms and show that MTV reality shows are related to risky intentions in an indirect way through descriptive peer norms. This indirect pathway is in line with TPB and with previous studies showing that examples of risk behavior in the media can lead to an overestimation of the extent to which peers and friends engage in this behavior (Strasburger et al., 2012). This perception of peers' engagement in negative health behaviors is believed to be used as norm for the comparison of the own behavior (Schultz et al., 2007) which was supported by the results of the current study for all of the examined health behaviors.

Furthermore, partial support was provided for the moderating role of injunctive norms for smoking, getting drunk and binge-drinking as was proposed in hypothesis 4a, 4b and 4c. It was assumed that both injunctive friends and family norms would act as a moderator, however, support was only found for a moderating role of friends norms. These results indicate that the extent to which friends (dis)approve of risk behaviors, the stronger or the weaker the association between descriptive norms and intentions. (Dis)approval of parents, on the other hand, does not appear to play a significant role in explaining the strength of this association. Believing that peers engage in a certain behavior that is approved by friends thus increases the likelihood that this behavior will be performed in the next six months. A possible explanation can be found in the strong peer identification and the importance of friends that emerges during adolescence (Cook et al., 2007). Friends become more and more important during this time and it can be assumed that also the opinion of these friends is used as a comparison tool for their own behavioral intentions, while this is less the case for the extent to which parents approve or disapprove of a certain behavior (Christie & Viner, 2005).

A **fourth and final aim** was to examine a second explanatory role of BAS and BIS besides

predictors of MTV reality shows. Previous research indicated that these concepts can be regarded as moderators of the association between media use and attitudes toward negative health behaviors as well (Beullens et al., 2016, Vangeel et al., 2016). Therefore, BAS and BIS were explored as moderators of the association between MTV reality show viewing and both descriptive peer norms and risky intentions. The results, however, did not support the hypothesized reinforcing role of BAS (hypothesis 5), neither did they confirm that BIS functions as a protector in this respect (hypothesis 6). It is possible that the absence of a moderation of BAS can be explained by the fact that intentions toward risk behavior are already higher among those adolescents with a sensitive BAS given that an active BAS has been shown to be related to an inclination toward engaging in risk behavior in previous research (Franken & Muris, 2006; Voigt et al., 2009). Additionally, the absence of a moderating role of BIS in the model might indicate that adolescents with a sensitive BIS are already aware of the negative consequences of the risk behavior examined in the current study, and that they don't need MTV reality shows as a source of information to activate inhibition or avoidance behavior regarding alcohol use and smoking. Longitudinal research is needed in order to disentangle the way these concepts are related and to examine how the associations evolve over time.

### ***Implications and directions for future research***

The results revealed an association between MTV reality shows and intentions toward different types of health-related behaviors in a direct as well as an indirect way through their estimations of real-life peer behavior. It can be reasoned that providing viewers with a balanced and realistic view of the harmful effects of these behaviors might help to counter risky messages and prevent an overestimation of real-life risk behavior. Furthermore, media literacy initiatives should focus on guiding adolescents in the development and improvement of their critical thinking skills. More specifically, encouraging adolescents to reflect on what they see in the media and to compare these messages to real-life observations as well as to their own beliefs might help them to process risky messages in a responsible way.

Adolescents with a sensitive BAS are more likely to watch MTV reality shows compared to those with lower BAS levels. In addition, previous research provided extensive support for the association between high BAS levels and engaging in risk behavior (e.g., Franken & Muris, 2006; Voigt et al., 2009). Adolescents who are highest at risk for conducting risk behavior are thus also exposed the most to the risk behavior portrayed in MTV reality shows. Media campaigns are considered as a powerful tool in the prevention of health-related risk behaviors such as alcohol use (Elder et al., 2004) given their ability to repeatedly reach a large and varied audience (Wakefield,

Loken, & Hornik, 2010). Following the findings of the current study it can be argued that media prevention campaigns should be broadcasted in commercials before, after and during these programs in order to counter exposure to behaviors portrayed in MTV shows. Furthermore, the results emphasize the need to tailor these campaigns based on the sensitivity BAS in order to maximize their effectiveness. Developers of prevention campaigns should take into account the link that was found in previous research between BAS and message effectiveness (Sherman, Mann, & Updegraff, 2006). These studies generally showed that a “gain frame” or “advantage frame” in which the benefits of a certain health behavior are emphasized are more successful in influencing individuals with a sensitive activation system such as BAS compared a “loss frame” stressing negative consequences (Shen & Dillard, 2007; Sherman et al., 2006).

Despite the relevance of the findings, there are some limitations that should be taken into account in future research. First, the cross-sectional nature of the study design allowed to find support for the association between MTV reality shows, and descriptive norms and higher intentions to perform risk behavior. In order to examine the causality of these associations longitudinal research can lead to additional insights. Second, the current study focused on adolescents because their increased involvement in experimenting behavior and their strong attachment to peers and friends. Therefore, our results cannot be extrapolated to other populations such as children and (emerging) adults. Future research could examine whether our results can be found in other samples as well. Third, the media variable integrated in the present study only measured viewing frequency of MTV reality shows and not duration. The incorporation of duration in studies on this topic might be valuable. Also, it might be interesting to examine the model for other media genres containing references to health-related risk behavior as well in order to investigate whether our findings can be extrapolated to other media genres.

Nevertheless, the current study makes an important contribution to the understanding of the way personality and social norms are involved in the association between media use and behavioral intentions. It was shown that especially reward sensitive individuals are likely to watch MTV reality shows which are in turn associated with higher intentions to smoke, get drunk and engage in binge-drinking through a partial mediation of descriptive peer norms. Additionally, the results emphasized that a theoretical distinction should be made between the role of descriptive norms and injunctive norms from the perspective of TPB. Therefore, it can be argued that both descriptive as injunctive norms need to be taken into account when examining the processes underlying the association between media use and risk behavior. Additionally, the results stress the need to examine the moderating role of injunctive norms and not merely regard all norms as mediators from a TPB perspective.

## REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, 26(9), 1113–1127. <http://doi.org/10.1080/08870446.2011.613995>
- Aluja-Fabregat, A., & Torrubia-Beltri, R. (1998). Viewing of mass media violence, perception of violence, personality and academic achievement. *Personality and Individual Differences*, 25, 973–989. [http://doi.org/10.1016/S0191-8869\(98\)00122-6](http://doi.org/10.1016/S0191-8869(98)00122-6)
- Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *British Journal of Social Psychology*, 40(4), 471–499. <http://doi.org/10.1348/014466601164939>
- Arnett, J. J. (2000). Emerging adulthood. A theory of development from the late teens through the twenties. *The American Psychologist*, 55, 469–480. <http://doi.org/10.1037/0003-066X.55.5.469>
- Bandura, A. (2001). Social Cognitive Theory of Mass Communication. *Media Psychology*, 3(3), 265–299. [http://doi.org/10.1207/S1532785XMEP0303\\_03](http://doi.org/10.1207/S1532785XMEP0303_03)
- Beullens, K., Rhodes, N., & Eggermont, S. (2016). Behavioral activation and inhibition as moderators of the relationship between music video-viewing and joyriding attitudes. *Media Psychology*, 19(2), 181–202. doi:10.1080/15213269.2014.950756
- Beullens, K., Roe, K., & Van den Bulck, J. (2008). Video games and adolescents' intentions to take risks in traffic. *Journal of Adolescent Health*, 43(1), 87–90. <http://doi.org/10.1016/j.jadohealth.2007.12.002>
- Beullens, K., & Van den Bulck, J. (2014). Predicting adolescents' smoking status in Belgium: The role of music television viewing, gender, and school year. *Journal of Children and Media*, 8(1), 69–86. <http://doi.org/10.1080/17482798.2014.863481>
- Beyens, I., & Eggermont, S. (2014). Putting Young Children in Front of the Television: Antecedents and Outcomes of Parents' Use of Television as a Babysitter. *Communication Quarterly*, 62(1), 57–74. <http://doi.org/10.1080/01463373.2013.860904>
- Bond, B. J., & Drogos, K. L. (2014). Sex on the Shore: Wishful Identification and Parasocial Relationships as Mediators in the Relationship Between Jersey Shore Exposure and Emerging Adults' Sexual Attitudes and Behaviors. *Media Psychology*, 17(1), 102–126.
- Borsari, B., & Carey, K. B. (2003). Descriptive and injunctive norms in college drinking: a meta-analytic integration. *Journal of Studies on Alcohol*, 64(3), 331–341.

- Borzekowski, D., & Strasburger, V. C. (2009). Adolescents and media messages about tobacco, alcohol and drugs. In S. L. Calvert & B. J. Wilson (Eds.), *The Handbook of Children, Media, and Development* (pp. 432–452). Oxford: Blackwell Publishing Ltd.
- Carver, C. S., & White, T. L. (1994). Behavioral Inhibition, Behavioral Activation, and Affective Responses to Impending Reward and Punishment: The BIS / BAS Scales. *Journal of Personality and Social Psychology*, *67*(2), 319–333. <http://doi.org/10.1037/0022-3514.67.2.319>
- Christie, D., & Viner, R. (2005). Adolescent development. *British Medical Journal*, *330*, 301–304. <http://doi.org/10.1136/bmj.330.7486.301>
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, *58*(6), 1015–1026.
- Cook, T. D., Deng, Y., & Morgano, E. (2007). Friendship influences during early adolescence: The special role of friends' grade point average. *Journal of Research on Adolescence*, *17*(2), 325–356. <http://doi.org/10.1111/j.1532-7795.2007.00525.x>
- Corr, P. J. (2008). The Reinforcement Sensitivity Theory (RST): introduction. In *The Reinforcement Sensitivity Theory of Personality* (pp. 1–43). Cambridge: Cambridge University Press.
- Dalton, M., Tickle, J. J., Sargent, J. D., Beach, M. L., Ahrens, M. B., & Heatherton, T. F. (2002). The incidence and context of tobacco use in popular movies from 1988 to 1997. *Preventive Medicine*, *34*, 516–523. <http://doi.org/10.1006/pmed.2002.1013>
- De Vries, H., Engels, R., Kremers, S., Wetzels, J., & Mudde, A. (2003). Parents' and friends' smoking status as predictors of smoking onset: Findings from six European countries. *Health Education Research*, *18*(5), 627–636. <http://doi.org/10.1093/her/cyg032>
- Eggermont, S. (2005). Young adolescents' perceptions of peer sexual behaviours: the role of television viewing. *Child: Care, Health and Development*, *31*(4), 459–68. <http://doi.org/10.1111/j.1365-2214.2005.00525.x>
- Elder, R. W., Shults, R., Sleet, D., Nichols, J. L., Thompson, R. S., & Rajab, W. (2004). Effectiveness of mass media campaigns for reducing drinking and driving and alcohol-involved crashes: a systematic review. *American Journal of Preventive Medicine*, *27*(1), 57–65. <http://doi.org/10.1016/j.amepre.2004.03.002>
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behaviour: The reasoned action approach*. Psychology Press. New York: Psychology Press.
- Flay, B. R., Hu, F. B., Siddiqui, O., Day, L. E., Hedeker, D., Petraitis, J., ... Sussman, S. (1994). Differential influence of parental smoking and friends' smoking on adolescent initiation and

- escalation of smoking. *Journal of Health and Social Behavior*, 35(3), 248–265. <http://doi.org/10.2307/2137279>
- Flynn, M., Morin, D., Park, S.-Y., & Stana, A. (2015). Let's get this party started!: An analysis of health risk behavior on MTV reality television shows. *Journal of Health Communication*.
- Franken, I. (2002). Behavioral approach system (BAS) sensitivity predicts alcohol craving. *Personality and Individual Differences*, 32(2), 349–355. [http://doi.org/10.1016/S0191-8869\(01\)00030-7](http://doi.org/10.1016/S0191-8869(01)00030-7)
- Franken, I., & Muris, P. (2006). BIS/BAS personality characteristics and college students' substance use. *Personality and Individual Differences*, 40(7), 1497–1503. <http://doi.org/10.1016/j.paid.2005.12.005>
- Göckeritz, S., Schultz, P. W., Rendón, T., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2010). Descriptive normative beliefs and conservation behavior: The moderating roles of personal involvement and injunctive normative beliefs. *European Journal of Social Psychology*, 40(3), 514–523.
- Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy*, 8(3), 249–266. [http://doi.org/10.1016/0005-7967\(70\)90069-0](http://doi.org/10.1016/0005-7967(70)90069-0)
- Gray, J. A., & McNaughton, N. (2003). *The Neuropsychology of Anxiety: An Enquiry Into the Function of the Septo-bippocampal System*. New York: Oxford University Press.
- Gunther, A. C., Bolt, D., Borzekowski, D. L. G., Liebhart, J. L., & Dillard, J. P. (2006). Presumed influence on peer norms: How mass media indirectly affect adolescent smoking. *Journal of Communication*, 56, 52–68. <http://doi.org/10.1111/j.1460-2466.2006.00002.x>
- Hanewinkel, R., Sargent, J. D., Poelen, E., Scholte, R., Florek, E., Sweeting, H., ... Morgenstern, M. (2012). Alcohol consumption in movies and adolescent binge drinking in 6 European countries. *Pediatrics*, 129(4), 709–20. <http://doi.org/10.1542/peds.2011-2809>
- Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York: The Guilford Press.
- Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and Gratifications Research. *Public Opinion Quarterly*, 37(4), 509–523.
- Kells, T. (2010). MTV's Jersey Shore - appropriate for your teen? Retrieved from <http://www.examiner.com/article/mtv-s-jersey-shore-appropriate-for-your-teen>
- Koordeman, R., Anschutz, D. J., & Engels, R. C. M. E. (2012). Alcohol portrayals in movies, music videos and soap operas and alcohol use of young people: current status and future challenges. *Alcohol and Alcoholism*, 47(5), 612–23. <http://doi.org/10.1093/alcalc/ags073>

- Lai, M. K., Ho, S. Y., & Lam, T. H. (2004). Perceived peer smoking prevalence and its association with smoking behaviours and intentions in Hong Kong Chinese adolescents. *Addiction, 99*, 1195–1205. <http://doi.org/10.1111/j.1360-0443.2004.00797.x>
- Lang, A. (2006). Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages. *Journal of Communication, 56*. <http://doi.org/10.1111/j.1460-2466.2006.00283.x>
- Lang, A., & Ewoldsen, D. (2010). Beyond effects: Conceptualizing communication as dynamic, complex, nonlinear, and fundamental. In S. Allan (Ed.), *Rethinking communication: Keywords in communication research*. New York: Hampton Press.
- Lang, A., & Yeghyan, N. (2011). Individual differences in motivational activation influence responses to pictures of taboo products. *Journal of Health Communication, 16*(10), 1072–87. <http://doi.org/10.1080/10810730.2011.571336>
- Larimer, M. E., Turner, A. P., Mallett, K., & Geisner, I. M. (2010). Predicting Drinking Behavior and Alcohol-Related Problems Among Fraternity and Sorority Members: Examining the Role of Descriptive and Injunctive Norms. *Psychological Addictive Behavior, 18*(3), 203–212. <http://doi.org/10.1037/0893-164X.18.3.203>
- Lee, C. M., Geisner, I. M., Lewis, M. A., Neighbors, C., & Larimer, M. E. (2007). Social motives and the interaction between descriptive and injunctive norms in college student drinking. *Journal of Studies on Alcohol and Drugs, 68*(5), 714–721.
- Lintonen, T. P., & Konu, A. I. (2004). The misperceived social norm of drunkenness among early adolescents in Finland. *Health Education Research, 19*(1), 64–70. <http://doi.org/10.1093/her/cyg010>
- Maggs, J. L., Patrick, M. E., & Feinstein, L. (2008). Childhood and adolescent predictors of alcohol use and problems in adolescence and adulthood in the National Child Development Study. *Addiction, 103*, 7–22. <http://doi.org/10.1111/j.1360-0443.2008.02173.x>
- Melis, S., Ilse, B., Rosiers, J., & Marijs, G. (2013). VAD-leerlingenbevraging in het kader van een drugbeleid op school, 24. <http://doi.org/D/2010/6030/15>
- Papacharissi, Z., & Mendelson, A. L. (2007). An Exploratory Study of Reality Appeal: Uses and Gratifications of Reality TV Shows. *Journal of Broadcasting & Electronic Media, 51*, 355–370. <http://doi.org/10.1080/08838150701307152>
- Peter, J., & Valkenburg, P. M. (2010). Processes Underlying the Effects of Adolescents' Use of Sexually Explicit Internet Material: The Role of Perceived Realism. *Communication Research, 37*, 375–399. <http://doi.org/10.1177/0093650210362464>



- Potter, R. F., Lee, S., & Rubenking, B. E. (2011). Correlating a Motivation-Activation Measure With Media Preference. *Journal of Broadcasting & Electronic Media*, 55(3), 400–418. <http://doi.org/10.1080/08838151.2011.597468>
- Rhodes, N., Ewoldsen, D. R., Shen, L., Monahan, J. L., & Eno, C. (2014). The Accessibility of Family and Peer Norms in Young Adolescent Risk Behavior. *Communication Research*, 41, 3–26. <http://doi.org/10.1177/0093650211429118>
- Rimal, R. N., & Real, K. (2005). How Behaviors are Influenced by Perceived Norms: A Test of the Theory of Normative Social Behavior. *Communication Research*, 32, 389–414. <http://doi.org/10.1177/0093650205275385>
- Riou Franca, L., Dautzenberg, B., Falissard, B., & Reynaud, M. (2010). Peer substance use overestimation among French university students: a cross-sectional survey. *BMC Public Health*, 10(1), 169. <http://doi.org/10.1186/1471-2458-10-169>
- Sargent, J. D., Dalton, M. a., Beach, M. L., Mott, L. a., Tickle, J. J., Ahrens, M. B., & Heatherton, T. F. (2002). Viewing tobacco use in movies. Does it shape attitudes that mediate adolescent smoking? *American Journal of Preventive Medicine*, 22(3), 137–145. [http://doi.org/10.1016/S0749-3797\(01\)00434-2](http://doi.org/10.1016/S0749-3797(01)00434-2)
- Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). Research Article: The Constructive, Destructive, and Reconstructive Power of Social Norms. *Psychological Science*, 18(5), 429. <http://doi.org/10.1111/j.1467-9280.2007.01917.x>
- Shen, L., & Dillard, J. P. (2007). The Influence of Behavioral Inhibition/Approach Systems and Message Framing on the Processing of Persuasive Health Messages. *Communication Research*, 34(4), 433–467. <http://doi.org/10.1177/0093650207302787>
- Sherman, D., Mann, T., & Updegraff, J. (2006). Approach/avoidance motivation, message framing, and health behavior: Understanding the congruency effect. *Motivation and Emotion*, 30(2), 165–169. <http://doi.org/10.1007/s11031-006-9001-5>
- Smith, S. L. (2005). Assessing Violence, Sex, and Substance Use on MTV. *Critical Studies in Media Communication*, 22, 89–98. <http://doi.org/10.1080/0739318042000333743>
- Strasburger, V. C., Jordan, A. B., & Donnerstein, E. (2012). Children, Adolescents, and the Media: Health Effects. *Pediatric Clinics of North America*, 59, 533–587. <http://doi.org/10.1016/j.pcl.2012.03.025>
- Valkenburg, P. M., & Peter, J. (2013). The Differential Susceptibility to Media Effects Model. *Journal of Communication*, 63(2), 221–243. <http://doi.org/10.1111/jcom.12024>
- Vandenbosch, L., & Eggermont, S. (2011). Temptation Island, The Bachelor, Joe Millionaire : A Prospective Cohort Study on the Role of Romantically Themed Reality Television in

- Adolescents' Sexual Development. *Journal of Broadcasting & Electronic Media*, 55(4), 563–580.  
<http://doi.org/10.1080/08838151.2011.620663>
- Verma, T., Adams, J., & White, M. (2007). Portrayal of health-related behaviours in popular UK television soap operas. *Journal of Epidemiology and Community Health*, 61(7), 575–7.  
<http://doi.org/10.1136/jech.2006.050757>
- Vervoort, L., Wolters, L. H., Hogendoorn, S. M., de Haan, E., Boer, F., & Prins, P. J. M. (2010). Sensitivity of Gray's Behavioral Inhibition System in clinically anxious and non-anxious children and adolescents. *Personality and Individual Differences*, 48(5), 629–633.  
<http://doi.org/10.1016/j.paid.2009.12.021>
- Villarreal, Y. (2013). "Jersey Shore"s' GTL routine will end, but effects will live on. LA Times. Retrieved from <http://articles.latimes.com/2012/oct/03/entertainment/la-et-st-jersey-shore-legacy-20121003>
- Voigt, D. C., Dillard, J. P., Braddock, K. H., Anderson, J. W., Sopory, P., & Stephenson, M. T. (2009). Carver and White's (1994) BIS/BAS scales and their relationship to risky health behaviours. *Personality and Individual Differences*, 47(2), 89–93.  
<http://doi.org/10.1016/j.paid.2009.02.003>
- Wakefield, M. A., Loken, B., & Hornik, R. C. (2010). Use of mass media campaigns to change health behaviour. *Lancet*, 376(9748), 1261–71. [http://doi.org/10.1016/S0140-6736\(10\)60809-4](http://doi.org/10.1016/S0140-6736(10)60809-4)
- Wang, Z., & Lang, A. (2012). Reconceptualizing Excitation Transfer as Motivational Activation Changes and a Test of the Television Program Context Effects. *Media Psychology*, 15(1), 68–92.
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, 132(2), 249–268.  
<http://doi.org/10.1037/0033-2909.132.2.249>
- WHO. (2014). Global status report on alcohol and health-2014. Retrieved from [http://www.who.int/substance\\_abuse/publications/global\\_alcohol\\_report/msb\\_gsr\\_2014\\_1.pdf?ua=1](http://www.who.int/substance_abuse/publications/global_alcohol_report/msb_gsr_2014_1.pdf?ua=1)
- Wright, P. J., Randall, A. K., & Arroyo, A. (2013). Father-Daughter Communication About Sex Moderates the Association Between Exposure to MTV's 16 and Pregnant/Teen Mom and Female Students' Pregnancy-Risk Behavior. *Sexuality and Culture*, 17, 50–66.  
<http://doi.org/10.1007/s12119-012-9137-2>

Yanovitzky, I., & Stryker, J. (2001). Mass Media, Social Norms, and Health Promotion Efforts: A Longitudinal Study of Media Effects on Youth Binge Drinking. *Communication Research, 28*, 208–239. <http://doi.org/10.1177/009365001028002004>

Zaleski, A. C., & Aloise-Young, P. A. (2013). Using peer injunctive norms to predict early adolescent cigarette smoking intentions. *Journal of Applied Social Psychology, 43*, E124–E131.

## Concluding remarks

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Generally, consensus exists among media researchers that different people select different types of media and that exposure to mediated content affects different people in different ways (Valkenburg & Peter, 2013b). In recent decades, several studies have been conducted that investigate the role of personality traits in the use and effects of media (e.g., Hall, 2005; Koordeman, Anschutz, & Engels, 2012; Weaver, 2000). Nevertheless, only a limited number of studies have addressed this issue by looking at the neuropsychological basis of individuals' personalities. The RST, however, provides some very interesting insights in this respect by describing the role of biological motivational systems in explaining personality (Corr, 2008). This dissertation aimed to incorporate this theory into media research by focusing on the dual role of personality – as both a predictor and a moderator – from an RST perspective.

The introduction to this dissertation began by highlighting the following question posed by Glen Sparks (2016): “Instead of thinking about the media first and their impact on people second, what happens when we start with people and move to the media”? The five chapters of this dissertation have aimed to contribute to answering this question. The findings of these different chapters have resulted in several conclusions that highlight (1) personality as a predictor of media use, (2) personality as a moderator of media use, (3) the importance of a reinforcement sensitivity perspective for media research, (4) the link between media use and health issues and (5) the differentiation between mediators and moderators. This section discusses the limitations of the dissertation and proposes an agenda for future studies as well as a description of initial steps toward prevention initiatives.

### **KEY FINDING 1: PERSONALITY IS A PREDICTOR OF MEDIA USE**

At first glance, it could be argued that the conclusion that individual differences in personality influence media use and selection of media genres does not offer much new information. Indeed, it is true that media researchers have, over the years, conducted a large number of studies on this issue that have supported the association between personality and media use by looking at a wide variety of personality traits and frameworks (Finn, 1997; Hall, 2005; Weaver, Brosius, & Mundorf, 1993). Nevertheless, until now, the question of the role of the biological, neuropsychological basis of personality in media selection remained mostly unanswered in the scientific literature on media. Although a limited number of studies have made progress in this direction by looking at the link between RST-(related) concepts and media use (e.g., Aluja-Fabregat & Torrubia-Beltri, 1998; Meerkerk, van den Eijnden, Franken, & Garretsen, 2010; Potter,

Lee, & Rubenking, 2011), a systematic examination of the predictive value of BAS and BIS was missing. Part 1 of this dissertation, therefore, aimed to address this gap in the literature and to link RST concepts to different types of media use (i.e., movies and games) and to different media genres (i.e., violent and nonviolent genres, etc.). The operationalization of personality was thus addressed from an alternative point of view compared to previous research. The theoretical foundation of the link between personality and media use was embedded in the more traditional uses and gratification perspective (Katz, Blumler, & Gurevitch, 1973).

The findings of chapter 1 indicated that higher levels of BAS are positively associated with the viewing of violent movies, while higher levels of BIS are negatively associated with the viewing of such movies. Additionally, chapter 2 found the same pattern for the association between both personality concepts and the use of violent games. More specifically, the results of chapters 1 and 2 support the reasoning that the violent, explicit, arousing and unexpected contents of violent movies and games are considered, on the one hand, as rewarding stimuli for adolescents with higher BAS levels, but such content should, on the other hand, be regarded as frightening and anxiety-inducing stimuli for adolescents with higher BIS levels. Additionally, the results of chapter 5 support the hypothesis that BAS is associated with arousing and sensational television genres by showing a positive association between BAS scores and MTV Reality Show viewing.

Furthermore, chapters 1 and 2 investigated the association between RST concepts and nonviolent media use. Their results, however, showed a less consistent pattern. Chapter 1 found no support for the expected positive associations between BAS and nonviolent movie viewing, nor did the results yield support for the hypothesized positive association between BIS and this type of movie. In chapter 2, however, these assumptions were confirmed for nonviolent games, with both BAS and BIS being positively associated with nonviolent game use. The latter results for nonviolent gaming are thus in line with our assumption that nonviolent content, like violent content, might serve as a rewarding stimulus. It can be argued that game features such as competition and challenge – which are also inherent to nonviolent games – suffice to make these games attractive to adolescents with high BAS levels. Additionally, the positive association with BIS supports our premise that nonviolent games can attract adolescents who are generally more anxious, given the absence of violent and frightening content.

In addition to highlighting BAS as an indicator of media use, chapter 2 also found support for a positive association between BAS and engagement in games. The more adolescents are sensitive and responsive to rewarding stimuli in the environment, the higher the likelihood that they will achieve higher levels of game engagement. This is no surprise given that challenge and competition are important parts of games and that succeeding in a game is paired with leveling-up

and receiving points and rewards. Furthermore, previous studies have already noted that high levels of game engagement are related to the development of problematic gaming behaviors such as game addiction (Chou, Ph, & Ting, 2003; Seah & Cairns, 2008). Additionally, BAS has been found to be positively associated with addictive substance behaviors such as smoking and misuse of alcohol. Based on the combination of these findings, it could be argued that adolescents with higher BAS levels need to be considered as vulnerable and as ‘at risk’ for the development of problematic gaming behaviors. It is, therefore, crucial to expand scientific knowledge of the link among BAS, engagement and addictive behaviors to more fully comprehend how these concepts are entangled.

Overall, the findings of chapters 1, 2 and 5 of this dissertation confirm that examining personality as an indicator of media use can still contribute important and new insights to the existing media literature. The findings generally confirm the value of addressing the link between personality and media use from a neuropsychological perspective and stress the need for the integration of BAS and BIS as predictors of media use, genres and engagement. The results indicate that the RST perspective can comprehensively explain media use and contribute to our current understanding of the role of personality in the use of violent and nonviolent media. Particularly for violent types of media use – movie viewing and gaming – the results were consistently in line with the theoretical functioning of the underlying brain systems. The lack of consistency in the results for nonviolent media use could be due to differences in the nature of games and movies. In this respect, Chory and Goodboy (2011) have already noted that personality might be a better predictor of game use than movie viewing given the active nature of video game use compared to the more passive nature of movie viewing. Furthermore, it can be argued that viewing nonviolent movies is a popular pastime regardless of personality type. Differentiation among subgenres based on sensation and arousal level within the context of nonviolent movies might lead to additional insights regarding a potential link to BAS and BIS. Although the media literature has argued for the relevance of focusing on personality as a predictor of media use, our results nevertheless stress the importance of continuing with this line of research. The content that adolescents select has often been found to have the power to influence their attitudes, intentions and behaviors. Research on why adolescents use specific types of media content can, therefore, add to our understanding of the role of media in contemporary society as well as shed light on the potential influence of media use on adolescents’ behavior. Both this media influence on health and the role of personality – operationalized from a RST perspective in this association – were examined in parts 2 and 3 of this dissertation, and the results are discussed in the following sections.

## **KEY FINDING 2: PERSONALITY MIGHT BE A MODERATOR OF MEDIA EFFECTS**

In addition to examining personality as a predictor of media use, this dissertation has devoted a large amount of attention to a second role of the RST-concepts: the potential enhancing or protecting roles of BAS and BIS as moderators of media effects. Throughout the chapters of part 2 and part 3, this moderating role was examined within the context of several traditional health-related media effects related to smoking, alcohol use and unhealthy snack intake. Combining insights from SCT (Bandura, 1971) and LC4MP (Lang, 2006), two main assumptions were presented. *First*, that adolescents with higher BAS levels would be more vulnerable to the effects of media use and exposure and, second, that BAS would thus serve as an enhancing factor. This dissertation noted multiple times that higher BAS levels are associated with responsiveness to rewarding stimuli, less attention to the possible negative consequences of certain behaviors, and approach behavior toward rewarding cues. Therefore, we argued that adolescents with higher BAS scores would be more attentive to risk-glorifying behaviors in the media compared to adolescents with lower BAS scores, which could be assumed to put them at an increased risk of being influenced by certain types of risk-related media content. Second, it was hypothesized that higher BIS scores would play a protective role when examining the influence of the media on health. Adolescents with high BIS levels are more attentive to the possible negative consequences of behavior. It was, therefore, expected that exposure to risk-glorifying media content would activate inhibition and avoidance behavior among those adolescents with higher BIS scores. In sum, this dissertation sought to answer the question of whether the neuropsychological perspective described by the RST could add to our understanding of adolescents' differential susceptibility to the health-related effects of media.

Chapter 3 zoomed in on the association between the viewing of soap operas and adolescents' attitudes toward alcohol use. These programs contain numerous references to alcohol-drinking behaviors, mostly in a glorifying and positive setting (Furnham, Ingle, Gunter, & McClelland, 1997; van Hoof, de Jong, Fennis, & Gosselt, 2009). On the television screen, the negative consequences of engaging in these behaviors are presented in a much more limited way. Previous studies have already found support for a positive association between the viewing of soap operas and (indicators) of alcohol-drinking behaviors (Koordeman et al., 2012). The results described in chapter 3 of this dissertation supported these findings and indicated that adolescents' soap opera viewing is related to more positive attitudes toward alcohol use. More importantly, the results also confirmed that adolescents' sensitivity to cues related to punishment and anxiety (BIS) moderated this association. More particularly, the strength of the association between soaps and alcohol attitudes decreased and, at a certain point, even disappeared as BIS increased. These results,

therefore, provide evidence that BIS can act as a protector against the negative influence of exposure to certain media messages on attitudes toward health issues among adolescents. Moreover, the findings reported in chapter 3 support the conclusions of a previous study by Beullens, Rhodes, and Eggermont (2016) showing that BIS functions as a protector against media effects, particularly with regard to the association between music video viewing and joyriding attitudes. Additionally, chapter 3 examined BAS as a possible moderator but found no support for the hypothesized enhancing function of the activation system. Thus, the results do not provide evidence for our assumption that adolescents with higher BAS levels are more susceptible to the positive portrayals of alcohol in soaps and are at higher risk for the potential negative consequences of exposure to this type of mediated content. The results of chapter 5 regarding the moderating role of BAS and BIS in the association between MTV Reality shows, social norms and intentions toward getting drunk, binge-drinking and smoking found no support for either the assumed enhancing role of BAS or for the protecting role of BIS. It could be argued that the type of content that is presented on MTV reality shows does not activate BAS and BIS to such an extent that they act as moderators of the hypothesized associations between the shows' content and behavioral indicators. Future research might need to take into account viewers' identification with characters, as well as the context and perceived realism of the storylines, when examining often-scripted MTV Reality Shows and; additionally, future research could study the potential roles that BAS and BIS play in this respect. Chapter 4 operationalized media use by looking at the total amount of time that is spent on games instead of focusing on exposure to a certain type of content. Additionally, no support was found for the moderating roles of BAS and BIS. It could be argued that, contrary to exposure to specific references to risk behavior in the media, the link between spending time on games and unhealthy snacking occurs at such an unconscious level that the activation of BAS and BIS does not play a role in the strength of this effect. It was found that BAS did serve as an important indicator of unhealthy snack intake, which is in line with previous research on this topic.

Overall, it seemed that BAS and BIS do not consistently function as enhancing or protecting factors in the association between exposure to certain types of media use and health-related issues. It might be necessary to complement the view of the RST with other personal and contextual variables in order to reach new insights regarding the importance of incorporating the neuropsychological basis of personality in this type of research. A more detailed description of recommendations for future research is addressed later in this section.



### **KEY FINDING 3: THE ADDED VALUE OF THE RST FOR MEDIA RESEARCH**

The RST has been incorporated to a great extent in psychological research; it has been found to be highly relevant for the study of people's health behaviors. Although media effects researchers have been interested for many years in the effects of the media on different types of health behaviors, a very limited number of studies have approached these issues from a reinforcement sensitivity perspective. This is striking given that many of these media effects studies adopted a multidisciplinary approach by using theories and methodologies from communication sciences, public health research and psychology. Despite the relevance of the RST for these domains, the personality framework has received little attention in the research that has been conducted at the intersection of these disciplines. This dissertation aimed to address this gap in the literature and integrated the RST-concepts both as predictors of media use and as moderators of media effects; the results were discussed in Key Findings 1 and 2. In addition to these specific results, the findings described in this dissertation also support the premise that media research can benefit from adopting an RST approach and that this framework can be relevant to this field of study in a number of ways.

First, the RST differs from other often-used personality frameworks in media research (e.g., the five factor model) by its biologically based description of personality. More specifically, the RST addresses the neuropsychological basis of personality by linking it to the functioning of two primary motivational systems. This is regarded by the psychological literature as an important contribution compared to other personality theories, which are often more descriptive in nature. Over the years, these descriptive measures of personality have absolutely proven their value for the understanding of media use and effects. The current study, however, stresses the need for and importance of incorporating BAS and BIS in this type of research as well. Chapter 1 integrated the FFM concepts and sensation seeking with the RST-concepts (BAS and BIS) and linked them to violent and nonviolent movie viewing among adolescents. As stated in Key Finding 1, BAS and BIS were found to be important predictors of violent movie viewing. Our results additionally showed that sensation seeking is positively associated with this type of media use as well. Although the RST concepts explain a higher percentage of the variance in violent movie viewing as sensation seeking, BAS and BIS thus act as valuable predictors of violent movie viewing. The FFM-traits, on the other hand, were not significantly related to either violent or nonviolent movies. These results show that BAS and BIS provide new insights into the link between personality and (mainly) violent movie use; they also show that a combination with other operationalizations of personality, such as sensation seeking, remains necessary to our current and future understanding of the use of violent (and other) types of media.

Furthermore, integrating BAS and BIS in media research adds to the existing literature in another way. The results of chapters 1 and 2 supported the premise that BAS and BIS can be regarded as indicators of mainly violent but also nonviolent content, even though the results were less consistent for the latter type of media content. Especially interesting in this respect is that the specific approach and inhibiting function of BAS and BIS, respectively, not only lead to insights regarding which personality traits make people choose a certain medium or genre but also provide information about which people either do not select or avoid a certain genre, for instance, because its content is perceived as too violent or frightening. Given that previous studies examining personality as an indicator of media use have mostly focused on the question of which people use which types of media genres, it is interesting that the incorporation of BAS and BIS also provides researchers with the opportunity to gain insight into why people do not select certain media genres.

Additionally, despite the fact that, in chapter 3 of this dissertation, BIS was only found to act as a moderator in the association between soap opera viewing and attitudes toward alcohol, the integration of BAS and BIS in research exploring the link between media and an individual's behavior can still add to our understanding of media effects. Especially when examining the effect of the media on health behaviors, integrating BAS and BIS as control variables is highly recommended given the strong associations that have been found throughout the years between these RST concepts and different types of risky behaviors such as substance abuse (alcohol, smoking), unhealthy eating and obesity. This view is supported by Koordeman, Anschutz and Engels (2012), who also noted that research in the domain of media and health could significantly benefit from the integration of dual process models. Models such as the RST could thus provide us with more information on the mechanisms affecting both media use and health, as well as the relationship between the two. Nevertheless, other methods such as brain scans and experiments might be needed (in addition to survey research) to assess the potential moderating values of BAS and BIS in health-related media effects.

The results of this dissertation indicate the value of integrating BAS and BIS as predictors of media use, to a lesser extent as moderators of certain media effects, and as control variables of potentially risky health behaviors among adolescents. Despite the relevance of these results, many questions have also emerged based on our findings, and several questions remain unanswered. Media researchers should, therefore, continue integrating this perspective on personality – as well as other measures of personality – to gain additional insights into the role of these concepts in media effects research. An agenda for future research on this topic will be proposed later in this conclusion.

#### **KEY FINDING 4: IMPORTANCE OF RESEARCH ON MEDIA AND HEALTH IN ADOLESCENCE**

Throughout the chapters of parts 2 and 3 of this dissertation, the moderating role of BAS and BIS in media research was examined by determining which adolescents are more or less at risk for several health-related media effects. Adolescents are a particular group of interest in this respect given that they spend significant amounts of time using a wide variety of media platforms. Although digitalization and technological advances have led to increases in the offerings of media platforms such as smartphones and tablets, television and games are still very popular among adolescents. The large amount of time that adolescents spend on these media is often cited as a cause for concern by researchers, parents, teachers and many others. These concerns are often driven by the notion that adolescence is a crucial developmental phase as young people move toward adulthood. Adolescence is typically the time during which young people start to become independent, search for their own identity, and form their long-term habits. Additionally, adolescents undergo many changes on cognitive, social, emotional and physical levels. As already noted in the introduction to this dissertation, being in good mental and physical health is, therefore, of great importance if young people are to emerge unscathed from this developmental period. The concerns that have been raised regarding the effects of media use are often related to the negative impact of the media on health-related issues. More specifically, the media have been accused of setting a bad example and of encouraging adolescents to engage in unhealthy behaviors by promoting sedentary behavior or by glorifying potentially risky behaviors such as alcohol use and smoking.

Previous research has found support for several associations between media use and attitudes, intentions, and actual behaviors toward negative health issues. The current study mainly approached these associations by focusing on potential enhancing and protecting factors and by looking at the underlying mechanisms of these relationships. Nevertheless, the associations themselves also provide important insights regarding the link between media use and health issues among adolescents. More specifically, chapter 3 indicated that the viewing of soap opera shows - known for their glorifying portrayals of alcohol use - are related to more positive attitudes toward alcohol use. This can be regarded as a reason for concern, given that the theory of planned behavior proposes that these positive attitudes can lead to higher future intentions to perform a certain behavior and, in the long term, even to engaging in the behavior itself. Furthermore, chapter 4 indicated that not only media content but also time spent on games specifically is associated with unhealthy health behaviors. More specifically, the results described in this chapter showed a positive association between time spent on games and unhealthy snack intake. Thus, the more time adolescents spend on gaming, the higher their intake of unhealthy snacks such as sugar-sweetened

beverages and snacks high in fat and sugar. Additionally, chapter 5 indicated that watching MTV reality shows is positively associated with higher estimations of smoking, getting drunk and binge-drinking among peers, which was in turn associated with higher intentions to engage in these behaviors in the following six months.

In sum, these results consistently support the premise that exposure to specific types of television content as well as total amount of time spent on games is linked with indicators of potentially negative health behaviors as well as with actual negative health behavior (i.e., unhealthy food intake). Overall, the results presented in this dissertation add to the concerns that have been expressed about adolescents' media use, finding several associations between exposure to specific types of media content and health-related risk behaviors as well as a link between media volume and health behaviors. Nevertheless, the results described in Key Findings 1 and 2 also show that this is not necessarily the case for all adolescents under all circumstances.

### **KEY FINDING 5: MEDIATORS VERSUS MODERATORS**

It is widely acknowledged that a large variety of mechanisms and conditions have the potential to play a role in the explanation and understanding of media use and health behaviors (Fishbein & Ajzen, 2010; Valkenburg & Peter, 2013b). Media scholars are constantly looking for new ways to broaden and expand scientific knowledge on the complexities related to, underlying and influencing media effects. It is thus not at all surprising that the examination of potential mediators and moderators has become more and more ubiquitous in media research. A large amount of research has thus moved beyond the question of whether there is an effect or association, instead focusing on how it occurs and for whom. These studies have provided us with accumulating amounts of information on underlying pathways and pronouncing or diminishing conditions, indicating how and when media effects are present. More specifically, research on **mediators** allows us to gain knowledge of potential third-variables and to unravel (parts of) the so-called black-box of media effects. Additionally, studies on potential **moderating variables** can shed light on the conditions under which some associations are present, absent, stronger or weaker (Yanovitzky & Greene, 2009). Although this distinction between mediators and moderators might seem clear, the understanding and differentiation between processes and conditions can, theoretically, be intertwined. The analytical procedures used to test a mediating or a moderating effect, on the other hand, are clearly distinct, forcing scholars to debate and reflect on the theoretical and conceptual value of variables of interest (Judd, Yzerbyt, & Muller, 2014). This dissertation aimed to add to this debate by exploring the same types of variables as either moderators or mediators in media research. More specifically, the potential roles of game

engagement and social norms (descriptive and injunctive) as mediators and moderators in media (effects) research were examined. The main goal of these analyses was to gather preliminary evidence on the different positions these variables might adopt.

Chapters 2 and 4 explored game engagement as a mediator of the association between BAS and violent/nonviolent gaming and as a moderator of the association between total time spent on games and unhealthy snacking, respectively. Game engagement was defined generally as the subjective experience of being distracted from everyday life by using games. Furthermore, the concept was operationalized by means of the game engagement questionnaire of Brockmyer et al. (2009), providing us with a score reflecting adolescents' self-reported feelings of engagement during gameplay. The results of *chapter 2* showed that the association between BAS and both violent and nonviolent types of game use (cf. Key Conclusion 1) was mediated by adolescents' levels of game engagement. These findings supported our assumption that feelings of engagement are experienced as rewarding, positive and enjoyable by adolescents with higher BAS levels and are, in turn, related to more violent and nonviolent gameplay. It is clear that longitudinal research is needed to gain insight into the precise time-order between these variables given that, in order to report experiences about engagement with games, previous experience with games is a necessary condition. The respondents who were incorporated into these analyses, however, were all gamers and could thus be assumed to be able to answer questions regarding how they feel during gameplay. In chapter 4 we assigned a moderating role to game engagement by testing whether engagement in games strengthened or weakened the association between time spent on games and unhealthy snack intake (cf. Key Finding 4). Given that game engagement could be assumed to make adolescents inattentive to either cues of satiety or to the urge to eat during media use, the two options (i.e., enhancing and protecting) were presented as possible outcomes. The results showed that the positive association between total time spent on games and unhealthy snack intake decreased at higher levels of game engagement. In sum, chapters 2 and 4 each allocated a different role to the concept of game engagement and each found support for the role it investigated.

Chapter 5 examined the role of social norms in the association between the viewing of MTV Reality Shows and behavioral intentions toward smoking, getting drunk and binge-drinking (cf. Key Finding 4). Social norms are theorized to underlie the association between background factors, such as media use, and behavioral intentions, following the model presented by the theory of planned behavior (Ajzen, 1991). The current dissertation wanted to present a potential extension to this model by exploring the interaction between descriptive and injunctive norms and proposing a moderated mediation model. More specifically, the suggestion of Göckeritz et al. (2010) that the link between descriptive norms and ecological intentions is strengthened if a certain

behavior is approved of by significant others was applied to our examination of MTV Reality Shows and risky intentions. First of all, the findings supported the mediating role of descriptive peer norms in MTV reality viewing and intentions toward smoking, getting drunk and binge-drinking. Additionally, the moderated mediation was supported for injunctive friend norms (not for injunctive family norms), showing that the more one's friends disapprove of the examined behavior, the weaker the association between the descriptive norm and intentions becomes. The results thus stress the need to differentiate between descriptive and injunctive norms in a media effects model as well as the importance of conducting research on the theoretical and methodological value of these two types of social norms.

In sum, our results suggest that the difference between moderators and mediators is not always clear. We acknowledge that integrating the same variable as both a moderator and a mediator is also a choice that makes this dissertation vulnerable to criticism. However, the findings also note the need for a continuation of the debate on mediators versus moderators and the difficulties that still exist when trying to differentiate between these roles. Suggestions for future research on this topic are presented later in this discussion section.

## **WHAT'S NEXT?**

### **SUGGESTIONS AND CHALLENGES FOR FUTURE RESEARCH**

Earlier in this section we mainly focused on what we learned from the different chapters of this dissertation. The results provided us with answers to some of the questions that we were trying to answer, however – as is usually the case when conducting research – they also leave us with many new questions, suggestions and ideas for future studies. This dissertation also suffers from limitations, such as the use of cross-sectional data and self-reports, as was extensively discussed throughout the chapters of this work. This section will, therefore, propose several recommendations for future research based on the strengths, limitations and findings of this dissertation. First, the need for a multidisciplinary approach is stressed, especially when focusing on the link between media, personality and health. Second, we recommend a continuation of studies on media use and health-related media effects using research methods that allow us to make statements about causality and long-term effects. Third and finally, we advocate the importance of a differential susceptibility perspective when examining media use and effects.

## **WORK TOGETHER, BROADEN THE SCOPE: THE ADOPTION OF MULTIDISCIPLINARY APPROACH**

The different studies of this dissertation can be positioned at the intersection of the disciplines of communication research, psychology and public health. Research that aims to answer questions of cross-disciplinary importance can strongly benefit from a combination of theories and methodologies from each of these domains (Gladney, Ayars, Taylor, Liehr, & Meininger, 2003). Multidisciplinary research can even be regarded as almost indispensable when examining complex societal problems such as negative health behaviors (Younglove-Webb, Gray, Abdalla, & Thurow, 1999). In this dissertation, we adopted a multidisciplinary approach by working together with researchers from departments of psychology and public health. This collaboration led to interesting debates and reflections on how media, health and personality are connected. Additionally, it allowed us to achieve a more profound understanding of the importance of psychological theories for media research as well as of the link between media and health issues. This collaboration with other disciplines facilitated the integration of the psychological concepts described by the RST into research on media use and the exploration of these concepts' effects on health behaviors among adolescents. Although multidisciplinary research can be challenging and requires compromises from time to time, the advantages can absolutely outweigh the costs. Therefore, we strongly encourage researchers working at the intersection of research disciplines to look beyond the borders of their own discipline and to collaborate with researchers from neighboring domains.

When operationalizing personality from the perspective of the RST and its neuropsychological reward and inhibitory systems, collaborations with the domain of cognitive neuroscience could also significantly improve our understanding of the role of these processes in explaining media use and its effects. It has been suggested by neuroscientists that examining asymmetry in frontal alpha activation (FAA) allows us to gain insights into the specific aspects of personality as described by the RST, given the association between FAA and approach and inhibition behaviors. More specifically, activation in the left frontal cortex is believed to be related to approach motivation or BAS, while activation in the right frontal cortex is linked to withdrawal motivation or BIS. Additionally, studying the activation of the nucleus accumbens (NAc), which is related to reward processing and is part of the mesolimbic dopaminergic pathway, can help researchers develop their understanding of reward processes in the use and effects of media. Both electroencephalography (EEG) and fMRI scans can be used to increase our understanding of the functioning of these processes during media use and exposure to media messages. Some previous studies have already taken some steps in this direction, mainly in the context of violent video games

research (e.g., letting people play a violent game during an EEG or fMRI). Overall, these studies concluded that EEG and fMRI are promising and valuable instruments for the measurement of neuropsychological responses to game events, for instance. The current dissertation proposes that, especially for the examination of the role of activation and inhibition processes related to reward and punishment from a neuroscientific perspective, brain scans can shed more light on the role of BAS and BIS in explaining both media use and its effects. Nevertheless, it is important to note that brain scans alone will not suffice to determine the role of BAS and BIS in media research. Both fMRI and EEG scans suffer from limitations regarding the interpretation of the scans and the linking of activity in certain brain regions to specific signals (Logothetis, 2008; Eklund, Nichols, & Knutsson, 2016). A multidisciplinary collaboration involving researchers from neuroscience, communication sciences, psychology and public health could be considered the recommended approach to making significant and innovative advances in this field of research.

### **THE QUEST FOR LONG-TERM EFFECTS AND CAUSALITY**

The results presented in this dissertation were all based on cross-sectional survey data, which allowed us to answer whether BIS and BAS act as indicators of media use and/or as moderators of the association between media use and health behaviors. This approach thus made it possible to explore the value of an RST perspective for media research. Unfortunately, cross-sectional data do not allow us to make statements about the causality of the relation between media use and health behaviors or about the potential short-term and long-term effects of media use and exposure to certain media messages on adolescents' health. Future research should, therefore, continue to examine these associations by employing other methods of data collection besides cross-sectional survey research. In addition to establishing significant empirical associations between variables, which is possible with cross-sectional survey data as well, longitudinal data allow researchers to determine the time-order between variables (Sparks, 2016). If we wanted, for example, to examine the link between soap opera viewing and alcohol drinking behaviors by using a longitudinal survey, we could determine whether soap opera viewing at time 1 is significantly associated with increased drinking behaviors at time 2. This is still no indication of a causal relationship, but it would allow us to make the statement that soap opera viewing precedes alcohol drinking behaviors. To fully capture causality, however, all plausible rival or third-variable explanations should be ruled out (Perry, 1996). Survey research, both cross-sectional and longitudinal, allows us to incorporate as many of these variables as possible, such as gender, age and social context, but it is impossible to rule out all other possible explanations. Experimental studies that are conducted in a controlled setting could significantly increase our understanding of



the causal relationship between media use and (indicators of) health behaviors. Future studies adopting such an approach could, for instance, take into account the impact of the *contexts* in which references to health behaviors such as smoking and alcohol use are presented on the screen. Following SCT (Bandura, 1971), it is assumed that positive references to behaviors such as rewards will increase the chance of modeling compared to behaviors that are approached rather negatively. Experimental research could shed light on the premise that the portrayal of health behaviors in a positive compared to a negative context provokes different effects. From a contextual point of view, it could also be examined whether the presentation of health behavior on fiction or non-fiction programs induces the same or different reactions. Additionally, it is assumed that higher levels of identification with the person engaging in the observed behavior will increase the chance of modeling that behavior (Bandura, 2001). This identification is, to a large extent, driven by the observer's perception of similarities between him- or herself and the model. In addition to contextual variables, the potential differences in the effects of variations in *specific features* such as the age, body composition and gender of a character should thus be taken into account.

In sum, both longitudinal and experimental studies can add to our current understanding of the way media use and health behaviors are related. It is clear that the research domain of media and health still presents important challenges for future research that need to be addressed if we want to more fully comprehend the impact of the media on adolescents' health behavior.

## **CONTINUATION OF RESEARCH ON PROCESSES AND CONDITIONS**

The results of the current dissertation imply that the examination of underlying processes and different conditions can significantly increase our understanding of media use and its effects. Although we believe that there is a limit to the level of refinement a media effects model should and can achieve before it become uninterpretable, it is clear that the examination of a simple direct dose-response effect would not even begin to cover the complexity that underlies and is related to media use and its effects. Future studies should, therefore, continue to evaluate the different roles that personality traits can play within media research, both as predictors of media use and as moderators of media effects. Only by examining which adolescents use which types of media and by testing for which adolescents a certain type of media use produces an effect or not, can vulnerable groups be detected and health interventions set-up accordingly. Additionally, media scholars should continue to investigate the complexity of the mechanisms and processes underlying media effects from a mediational point of view. More importantly, based on our findings we can add that rethinking the theoretical and conceptual roles of certain variables as mediators and moderators, for instance, can add to our understanding of media effects. Social

norms, for instance, are regarded as mediators in the association between media use and intentions by the theory of planned behavior (Ajzen, 1991). The results of *Chapter 5* showed, however, that their roles do not necessarily have to be limited to mediating ones in a media effects model. Differentiating between descriptive and injunctive norms might allow us to refine this model by making it possible to test potential moderated mediation pathways (cf. Chapter 5, Key Finding 5). Additionally, variables such as game engagement were found to serve as mediators as well as moderators in media research, depending on the model that is examined. Future research should, therefore, focus on a systematic examination of the multiple roles variables can take on when examining media use and effects to come to a more complete understanding of the factors influencing people's susceptibility to media effects.

### **FIRST STEPS TOWARD RECOMMENDATIONS FOR PRACTICE**

The main goal of this dissertation was to contribute to the scientific literature on media use and effects by determining the different roles (i.e., predictor and moderator) of BAS and BIS in media research. Although the focus of the different chapters was thus primarily on the assessment of the theoretical and methodological value of the RST for media research, our results also provide thought-provoking evidence on the link between media and health. More specifically, this dissertation showed that adolescents' exposure to specific forms of media (i.e., soaps and MTV Reality Shows), as well as the amount of time that they spend on games, are associated with a variety of negative (indicators of) health behaviors. These (and other) associations have often been cited as concerns by parents, teachers and health practitioners. Our results indeed support the premise that media use and negative health behaviors are linked, but given that our findings do not provide any causal evidence or allow us to make statements about long-term consequences, they should be interpreted with caution. Additionally, conceptual frameworks in health behavior research such as the *health belief model*, the *integrated behavioral model* and the *theory of planned behavior* propose complex models both in terms of explaining and changing health behaviors (Glanz, Rimer, & Viswanath, 2008). In this respect, media use is regarded as just one of many potential indicators of adolescents' health behaviors, in addition to many others such as self-esteem, intelligence, health knowledge and emotions (Ajzen, Albarracin, & Hornik, 2007). Furthermore, many processes exist on the basis of the associations between these indicators and health behaviors. Additionally, several factors are assumed to play a protecting or enhancing role, as also indicated in part by this dissertation. Due to this conceptual complexity of explaining and changing health behaviors, simply translating the results of this dissertation into specific guidelines and recommendations for practice would be too great a leap. Nevertheless, our results do allow us to

suggest the first steps toward recommendations for practice as well to support steps that have already been initiated and developed in a prevention context. Adolescents should be considered as a particularly important target group for prevention initiatives given their susceptibility to engagement in negative health behaviors.

First of all, the results of chapters 3 and 5 showed that exposure to risk-glorifying types of media content is positively associated with adolescents' attitudes and intentions toward alcohol drinking behaviors and smoking. It could be suggested that broadcasting companies be informed about these and other results that support the influence of exposure to different types of media content on adolescents' health behaviors. Media researchers should, in other words, engage in dialogue with media producers and directors to initiate scientifically based debate and reflection on the potential impact of portrayals of alcohol and smoking on the television screen.

In addition to debating and reflecting on *what* young people should or should not be exposed to, media literacy education has been recommended in the literature as a promising health promotion strategy to educate young people on *how* to process media messages (Bergsma & Carney, 2008). These initiatives aim to improve adolescents' critical viewing skills and to empower them to analyze and evaluate references to health behaviors in the media (Brown & Knight, 2006). More specifically, young people can be taught how to recognize explicit and implicit media references to health behaviors, such as alcohol use and smoking, and to contemplate the potential negative effects of these behaviors (Austin & Johnson, 1997). In the scientific literature, several examples of media literacy initiatives for smoking and alcohol use have been described and examined. Although much still needs to be learned about their effectiveness (Brown & Knight, 2006), support has been found for the success of media literacy programs (Austin & Johnson, 1997; Pinkleton, Austin, Cohen, Miller, & Fitzgerald, 2007; Primack, Gold, Land, & Fine, 2006). Media literacy can thus serve as an empowering tool against the negative effects of media exposure and might be considered as a powerful strategy in health promotion. Nevertheless, research on the effectiveness of different media literacy strategies remains of great importance. Furthermore, we suggest, in line with Austin, Muldrow and Austin (2016), that future studies on this topic should also take into account the role of personality factors to determine whether differences exist in effectiveness depending on adolescents' personality types. More specifically, research could look into the question of whether people are equally susceptible to media literacy interventions and focus on characteristics such as BAS and BIS, which have been found to be related to negative and risky health behaviors.

It should be noted that, in addition to having the potential to influence adolescents' negative health behaviors, the media can also be deployed as tool and a channel for the

development and distribution of health prevention and promotion campaigns. Social media, television, radio and the internet are often employed to distribute health promotion messages, with the goal of reaching as many people as possible in the target audience. Also in this context, the potential role of personality traits in the effectiveness of health campaigns should be taken into account. As already mentioned in chapter 3 of this dissertation, individuals' with higher BAS scores were found in previous research to be more susceptible to messages that use a "gain frame" or "advantage frame" compared to messages employing a "loss frame" (Shen & Dillard, 2007; Sherman et al., 2006). An important suggestion for developers of health campaigns as well as for researchers examining their effectiveness is, therefore, to take into account people's differential susceptibility to these messages. We suggest that an operationalization of personality from an RST perspective might be especially valuable in this respect given the link between BAS and BIS and negative health behaviors that was found in this dissertation as well as in many other studies. The Flemish center of expertise on alcohol and other drugs (VAD), for instance, recently adopted such a differential approach in an intervention aimed at early initiators of alcohol and other substances among adolescents 12-to-15 years old. VAD developed four different versions of the intervention, each tailored to a different personality profile. We support these initiatives and suggest that health practitioners and researchers should collaborate closely in the future to assess the success of these initiatives and to develop new personality-tailored interventions.

## GENERAL CONCLUSION

Although the current dissertation suffers from several limitations and raises new questions as well as opportunities for future research, we were able to provide important new information regarding the roles of BAS and BIS in media research. First, we learned that both BAS and BIS should be regarded as important predictors of several types of media use. Our findings showed, based on the RST, *which people use* which types of media genres and *which people don't use* certain media genres. Second, our results provide preliminary evidence that BIS can have a *protective function*, but given the inconsistencies regarding this role more research is needed to fully understand the potential moderating role of BIS as well as BAS. Additionally, we were able to show the need to *differentiate* between the roles that other variables such as game engagement and social norms can take on in media effects research.

To conclude we should go back to Sparks' question that was proposed at the start of this dissertation: *'Instead of thinking about the media first and their impact on people second, what happens when we start with people and move to the media?'* Based on the findings of this dissertation we can conclude that differentiating between individual differences in personality, amongst others, can make

important contributions to our understanding of media use and effects. Therefore, we encourage media researchers to continue the exploration of underlying processes and conditions in order to take new steps in our understanding adolescents' media use and susceptibility toward media effects.

## REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211. [http://doi.org/10.1016/0749-5978\(91\)90020-T](http://doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I., Albarracin, D. E., & Hornik, R. E. (2007). *Prediction and change of health behavior: Applying the reasoned action approach*. Prediction and change of health behavior Applying the reasoned action approach. New Jersey: Lawrence Erlbaum Associates Publishers.
- Aluja-Fabregat, A., & Torrubia-Beltri, R. (1998). Viewing of mass media violence, perception of violence, personality and academic achievement. *Personality and Individual Differences*, 25, 973–989. [http://doi.org/10.1016/S0191-8869\(98\)00122-6](http://doi.org/10.1016/S0191-8869(98)00122-6)
- Austin, E. W., & Johnson, K. K. (1997). Immediate and Delayed Effects of Media Literacy Training on Third Grader's Decision Making for Alcohol. *Health Communication*, 9(4), 323–249. [http://doi.org/10.1207/s15327027hc0904\\_3](http://doi.org/10.1207/s15327027hc0904_3)
- Austin, E. W., Muldrow, a, & Austin, B. W. (2016). Examining How Media Literacy and Personality Factors Predict Skepticism Toward Alcohol Advertising. *Journal of Health Communication*, 21(5), 600–609. <http://doi.org/10.1080/10810730.2016.1153761>
- Bandura, A. (1971). Social learning theory. In *Social Learning Theory* (pp. 1–46).
- Bandura, A. (2001). Social Cognitive Theory of Mass Communication. *Media Psychology*, 3(3), 265–299. [http://doi.org/10.1207/S1532785XMEP0303\\_03](http://doi.org/10.1207/S1532785XMEP0303_03)
- Bergsma, L. J., & Carney, M. E. (2008). Effectiveness of health-promoting media literacy education: A systematic review. *Health Education Research*, 23(3), 522–542. <http://doi.org/10.1093/her/cym084>
- Beullens, K., Rhodes, N., & Eggermont, S. (2014). Behavioral Activation and Inhibition as Moderators of the Relationship Between Music Video-Viewing and Joyriding Attitudes. *Media Psychology*, 1–22. <http://doi.org/10.1080/15213269.2014.950756>
- Brockmyer, J. H., Fox, C. M., Curtiss, K. a., McBroom, E., Burkhart, K. M., & Pidruzny, J. N. (2009). The development of the Game Engagement Questionnaire: A measure of engagement in video game-playing. *Journal of Experimental Social Psychology*, 45(4), 624–634.
- Brown, J. D., & Knight, J. K. (2006). Media Literacy Has Potential to Improve Adolescents' Health. *Journal of Adolescent Health*, 39(4), 459–460. <http://doi.org/10.1016/j.jadohealth.2006.07.014>
- Chory, R. M., & Goodboy, A. K. (2011). Is basic personality related to violent and non-violent video game play and preferences? *Cyberpsychology, Behavior and Social Networking*, 14(4), 191–8. <http://doi.org/10.1089/cyber.2010.0076>

- Chou, T.-J., Ph, D., & Ting, C.-C. (2003). The role of flow experience in cyber-game addiction. *Cyberpsychology & Behavior*, 6(6), 663–675. <http://doi.org/10.1089/109493103322725469>
- Corr, P. J. (2008). The Reinforcement Sensitivity Theory (RST): introduction. In *The Reinforcement Sensitivity Theory of Personality* (pp. 1–43). Cambridge: Cambridge University Press.
- Finn, S. (1997). Origins of Media Exposure: Linking Personality Traits to TV, Radio, Print, and Film Use. *Communication Research*, 24(5), 507–529.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behaviour: The reasoned action approach*. Psychology Press. New York: Psychology Press.
- Franken, I., & Muris, P. (2006). BIS/BAS personality characteristics and college students' substance use. *Personality and Individual Differences*, 40(7), 1497–1503. <http://doi.org/10.1016/j.paid.2005.12.005>
- Furnham, A., Ingle, H., Gunter, B., & McClelland, A. (1997). A content analysis of alcohol portrayal and drinking in British television soap operas. *Health Education Research*, 12(4), 519–529. <http://doi.org/10.1093/her/12.4.519>
- Eklund, A., Nichols, T.E., & Knutsson, H. (2016). Cluster failure: Why fMRI inferences for spatial extent have inflated false-positive rates. *Proceedings of the national academy of sciences*, 113(28), 7900-7905. doi: 10.1073/pnas.1602413113
- Gladney, A. P., Ayars, C., Taylor, W. C., Liehr, P., & Meininger, J. C. (2003). Consistency of Findings Produced by Two Multidisciplinary Research Teams. *Sociology*, 37(2), 297–313. <http://doi.org/10.1177/0038038503037002005>
- Glanz, K., Rimer, B. K., & Viswanath, K. (2008). *Health behavior and health education*. San Francisco: Jossey-Bass.
- Göckeritz, S., Schultz, P. W., Rendón, T., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2010). Descriptive normative beliefs and conservation behavior: The moderating roles of personal involvement and injunctive normative beliefs. *European Journal of Social Psychology*, 40(3), 514–523.
- Hall, A. (2005). Audience Personality and the Selection of Media and Media Genres. *Media Psychology*, 7(4), 377–398.
- Judd, C. M., Yzerbyt, V. Y., & Muller, D. (2014). Mediation and moderation. In H. Reiss & C. Judd (Eds.), *Handbook of research methods in personality and social psychology* (University, pp. 653–676). Cambridge.
- Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and Gratifications Research. *Public Opinion Quarterly*, 37(4), 509–523.

- Koordeman, R., Anschutz, D. J., & Engels, R. C. M. E. (2012). Alcohol portrayals in movies, music videos and soap operas and alcohol use of young people: current status and future challenges. *Alcohol and Alcoholism*, 47(5), 612–23. <http://doi.org/10.1093/alcalc/ags073>
- Lang, A. (2006). Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages. *Journal of Communication*, 56. <http://doi.org/10.1111/j.1460-2466.2006.00283.x>
- Logothetis, N. K. (2008). What we can do and what we cannot do with fMRI. *Nature*, 24(7197), 869–878. <http://doi.org/10.1038/nature06976>
- Loxton, N. J., & Dawe, S. (2001). Alcohol abuse and dysfunctional eating in adolescent girls: the influence of individual differences in sensitivity to reward and punishment. *The International Journal of Eating Disorders*, 29(4), 455–62. <http://doi.org/10.1002/eat.1042>
- Meerkerk, G.-J., van den Eijnden, R. J. J. M., Franken, I., & Garretsen, H. F. L. (2010). Is compulsive internet use related to sensitivity to reward and punishment, and impulsivity? *Computers in Human Behavior*, 26(4), 729–735. <http://doi.org/10.1016/j.chb.2010.01.009>
- Perry, D. K. (1996). *Theory & research in mass communication: Contexts and consequences*. Mahwah: NJ: Erlbaum.
- Pinkleton, B. E., Austin, E. W., Cohen, M., Miller, A., & Fitzgerald, E. (2007). A statewide evaluation of the effectiveness of media literacy training to prevent tobacco use among adolescents. *Health Communication*, 21(1), 23–34. <http://doi.org/10.1080/10410230701283306>
- Potter, R. F., Lee, S., & Rubenking, B. E. (2011). Correlating a Motivation-Activation Measure With Media Preference. *Journal of Broadcasting & Electronic Media*, 55(3), 400–418. <http://doi.org/10.1080/08838151.2011.597468>
- Primack, B. A., Gold, M. A., Land, S. R., & Fine, M. J. (2006). Association of Cigarette Smoking and Media Literacy about Smoking among Adolescents. *Journal of Adolescent Health*, 39(4), 465–472. <http://doi.org/10.1016/j.jadohealth.2006.05.011>
- Seah, M., & Cairns, P. (2008). From Immersion to Addiction in Videogames. *Proceedings of BCS HCI*, 55–63. <http://doi.org/10.1111/j.1365-2427.2010.02427.x>
- Sparks, G. (2016). *Media effects research: a basic overview* (5th editio). Boston: Cengage Learning.
- Valkenburg, P. M., & Peter, J. (2013a). Five challenges for the future of media-effects research. *International Journal of Communication*, 7(1), 197–215.
- Valkenburg, P. M., & Peter, J. (2013b). The Differential Susceptibility to Media Effects Model. *Journal of Communication*, 63(2), 221–243. <http://doi.org/10.1111/jcom.12024>



- Van Hoof, J. J., de Jong, M. D. T., Fennis, B. M., & Gosselt, J. F. (2009). There's alcohol in my soap: portrayal and effects of alcohol use in a popular television series. *Health Education Research, 24*(3), 421–9. <http://doi.org/10.1093/her/cyn037>
- Weaver, J. B. (2000). Personality and entertainment preferences. In D. Zillmann & P. Vorderer (Eds.), *Media entertainment: The psychology of its appeal*. (pp. 235–248). Lawrence Erlbaum Associates Publishers.
- Weaver, J. B., Brosius, H.-B., & Mundorf, N. (1993). Personality and movie preferences: A comparison of American and German audiences. *Personality and Individual Differences*.
- Yanovitzky, I., & Greene, K. (2009). Quantitative methods and causal inference in media effects research. In R. L. Nabi & M. B. Oliver (Eds.), *The SAGA Handbook of Media Processes and Effect* (pp. 35–52). California: Sage Publications, Inc.
- Younglove-Webb, J., Gray, B., Abdalla, C. W., & Thurow, A. P. (1999). The Dynamics of Multidisciplinary Research Teams in Academia. *The Review of Higher Education, 22*(4).

## Samenvatting

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Over het algemeen bestaat er consensus over de hypothese dat verschillende mensen verschillende media(-inhouden) selecteren en dat blootstelling aan deze inhouden verschillende mensen op een verschillende manier kan beïnvloeden. Doorheen de jaren zijn dan ook heel wat studies uitgevoerd naar de link tussen persoonlijkheid en mediagebruik enerzijds en de rol van persoonlijkheid in het verklaren van media-effecten anderzijds. De meeste van deze studies operationaliseerden persoonlijkheid door gebruik te maken van eerder descriptieve modellen zoals het *Five Factor Model* of selecteerden specifieke persoonlijkheidskenmerken zoals agressiviteit en sensation seeking. In dit doctoraat werd een alternatieve operationalisering van persoonlijkheid geïntegreerd in onderzoek naar mediagebruik en media-effecten vanuit het perspectief van de *Reinforcement Sensitivity Theory*. Deze theorie stelt dat neuropsychologische processen aan de basis liggen van verschillen in persoonlijkheid. Meer bepaald worden twee belangrijke systemen onderscheiden: het *behavioral activation system* (BAS) en het *behavioral inhibition system* (BIS). BAS wordt geactiveerd door positieve stimuli die geassocieerd zijn met beloning. Blootstelling aan deze stimuli leidt tot gedrag in de richting van de positieve, belonende stimulus. BIS wordt geactiveerd door negatieve stimuli die geassocieerd zijn met straf. Blootstelling aan dergelijke stimuli zal leiden tot het inhibitiegedrag en het vermijden van situaties waarin strafgerelateerde stimuli aanwezig zijn. Aangezien deze systemen in volle ontwikkeling zijn tijdens de adolescentie en vooral BAS op dat moment een piek vertoont, is onderzoek naar deze kenmerken bij adolescenten van groot belang.

Het *Differential Susceptibility to Media Effects Model* schrijft twee belangrijke rollen toe aan persoonlijkheid binnen media-onderzoek; eerst en vooral als *voorspeller* van mediagebruik en ten tweede als *moderator* van media-effecten. Binnen dit doctoraat staan deze twee rollen centraal door de concepten van de reinforcement sensitivity theorie te onderzoeken als voorspeller en moderator binnen onderzoek naar mediagebruik –en effecten. Meer specifiek werd binnen hoofdstuk 1 en 2 van dit doctoraat bekeken of er een associatie bestaat tussen BAS en BIS aan de ene kant en gewelddadig en niet-gewelddadig mediagebruik aan de andere kant. De resultaten toonden aan dat hogere scores op BAS gelinkt zijn met het kijken naar gewelddadige films en het spelen van gewelddadige games, wat volledig in lijn lag met de vooropgestelde hypothesen. De link tussen BAS/BIS en niet gewelddadige vormen van mediagebruik was minder eenduidig. Er werd namelijk geen link gevonden tussen deze persoonlijkheidskenmerken en het kijken naar niet-gewelddadige films. Er bleek wel positieve associatie te zijn tussen BAS en het spelen van niet-gewelddadige games en een positieve associatie tussen BIS en het spelen van niet-gewelddadige games. Hoewel

meer onderzoek nodig is naar de link tussen deze concepten en verschillende vormen van mediagebruik, tonen de studies van dit doctoraat wel de waarde aan van het centrale persoonlijkheidsperspectief voor media-onderzoek. Zeker voor gewelddadige vormen van mediagebruik blijken BAS en BIS goede voorspellers te zijn die een nieuw licht werpen op het verklaren van welke individuen al dan niet gewelddadige media gebruiken.

De vraag of BAS en BIS naast voorspellers van mediagebruik ook moderatoren zijn van media-effecten werd onderzocht in hoofdstuk 3, 4 en 5 van dit doctoraat. Uit de psychologische en gezondheidswetenschappelijke literatuur leerden we dat BAS en BIS een sterke link vertonen met verschillende vormen van gezondheidsgerelateerde risicogedragingen zoals ongezond eten, roken en alcoholgebruik. Binnen dit doctoraat werd daarom de focus gelegd op de rol van BAS en BIS binnen enkele traditionele effecten van de media op deze gezondheidsgedragingen: de link tussen soaps en alcohol attitudes (hoofdstuk 3), de link tussen gamen en ongezond snackgedrag (hoofdstuk 4) en de link tussen MTV reality shows en intenties ten aanzien van roken, dronken zijn en binge-drinken (hoofdstuk 5). Twee belangrijke hypothesen vormden de rode draad doorheen deze hoofdstukken. Eerst en vooral werd verwacht dat adolescenten met hogere BAS scores gevoeliger zouden zijn voor het invloed van de media op gezondheidsgedrag aangezien zij aandachtiger zouden kunnen zijn voor boodschappen die bijvoorbeeld alcohol en roken op een positieve manier voorstellen. Ten tweede, werd verwacht dat adolescenten met hogere scores op BIS zich bewust zijn van de potentiële negatieve gevolgen van risicogedragingen en dat BIS dus beschermend zou werken voor de invloed van de media. De resultaten toonden aan dat BAS en BIS over het algemeen geen modererende rol spelen in de onderzochte verbanden. Enkel in hoofdstuk 3 werd gevonden dat BIS een beschermende rol speelt in het verband tussen het kijken naar soaps en positievere alcohol attitudes.

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18. WALGRAVE, S., *Tussen loyaliteit en selectiviteit. Een sociologisch onderzoek naar de ambivalente verhouding tussen nieuwe sociale bewegingen en groene partij in Vlaanderen.* Leuven, Garant, 1994, 361 blz.
19. CASIER, T., *Over oude en nieuwe mythen. Ideologische achtergronden en repercussies van de politieke omwentelingen in Centraal- en Oost-Europa sinds 1985.* Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 1994, 365 blz.
20. DE RYNCK, F., *Streekontwikkeling in Vlaanderen. Bestuursverhoudingen en beleidsnetwerken in bovenlokale ruimtes.* Leuven, Departement Politieke Wetenschappen, Afdeling Bestuurswetenschap, K.U.Leuven, 1995, 432 blz.
21. DEVOS, G., *De flexibilisering van het secundair onderwijs in Vlaanderen. Een organisatie-sociologische studie van macht en institutionalisering.* Leuven, Acco, 1995, 447 blz.
22. VAN TRIER, W., *Everyone A King? An investigation into the meaning and significance of the debate on basic incomes with special references to three episodes from the British inter-War experience.* Leuven, Departement Sociologie, K.U.Leuven, 1995, vi+501 blz.
23. SELS, L., *De overheid viert de teugels. De effecten op organisatie en personeelsbeleid in de autonome overheidsbedrijven.* Leuven, Acco, 1995, 454 blz.
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28. JEMADU Aleksius, *Sustainable Forest Management in the Context of Multi-level and Multi-actor Policy Processes.* Leuven, Departement Politieke Wetenschappen, Afdeling Bestuur en Overheidsmanagement, K.U.Leuven, 1996, 310 blz.
29. HENDRAWAN Sanerya, *Reform and Modernization of State Enterprises. The Case of Indonesia.* Leuven, Departement Politieke Wetenschappen, Afdeling Bestuur en Overheidsmanagement, K.U.Leuven, 1996, 372 blz.
30. MUIJS Roland Daniël, *Self, School and Media: A Longitudinal Study of Media Use, Self-Concept, School Achievement and Peer Relations among Primary School Children.* Leuven, Departement Communicatiewetenschap, K.U.Leuven, 1997, 316 blz.
31. WAEGE Hans, *Vertogen over de relatie tussen individu en gemeenschap.* Leuven, Acco, 1997, 382 blz.
32. FIERS Stefaan, *Partijvoorzitters in België of 'Le parti, c'est moi'?* Leuven, Acco, 1998, 419 blz.
33. SAMOY Erik, *Ongeschied of ongewenst? Een halve eeuw arbeidsmarktbeleid voor gehandicapten.* Leuven, Departement Sociologie, K.U.Leuven, 1998, 640 blz.

34. KEUKELEIRE Stephan, *Het Gemeenschappelijk Buitenlands en Veiligheidsbeleid (GBVB): het buitenlands beleid van de Europese Unie op een dwaalspoor*. Leuven, Departement Politieke Wetenschappen, Afdeling Internationale Betrekkingen, K.U.Leuven, 1998, 452 blz.
35. VERLINDEN Ann, *Het ongewone alledaagse: over zwarte katten, horoscopen, miraculeuze genezingen en andere geloofselementen en praktijken. Een sociologie van het zogenaamde bijgeloof*. Leuven, Departement Sociologie, K.U.Leuven, 1999, 387 blz. + bijlagen.
36. CARTON Ann, *Een interviewernetwerk: uitwerking van een evaluatieprocedure voor interviewers*. Leuven, Departement Sociologie, 1999, 379 blz. + bijlagen.
37. WANG Wan-Li, *Understanding Taiwan-EU Relations: An Analysis of the Years from 1958 to 1998*. Leuven, Departement Politieke Wetenschappen, Afdeling Internationale Betrekkingen, K.U.Leuven, 1999, 326 blz. + bijlagen.
38. WALRAVE Michel, *Direct Marketing en Privacy. De verhouding tussen direct marketingscommunicatie en de bescherming van de informationele en de relationele privacy van consumenten*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 1999, 480 blz. + bijlagen.
39. KOCHUYT Thierry, *Over een ondercultuur. Een cultuursociologische studie naar de relatieve deprivatie van arme gezinnen*. Leuven, Departement Sociologie, K.U.Leuven, 1999, 386 blz. + bijlagen.
40. WETS Johan, *Waarom onderweg? Een analyse van de oorzaken van grootschalige migratie- en vluchtelingenstromen*. Leuven, Departement Politieke Wetenschappen, Afdeling Internationale Betrekkingen, K.U.Leuven, 1999, 321 blz. + bijlagen.
41. VAN HOOTEGEM Geert, *De draaglijke traagheid van het management. Productie- en Personeelsbeleid in de industrie*. Leuven, Departement Sociologie, K.U.Leuven, 1999, 471 blz. + bijlagen.
42. VANDEBOSCH Heidi, *Een geboeid publiek? Het gebruik van massamedia door gedetineerden*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 1999, 375 blz. + bijlagen.
43. VAN HOVE Hildegard, *De weg naar binnen. Spiritualiteit en zelfontplooiing*. Leuven, Departement Sociologie, K.U.Leuven, 2000, 369 blz. + bijlagen.
44. HUYS Rik, *Uit de band? De structuur van arbeidsverdeling in de Belgische autoassemblagebedrijven*. Leuven, Departement Sociologie, K.U.Leuven, 2000, 464 blz. + bijlagen.
45. VAN RUYSEVELDT Joris, *Het belang van overleg. Voorwaarden voor macroresponsieve CAO-onderhandelingen in de marktsector*. Leuven, Departement Sociologie, K.U.Leuven, 2000, 349 blz. + bijlagen.
46. DEPAUW Sam, *Cohesie in de parlementsfracties van de regeringsmeerderheid. Een vergelijkend onderzoek in België, Frankrijk en het Verenigd Koninkrijk (1987-97)*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2000, 510 blz. + bijlagen.
47. BEYERS Jan, *Het maatschappelijk draagvlak van het Europees beleid en het einde van de permissieve consensus. Een empirisch onderzoek over politiek handelen in een meerlagig politiek stelsel*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2000, 269 blz. + bijlagen.
48. VAN DEN BULCK Hilde, *De rol van de publieke omroep in het project van de moderniteit. Een analyse van de bijdrage van de Vlaamse publieke televisie tot de creatie van een nationale cultuur en identiteit (1953-1973)*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 2000, 329 blz. + bijlagen.
49. STEEN Trui, *Krachtlijnen voor een nieuw personeelsbeleid in de Vlaamse gemeenten. Een studie naar de sturing en implementatie van veranderingsprocessen bij de overheid*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2000, 340 blz. + bijlagen.
50. PICKERY Jan, *Applications of Multilevel Analysis in Survey Data Quality Research. Random Coefficient Models for Respondent and Interviewer Effects*. Leuven, Departement Sociologie, K.U.Leuven, 2000, 200 blz. + bijlagen.
51. DECLERCQ Aniana (Anja), *De complexe zoektocht tussen orde en chaos. Een sociologische studie naar de differentiatie in de institutionele zorgregimes voor dementerende ouderen*. Leuven, Departement Sociologie, K.U.Leuven, 2000, 260 blz. + bijlagen.
52. VERSCHRAEGEN Gert, *De maatschappij zonder eigenschappen. Systeemtheorie, sociale differentiatie en moraal*. Leuven, Departement Sociologie, K.U.Leuven, 2000, 256 blz. + bijlagen.
53. DWIKARDANA Saptia, *The Political Economy of Development and Industrial Relations in Indonesia under the New Order Government*. Leuven, Departement Sociologie, K.U.Leuven, 2001, 315 blz. + bijlagen.
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55. HAJNAL Istvan, *Classificatie in de sociale wetenschappen. Een evaluatie van de nauwkeurigheid van een aantal clusteranalysemethoden door middel van simulaties*. Leuven, Departement Sociologie, K.U.Leuven, 2001, 340 blz. + bijlagen.
56. VAN MEERBEECK Anne, *Het doopsel: een familieritueel. Een sociologische analyse van de betekenissen van dopen in Vlaanderen*. Leuven, Departement Sociologie, K.U.Leuven, 2001, 338 blz. + bijlagen.
57. DE PRINS Peggy, *Zorgen om zorg(arbeid). Een vergelijkend onderzoek naar oorzaken van stress en maatzorg in Vlaamse rusthuizen*. Leuven, Departement Sociologie, K.U.Leuven, 2001, 363 blz. + bijlagen.



58. VAN BAVEL Jan, *Demografische reproductie en sociale evolutie: geboortebepanking in Leuven 1840-1910*. Leuven, Departement Sociologie, K.U.Leuven, 2001, 362 blz. + bijlagen.
59. PRINSLOO Riana, *Subnationalism in a Cleavaged Society with Reference to the Flemish Movement since 1945*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2001, 265 blz. + bijlagen.
60. DE LA HAYE Jos, *Missed Opportunities in Conflict Management. The Case of Bosnia-Herzegovina (1987-1996)*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2001, 283 blz. + bijlagen.
61. ROMMEL Ward, *Heeft de sociologie nood aan Darwin? Op zoek naar de verhouding tussen evolutiepsychologie en sociologie*. Leuven, Departement Sociologie, K.U.Leuven, 2002, 287 blz. + bijlagen.
62. VERVLIET Chris, *Vergelijking tussen Duits en Belgisch federalisme, ter toetsing van een neofunctionalistisch verklaringsmodel voor bevoegdheidsverschuivingen tussen nationale en subnationale overheden: een analyse in het economisch beleidsdomein*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2002, 265 blz. + bijlagen.
63. DHOEST Alexander, *De verbeelde gemeenschap: Vlaamse tv-fictie en de constructie van een nationale identiteit*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 2002, 384 blz. + bijlagen.
64. VAN REETH Wouter, *The Bearable Lightness of Budgeting. The Uneven Implementation of Performance Oriented Budget Reform Across Agencies*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2002, 380 blz. + bijlagen.
65. CAMBRÉ Bart, *De relatie tussen religiositeit en ethnocentrisme. Een contextuele benadering met cross-culturele data*. Leuven, Departement Sociologie, K.U.Leuven, 2002, 257 blz. + bijlagen.
66. SCHEERS Joris, *Koffie en het aroma van de stad. Tropische (re-)productiestructuren in ruimtelijk perspectief. Casus centrale kustvlakte van Ecuador*. Leuven, Departement Sociologie, K.U.Leuven, 2002, 294 blz. + bijlagen.
67. VAN ROMPAEY Veerle, *Media on / Family off? An integrated quantitative and qualitative investigation into the implications of Information and Communication Technologies (ICT) for family life*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 2002, 232 blz. + bijlagen.
68. VERMEERSCH Peter, *Roma and the Politics of Ethnicity in Central Europe. A Comparative Study of Ethnic Minority Mobilisation in the Czech Republic, Hungary and Slovakia in the 1990s*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2002, 317 blz. + bijlagen.
69. GIELEN Pascal, *Pleidooi voor een symmetrische kunstsociologie. Een sociologische analyse van artistieke selectieprocessen in de sectoren van de hedendaagse dans en de beeldende kunst in Vlaanderen*. Leuven, Departement Sociologie, K.U.Leuven, 2002, 355 blz. + bijlagen.
70. VERHOEST Koen, *Resultaatgericht verzelfstandigen. Een analyse vanuit een verruimd principaal-agent perspectief*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2002, 352 blz. + bijlagen.
71. LEFÈVRE Pascal, *Willy Vandersteens Suske en Wiske in de krant (1945-1971). Een theoretisch kader voor een vormelijke analyse van strips*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 2003, 186 blz. (A3) + bijlagen.
72. WELKENHUYSEN-GYBELS Jerry, *The Detection of Differential Item Functioning in Likert Score Items*. Leuven, Departement Sociologie, K.U.Leuven, 2003, 222 blz. + bijlagen.
73. VAN DE PUTTE Bart, *Het belang van de toegeschreven positie in een moderniserende wereld. Partnerkeuze in 19de-eeuwse Vlaamse steden (Leuven, Aalst en Gent)*. Leuven, Departement Sociologie, K.U.Leuven, 2003, 425 blz. + bijlagen.
74. HUSTINX Lesley, *Reflexive modernity and styles of volunteering: The case of the Flemish Red Cross volunteers*. Leuven, Departement Sociologie, K.U.Leuven, 2003, 363 blz. + bijlagen.
75. BEKE Wouter, *De Christelijke Volkspartij tussen 1945 en 1968. Breuklijnen en pacificatiemechanismen in een catch-allpartij*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2004, 423 blz. + bijlagen.
76. WAYENBERG Ellen, *Vernieuwingen in de Vlaamse centrale - lokale verhoudingen: op weg naar partnerschap? Een kwalitatieve studie van de totstandkoming en uitvoering van het sociale impulsbeleid*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2004, 449 blz. + bijlagen.
77. MAESSCHALCK Jeroen, *Towards a Public Administration Theory on Public Servants' Ethics. A Comparative Study*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2004, 374 blz. + bijlagen.
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80. WAUTERS Bram, *Verkiezingen in organisaties*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2004, 707 blz. + bijlagen.

81. VANDERLEYDEN Lieve, *Het Belgische/Vlaamse ouderenbeleid in de periode 1970-1999 gewikt en gewogen*. Leuven, Departement Sociologie, K.U.Leuven, 2004, 386 blz. + bijlagen.
82. HERMANS Koen, *De actieve welvaartsstaat in werking. Een sociologische studie naar de implementatie van het activeringsbeleid op de werkvloer van de Vlaamse OCMW's*. Leuven, Departement Sociologie, K.U.Leuven, 2005, 300 blz. + bijlagen.
83. BEVIGLIA ZAMPETTI Americo, *The Notion of 'Fairness' in International Trade Relations: the US Perspective*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2005, 253 blz. + bijlagen.
84. ENGELEN Leen, *De verbeelding van de Eerste Wereldoorlog in de Belgische speelfilm (1913-1939)*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 2005, 290 blz. + bijlagen.
85. VANDER WEYDEN Patrick, *Effecten van kiessystemen op partijsystemen in nieuwe democratieën*. Leuven, Departement Sociologie, K.U.Leuven/K.U.Brussel, 2005, 320 blz. + bijlagen.
86. VAN HECKE Steven, *Christen-democraten en conservatieven in de Europese Volkspartij. Ideologische verschillen, nationale tegenstellingen en transnationale conflicten*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2005, 306 blz. + bijlagen.
87. VAN DEN VONDER Kurt, *"The Front Page" in Hollywood. Een geïntegreerde historisch-poëtische analyse*. Leuven, Departement Communicatiewetenschap, K.U.Leuven, 2005, 517 blz. + bijlagen.
88. VAN DEN TROOST Ann, *Marriage in Motion. A Study on the Social Context and Processes of Marital Satisfaction*. Leuven, Departement Sociologie, K.U.Leuven/R.U.Nijmegen, Nederland, 2005, 319 blz. + bijlagen.
89. ERTUGAL Ebru, *Prospects for regional governance in Turkey on the road to EU membership: Comparison of three regions*. Leuven, Departement Politieke Wetenschappen, K.U.Leuven, 2005, 384 blz. + bijlagen.
90. BENIJTS Tim, *De keuze van beleidsinstrumenten. Een vergelijkend onderzoek naar duurzaam sparen en beleggen in België en Nederland*. Leuven, Onderzoekseenheid: Instituut voor de Overheid [IO], K.U.Leuven, 2005, 501 blz. + bijlagen
91. MOLLICA Marcello, *The Management of Death and the Dynamics of an Ethnic Conflict: The Case of the 1980-81 Irish National Liberation Army (INLA) Hunger Strikes in Northern Ireland*. Leuven, Onderzoekseenheid: Instituut voor Internationaal en Europees Beleid [IIEB], K.U.Leuven, 2005, 168 blz. + bijlagen
92. HEERWEGH Dirk, *Web surveys. Explaining and reducing unit nonresponse, item nonresponse and partial nonresponse*. Leuven, Onderzoekseenheid: Centrum voor Sociologie [CeSO], K.U.Leuven, 2005, 350 blz. + bijlagen
93. GELDERS David (Dave), *Communicatie over nog niet aanvaard beleid: een uitdaging voor de overheid?* Leuven, Onderzoekseenheid: School voor Massacommunicatieresearch [SMC], K.U.Leuven, 2005, (Boekdeel 1 en 2) 502 blz. + bijlagenboek
94. PUT Vital, *Normen in performance audits van rekenkamers. Een casestudie bij de Algemene Rekenkamer en het National Audit Office*. Leuven, Onderzoekseenheid: Instituut voor de Overheid [IO], K.U.Leuven, 2005, 209 blz. + bijlagen
95. MINNEBO Jurgen, *Trauma recovery in victims of crime: the role of television use*. Leuven, Onderzoekseenheid: School voor Massacommunicatieresearch [SMC], K.U.Leuven, 2006, 187 blz. + bijlagen
96. VAN DOOREN Wouter, *Performance Measurement in the Flemish Public Sector: A Supply and Demand Approach*. Leuven, Onderzoekseenheid: Instituut voor de Overheid [IO], K.U.Leuven, 2006, 245 blz. + bijlagen
97. GIJSELINCKX Caroline, *Kritisch Realisme en Sociologisch Onderzoek. Een analyse aan de hand van studies naar socialisatie in multi-etnische samenlevingen*. Leuven, Onderzoekseenheid: Centrum voor Sociologie [CeSO], K.U.Leuven, 2006, 305 blz. + bijlagen
98. ACKAERT Johan, *De burgemeestersfunctie in België. Analyse van haar legitimering en van de bestaande rolpatronen en conflicten*. Leuven, Onderzoekseenheid: Instituut voor de Overheid [IO], K.U.Leuven, 2006, 289 blz. + bijlagen
99. VLEMINCKX Koen, *Towards a New Certainty: A Study into the Recalibration of the Northern-Tier Conservative Welfare States from an Active Citizens Perspective*. Leuven, Onderzoekseenheid: Centrum voor Sociologie [CeSO], K.U.Leuven, 2006, 381 blz. + bijlagen
100. VIZI Balázs, *Hungarian Minority Policy and European Union Membership. An Interpretation of Minority Protection Conditionality in EU Enlargement*. Leuven, Onderzoekseenheid: Instituut voor Internationaal en Europees Beleid [IIEB], K.U.Leuven, 2006, 227 blz. + bijlagen
101. GEERARDYN Aagje, *Het goede doel als thema in de externe communicatie. Bedrijfscommunicatie met een sociaal gezicht?* Leuven, Onderzoekseenheid: School voor Massacommunicatieresearch [SMC], K.U.Leuven, 2006, 272 blz. + bijlagen
102. VANCOPPENOLLE Diederik, *De ambtelijke beleidsvormingsrol verkend en getoetst in meervoudig vergelijkend perspectief. Een two-level analyse van de rol van Vlaamse ambtenaren in de Vlaamse beleidsvorming*. Leuven, Onderzoekseenheid: Instituut voor de Overheid [IO], K.U.Leuven, 2006, 331 blz. + bijlagenboek

103. DOM Leen, *Ouders en scholen: partnerschap of (ongelijke) strijd? Een kwalitatief onderzoek naar de relatie tussen ouders en scholen in het lager onderwijs*. Leuven, Onderzoekseenheid: Centrum voor Sociologisch Onderzoek [CeSO], K.U.Leuven, 2006, 372 blz. + bijlagen
104. NOPPE Jo, *Van kiesprogramma tot regeerakkoord. De beleidsonderhandelingen tussen de politieke partijen bij de vorming van de Belgische federale regering in 1991-1992 en in 2003*. Leuven, Onderzoekseenheid: Centrum voor Politicologie [CePO], K.U.Leuven, 2006, 364 blz. + bijlagen
105. YASUTOMI Atsushi, *Alliance Enlargement: An Analysis of the NATO Experience*. Leuven, Onderzoekseenheid: Instituut voor Internationaal en Europees Beleid [IIEB], K.U.Leuven, 2006, 294 blz. + bijlagen
106. VENTURINI Gian Lorenzo, *Poor Children in Europe. An Analytical Approach to the Study of Poverty in the European Union 1994-2000*. Dipartimento di Scienze Sociali, Università degli studi di Torino, Torino (Italië) / Onderzoekseenheid: Centrum voor Sociologisch Onderzoek [CeSO], K.U.Leuven, 2006, 192 blz. + bijlagen
107. EGGERMONT Steven, *The impact of television viewing on adolescents' sexual socialization*. Onderzoekseenheid: School voor Massacommunicatieresearch [SMC], K.U.Leuven, 2006, 244 blz. + bijlagen
108. STRUYVEN Ludovicus, *Hervormingen tussen drang en dwang. Een sociologisch onderzoek naar de komst en de gevolgen van marktwerking op het terrein van arbeidsbemiddeling*. Onderzoekseenheid: Centrum voor Sociologisch Onderzoek [CeSO], K.U.Leuven, 2006, 323 blz. + bijlagen
109. BROOS Agnetha, *De digitale kloof in de computergeneratie: ICT-exclusie bij adolescenten*. School voor Massacommunicatieresearch [SMC], K.U.Leuven, 2006, 215 blz. + bijlagen
110. PASPALANOVA Mila, *Undocumented and Legal Eastern European Immigrants in Brussels*. Onderzoekseenheid: Centrum voor Sociologisch Onderzoek [CeSO], K.U.Leuven/K.U.Brussel, 2006, 383 blz. + bijlagen
111. CHUN Kwang Ho, *Democratic Peace Building in East Asia in Post-Cold War Era. A Comparative Study*. Onderzoekseenheid: Instituut voor Internationaal en Europees Beleid [IIEB], K.U.Leuven, 2006, 297 blz. + bijlagen
112. VERSCHUERE Bram, *Autonomy & Control in Arm's Length Public Agencies: Exploring the Determinants of Policy Autonomy*. Onderzoekseenheid: Instituut voor de Overheid [IO], K.U.Leuven, 2006, 363 blz. + bijlagenboek
113. VAN MIERLO Jan, *De rol van televisie in de cultivatie van percepties en attitudes in verband met geneeskunde en gezondheid*. Onderzoekseenheid: School voor Massa-communicatieresearch [SMC], K.U.Leuven, 2007, 363 blz. + bijlagen
114. VENCATO Maria Francesca, *The Development Policy of the CEECs: the EU Political Rationale between the Fight Against Poverty and the Near Abroad*. Onderzoekseenheid: Instituut voor Internationaal en Europees Beleid [IIEB], K.U.Leuven, 2007, 276 blz. + bijlagen
115. GUTSCHOVEN Klaas, *Gezondheidsempowerment en de paradigmaverschuiving in de gezondheidszorg: de rol van het Internet*. Onderzoekseenheid: School voor Massa-communicatieresearch [SMC], K.U.Leuven, 2007, 330 blz. + bijlagen
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117. DE COCK Rozane, *Trieste Vedetten? Assisenverslaggeving in Vlaamse kranten*. Onderzoekseenheid: School voor Massa-communicatieresearch [SMC], K.U.Leuven, 2007, 257 blz. + bijlagen
118. MALLIET Steven, *The Challenge of Videogames to Media Effect Theory*. Onderzoekseenheid: Centrum voor Mediacultuur en communicatietechnologie [CMC], K.U.Leuven, 2007, 187 blz. + bijlagen
119. VANDECASTEELE Leen, *Dynamic Inequalities. The Impact of Social Stratification Determinants on Poverty Dynamics in Europe*. Onderzoekseenheid: Centrum voor Sociologisch Onderzoek [CeSO], K.U.Leuven, 2007, 246 blz. + bijlagen
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122. DE WIT Kurt, *Universiteiten in Europa in de 21e eeuw. Netwerken in een veranderende samenleving*. Onderzoekseenheid: Centrum voor Sociologisch Onderzoek [CeSO], K.U.Leuven, 2007, 362 blz. + bijlagen
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124. VANDER STICHELE Alexander, *De culturele alleseter? Een kwantitatief en kwalitatief onderzoek naar 'culturele omnivoriteit' in Vlaanderen*. Onderzoekseenheid: Centrum voor Sociologisch Onderzoek [CeSO], K.U.Leuven, 2008, 414 blz. + bijlagen(boek)

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