



**ATTENTIONAL BIAS FOR FOOD AND ALCOHOL CUES AFTER EXPOSURE TO
COMMERCIAL ADVERTISING: A CONSUMER NEUROSCIENCE APPROACH**

Keitiline Ramos Viacava

Doctoral Thesis

Porto Alegre/RS, 2015.

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COMMERCIAL ADVERTISING: A CONSUMER NEUROSCIENCE APPROACH**

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Doctoral thesis presented to the Graduate Program in Psychology at the Universidade Federal do Rio Grande do Sul (UFRGS) as a partial requirement for the Degree of Doctor of Psychology under the supervision of Lisiane Bizarro Araújo, PhD (UFRGS), and co-supervision of John W. VanMeter, PhD (Georgetown University) and Paulo Sérgio Boggio, PhD (Universidade Presbiteriana Mackenzie)

Universidade Federal do Rio Grande do Sul

Instituto de Psicologia

Programa de Pós-graduação em Psicologia

August 2015.

Dedication

I dedicate this thesis to my beloved husband, Jackson M. Lopes. I couldn't have done this without him in my life. I thank him so much for all of his love, understanding, trust, and unconditional support along the way. He is the best!

ACKNOWLEDGMENTS

I wish to express the deepest gratitude to my thesis advisor, Dr. Lisiane Bizarro for accepting me as a PhD candidate in the Laboratório de Psicologia Experimental, Neurociências e Comportamento (LPNeC). I am eternally grateful to her for all her patience and guidance, and for providing me with the necessary feedback to help me overcome at least part of the limitations I encountered, thus enabling me to pursue my ambitions. I also thank her for showing results and helping me to rely on every small improvement along this process, as a way to find the stamina needed to keep up the good work. I am thankful for all the opportunities she has created or inspired. Notably, I thank her for offering an undergraduate course in organizational psychology and allowing me to teach a full semester as a lecturer trainee, as well as for undertaking the effort to support an interdepartmental collaboration, thus permitting the foundation of the first extension course in neuroeconomics at UFRGS. Lastly, I thank her for sharing her knowledge and exceptional talent in experimental research and scientific editing and writing.

It is also with immense gratitude that I thank my international advisor, Dr. John W. VanMeter and his group for receiving me as a visiting research scholar at the Center for Functional and Molecular Imaging (CFMI) at Georgetown University. During my doctoral “sandwich” year at CFMI I had the privilege of working with a neuroscience team who has made an extraordinary effort and commitment to elucidate the association between integrity of neurodevelopment and level of alcohol use in adolescence, with the aim of charting the progressive nature of brain impairment as a consequence of alcohol use. I thank Dr. VanMeter for providing me with such a wonderful opportunity, as well as for the guidance, patience and support. More importantly, I thank him for personally taking the time and effort to help me during all the steps of the image data acquisition, analysis, and manuscript writing. My thanks also go to Dr. Diana H. Fishbein from the Pennsylvania State University for supporting my

work, kindly reviewing my manuscript in a very short period of time, and for her words of encouragement.

I also owe a deep sense of gratitude to Dr. Homero Dewes from the Centro de Estudos e Pesquisas em Agronegócios (CEPAN) at UFRGS for all the life and career guidance, friendship, and unconditional patience and support throughout the ups and downs of my graduate journey. Particularly, I thank him for making me believe that I could “reach for the stars” and for providing me innumerable valuable opportunities to present and discuss preliminary ideas and results of this thesis to a rich, diverse, and highly qualified scientific audience. In the same line, I also thank Dr. Alcyr Oliveira for looking after my work, especially for receiving me as a guest speaker at his undergraduate course in psychology at the Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA) and for inviting me to integrate the scientific committee of the VI Annual Meeting of the Instituto Brasileiro de Neuropsicologia e Comportamento (IBNeC). For this, I am deeply honored.

It is my privilege to additionally thank my co-advisor Dr. Paulo Boggio from the Laboratório de Neurociência Cognitiva e Social at Universidade Presbiteriana Mackenzie and my thesis project committee: Dr. Elizeu Macedo (Mackenzie), Dr. Lilian Stein (PUCRS), and Dr. Gustavo Gauer (UFRGS), as well as Dr. Antonio Rangel (Caltech), Dr. Dora Fix Ventura (USP) and Dr. Isabel de Paula A. David (UFF) for providing valuable comments on the early versions of this thesis. Similarly, I would like to extend my enormous respect and gratitude to my former advisor, Dr. Eugenio Pedrozo, as well as to Dr. Tania Nunes da Silva from the Escola de Administração (EA) at UFRGS for all their support and encouragement. I also thank Dr. Felipe Nascimento (EA) for integrating my master's final examination committee and for addressing the questions that deeply inspired this project.

I am also very grateful for all the undergraduate students who volunteered to work in this project and kindly accepted my guidance. I am particularly thankful to Gibson Weydmann, Arthur Tietze and Michael Duarte from UNISINOS; Ricardo Santolim and

Betina Damasceno from UFRGS; and Bruna Felizardo from IPA. Thanks also go to Grazielle Batista (UFCSPA) and her colleagues for providing food and nutrition technical assistance to this project. Besides, I wish to extend my appreciation to all members of the Equilíbrio Assessoria Econômica at UFRGS, in particular to Aline Merola, César Hoffmann, Gabriel Vieira, Leonardo Torres and Walter Vargas for supporting the first and the second editions of the neuroeconomics course at the Faculdade de Ciências Econômicas (FCE), also for inviting me as a guest speaker for the student's seminar. I also recognize and thank Ramon Wiest for his collaboration and Dr. Edson Talamini for supporting the second edition of our course.

I thank Dr. Álvaro Vigo from the Núcleo de Assessoria Estatística (NAE) at UFRGS for his statistical support and co-authorship. I profusely thank all my co-authors, including but not limited to Dr. Rosa Maria M. de Almeida, Juliana Jaboinski, Mailton Vasconcelos and Reinaldo A. G. Simões, for their help in preparing the manuscripts. I thank Dr. Fernanda Lopes for providing me the distinctive opportunity of co-authoring one of her papers. I thank all my colleagues from LPNeC, particularly Dr. Ana Carolina W. B. Peuker for her national pioneerism in the study of attentional bias. I would also like to extend my appreciation to all the professors and staff personal of the Programa de Pós-graduação em Psicologia of UFRGS. My thanks also go to Ileana Pacheco-Colón from CFMI and Maria Eduarda Tabajara from Grupo A for their prompt and implacable editing and writing review assistance. I similarly thank Dr. Rosa Krausz, Liana Gus Gomes, Nair Dias Gomes and Simone Kramer from ABRACEM for their support.

I sincerely thank my husband, Jackson M. Lopes, my parents, Maria Odete de C. Ramos and Vitor E. Viacava, my stepparent Zoraide M. Ramos, as well as to my adored siblings, Fernando, Paula and Vinícius Viacava, and all my family and friends for their support. Finally, I thank the Coordenação de Aperfeiçoamento de Pessoal de Ensino Superior (CAPES) for the financial support received through my doctorate training in Brazil and abroad.

*“If we knew what it was we were doing, it
would not be called research, would it?”*

Albert Einstein

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LIST OF ACRONYMS AND ABBREVIATIONS

AB	Attentional Bias
ABIA	Associação Brasileira das Indústrias da Alimentação
ABM	Attentional Bias Modification
AC	Accuracy
ACC	Anterior Cingulate Cortex
ADS	Adolescent Development Study
ANOVA	Analysis of Variance
ANVISA	Agência Nacional de Vigilância Sanitária
AUDIT	Alcohol Use Disorders Identification Test
BMI	Body Mass Index
CAPES	Coordenação de Aperfeiçoamento de Pessoal de Nível Superior
CFMI	Center for Functional and Molecular Imaging
CI	Confidence Intervals
CNPq	Conselho Nacional de Desenvolvimento Científico e Tecnológico
CONAR	Código Brasileiro de Autorregulamentação Publicitária
<i>df</i>	Degree of Freedom

DP	Dependent Variable
DUSI	Drug Use Screening Inventory
DVD	Digital Versatile Disc
DVR	Digital Video Recorder
ecStroop	Emotional Counting Stroop
FAHRE	Food and Health Research in Europe
FAO	Food and Agriculture Organization
fMRI	Functional Magnetic Resonance Imaging
FOV	Field of View
FSAB	National Food Agency of the United Kingdom
IBOPE	Instituto Brasileiro de Opinião Pública e Estatística
IRB	Institutional Review Board
IV	Independent Variable
LPNeC	Laboratório de Psicologia Experimental, Neurociências e Comportamento
M-AUDIT	Modified Alcohol Use Disorders Identification Test
MEE	Mere-exposure Effect
MEQ	Media Exposure Questionnaire
MPRAGE	Magnetization Prepared Rapid Acquisition Gradient Echo
MRI	Magnetic Resonance Imaging

<i>ms</i>	Milliseconds
NIAAA	National Institute on Alcohol Abuse and Alcoholism
PANAS	Positive and Negative Affect Scale
RA	Research Assistant
RT	Reaction Time
SBT	Sistema Brasileiro de Televisão
SD	Standard Deviation
SMA	Supplementary Motor Area
SOA	Stimulus Onset Asynchrony
SUD	Substance use Disorder
T1	Longitudinal Relaxation Time
TE	Echo Time
TG	Training Groups
TR	Repetition Time
TV	Television
UFRGS	Universidade Federal do Rio Grande do Sul
VPT	Visual Probe Task
WHO	World Health Organization

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ABSTRACT

Understanding how commercial stimuli may affect individuals' behavior and health is one of the main questions in Consumer Neuroscience. Thus, the main aim of this thesis was to investigate the role of exposure to commercial advertising on attentional bias for food and alcohol cues in a set of studies. There were similarities in the use of visuoperceptual content in advertisements for tobacco, alcohol and food in Brazil (study 1); and high proportion (75%) of unhealthy food commercials in the Brazilian television (study 2). We found that commercial advertisements can affect attention to food, and watching TV per se can influence affect and subjective hunger in young adults (study 3). Results also revealed associations between exposure to alcohol marketing and limbic-frontal activations in adolescents (study 4). Altogether, these results represent an attempt toward identifying possible risk factors for increased energy intake and alcohol misuse.

Keywords: commercial advertisements, food, alcohol, attentional bias, fMRI

RESUMO

Entender como estímulos comerciais podem afetar o comportamento e a saúde de indivíduos é uma das principais questões da Neurociência do Consumidor. O principal objetivo desta tese foi investigar o papel da exposição à propaganda comercial no viés da atenção para pistas relacionadas a alimentos e álcool, através de um conjunto de estudos. Encontramos similaridades no uso de conteúdo visual em anúncios de tabaco, álcool e alimentos no Brasil (estudo 1); e elevada proporção (75%) de comerciais de alimentos não saudáveis na televisão brasileira (estudo 2). Observamos que comerciais podem afetar a atenção para alimentos, e assistir TV por si só pode influenciar a avaliação e a fome subjetiva em jovens adultos (estudo 3). Os resultados também revelaram associações entre exposição à publicidade de bebidas e ativações límbico-frontal em adolescentes (estudo 4). Estes estudos representam uma tentativa de identificar potenciais fatores de risco para o aumento do consumo de alimentos e abuso de álcool.

Palavras-chave: propagandas comerciais, comida, álcool, viés da atenção, fMRI

INTRODUCTION

Food and beverage are essential everyday products, since they provide energy for our daily activities and bodily function. Selective attention is the evolved cognitive process that promotes searching for these items in the environment. In the current context, full of over-advertised and over-processed product options, the same adaptations that once have helped us to maintain life, now might be propelling us toward obesity and addiction (Garcia & Saad, 2008; Preston, 2011; Walla, Koller, & Meier, 2014). Understanding how commercial stimuli may affect individuals' behavior and health is one of the main questions in Consumer Neuroscience — i.e., a Neuroeconomics sub-discipline oriented to adapt theories and methods from neuroscience to develop a neuropsychological model of consumption (Plassmann, Ramsay, & Milosavljevic, 2012).

Consumer Neuroscience differs from Neuroeconomics in its focus on the study of consumer behavior, and from Neuromarketing in its purpose. Neuromarketing uses neuroscience techniques to solve concrete problems related to product sales and marketing (Ariely & Berns, 2010; Koller, 2010; Lee, Broderick, & Chamberlain, 2007; Morin, 2011). Consumer Neuroscience, on the other hand, is the field of research that uses neuroscientific findings and methods to better understand consumer behavior and its neurophysiological substrates (Hubert, 2010). This is a thesis in the field of Consumer Neuroscience.

The general aim of this thesis was to investigate the role of exposure to commercial advertising on attentional bias for food and alcohol cues in healthy subjects. The justification for taking this approach was grounded on the idea that the more we learn about automatic motivational processes (e.g., attentional biases) involved in consumption over time, the more all consumers will understand, and consequently enhance their ability to make healthy choices (Walla et al., 2014). Our main hypotheses were that attentional biases for food and alcohol-

related cues would be (i) present in healthy individuals and (ii) stronger in those exposed to a high density of commercial advertisements.

The rationale was built upon different models; most of them came from the field of Cognitive and Behavioral Psychology, Cognitive Neuroscience and the Psychology of Addictions, while some came from the Consumer Psychology and Consumer Behavior Management. Hence, we shared the neurobiological view of human cognition and behavior. Essentially, we relied on the dual process model of information processing (Hofmann, Gschwendner, Friese, Wiers, & Schmitt, 2008; Wiers et al., 2007), although adopting a more relative view of the distinction between automatic and controlled processes (Cohen, Dunbar, & McClelland, 1990; Moors & De Houwer, 2006).

We embraced the warning issued by the Food and Health Research in Europe – FAHRE (McCarthy et al., 2011) in 2011 concerning the need to consolidate studies in health and nutrition (such as tobacco, alcohol, and food). And this was particularly influenced by a previous paper entitled “The perils of ignoring history: Big tobacco played dirty and millions died. How similar is Big Food?” (Brownell & Warner, 2009). Thus, with regards to commercial advertising exposure, we took into consideration that these kinds of products in particular deserve special attention from health scientists and policymakers. This assumption was based on the recognition of the effectiveness of primary reinforcers such as food and beverage on behavior (Kullmann et al., 2013; Lawrence, Hinton, Parkinson, & Lawrence, 2012; Volkow, Wang, & Baler, 2011; Yokum, Ng, & Stice, 2011), and consequently, the existing risk of increased incentive salience and potential transition to addiction (Robinson & Berridge, 1993).

In accordance with the mere exposure effect, we accepted that individuals could develop a preference for a repeatedly advertised product, even if they cannot consciously recall the commercials (Zajonc, 1968, 2001). This supports our abovementioned hypothesis that repeated exposure to a particular class of product might trigger attentional biases toward

product-related cues. One possible explanation for this influence might be found in conditioned learning—in this case through the pairing of a new product (e.g., candy) with a known reward (e.g., sweet tastes) or a salient stimulus (e.g., color), which is typically produced by marketing campaigns. Another possible reason is that these types of associations might also lead consumers to make inaccurate evaluations about the product, triggering hedonic motivations through a process described in management as the health halo effect (Chandon, 2013; Chandon & Wansink, 2007).

Furthermore, our rationale was that the effects of commercial advertising may not only be influenced by the frequency of exposure to a specific product (e.g., a dark chocolate bar from a specific brand), but also by the generalization to another product that represents the same product category (e.g., a white chocolate bar from the same specific brand; a dark chocolate bar from a different brand). This said, we assumed that commercial advertisements could affect consumption of any type of similar product available, not only the one that has been advertised (Halford et al., 2008; Harris, Bargh, & Brownell, 2009). Altogether, these models and concepts supported the elaboration of this thesis, which is comprised by four empirical papers and is organized as follows.

In Chapter I, you will find the first study, entitled “It is pleasant and heavy: Convergence of visual contents in tobacco, alcohol, and food marketing in Brazil”, published in the journal of Health Promotion International. This represented a first attempt in conducting a convergence analysis in the marketing of tobacco, alcohol and food industries altogether. Besides the similarities observed in the strategies used as variables for the selection of commercial stimuli, such as color, position, and size, this paper offered a provocative literature review discussing how visuoperceptual content is commonly explored in marketing.

The second paper (Chapter II), entitled “Unhealthy Food Commercials on Brazilian TV” is currently under review. The primary aim of that study was to identify the proportion of

unhealthy foods and compare it with previous data on the quantity and quality of these products advertised on the Brazilian television, published previously (Almeida, Nascimento, & Quaioti, 2002). One specific purpose of developing this study was to acquire a database of ecologically valid commercial advertisements for conducting experimental studies. This study considered advertisements in continuous programming from 8 to 22 hours, during the seven days of the week, and data was collected during one week and two weekends. Therefore, compared to the previous study (Almeida et al., 2002), this paper adds a new methodological criterion.

The third study (Chapter III), “Attentional bias for food images after exposure to food commercials on TV,” was one of the main studies of this thesis. The aim was to investigate the role of exposure to TV commercials for unhealthy food on attentional bias for food images in healthy (non-obese) young adults. It was mostly inspired by the protocol and results of two previous studies: “Priming effects of television food on eating behavior” (Harris et al., 2009) and “Exposure to alcohol commercials in movie theaters affects actual alcohol consumption in young adult high weekly drinkers: an experimental study” (Koordeman, Anschutz, & Engels, 2011). However, instead of explicit measures such as the amount of food or beverage ingested, our study adds implicit measures of attentional biases to the field protocol. To the best of our knowledge, this was the first study of this nature to measure attentional bias, especially with the Visual Probe Task, shedding light on the understanding the cognitive mechanisms involved in the processing of commercial information and the behavioral response to commercial advertisements, as well as how these factors could drive responses that alter consumption.

The fourth and last paper of this thesis (Chapter IV) is titled “Preliminary steps toward a mediation model of attentional bias in the relationship of exposure to alcohol advertising and attitudinal responses in adolescents”. It was part of the Adolescent Development Study (ADS) at the Center for Functional and Molecular Imaging (CFMI) at Georgetown University

(USA). ADS is a longitudinal neuroimaging study designed to elucidate the association between integrity of neurodevelopment and level of alcohol use in adolescence, with the aim of charting the progressive nature of brain impairment as a consequence of alcohol use. Our approach in this study was convergent with previous works aimed to investigate associations between alcohol advertising and drinking behavior in adolescents. However, the design we proposed differs in terms of measurement and methodology. Once again, as far as we know, this was the first study of this nature to investigate attentional biases, in this case with the Emotional Counting Stroop task, and to adopt fMRI methodology.

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CHAPTER I

STUDY 1 – IT IS PLEASANT AND HEAVY: CONVERGENCE OF VISUAL CONTENTS IN TOBACCO, ALCOHOL, AND FOOD MARKETING IN BRAZIL

Published

Viacava, K. R., Weydmann, G. J., Vasconcelos, M. F., Jaboiniski, J., Batista, G. D., de Almeida, R. M. M., Bizarro, L. (2015). It is pleasant and heavy: Convergence of visual contents in tobacco, alcohol, and food marketing in Brazil. *Health Promotion International*: dav057v1-dav057.

Abstract

The tactical use of visuoperceptual content in marketing may encourage impulsive consumption of unhealthy products. In this study, the application of visuoperceptual content was compared in advertisements used by industries of tobacco, alcohol and food. The aim was to ascertain whether similarities exist in the strategies used as variables for the selection of commercial stimuli, such as color, position and size. Scion Image and Corel Draw Graphics Suite software were used to analyze the content of a non-probabilistic sample of advertising images ($N = 150$). Differences were identified in the use of the colors green ($p = .04$) and red ($p = .01$), but not in the use of the color blue ($p = .64$), suggesting that induction of feelings of pleasantness resulting from the use of the color blue may be associated with the advertising in the alcohol and tobacco industries. Regarding the position of the commercial stimuli, a predominance of the use of quadrants “C” ($p < .01$) and “D” ($p = .01$) was found in all three industries, indicating a similar use of areas perceived as being “heavier”. As to the size, 78% of advertisements placed the commercial stimuli within a range of 0% to 25% of the total image. The results showed some similarities in the use of visuoperceptual content in advertisements for tobacco, alcohol and food, especially between tobacco and alcohol. The paper offers a convergence analysis of these three industries altogether, providing additional subsidies for the formulation of protection policies.

Keywords: convergence, tobacco, alcohol, food, advertising, Brazil

Introduction

The impact of commercial advertising on the abuse of tobacco (Hanewinkel *et al.*, 2010, Hanewinkel *et al.*, 2011, Lovato *et al.*, 2011, Rigotti *et al.*, 2005), alcohol (Faria *et al.*, 2011, Gordon *et al.*, 2011, Henriksen *et al.*, 2008, Koordeman *et al.*, 2012, Morgenstern *et al.*, 2011) and unhealthy foods (Boyland *et al.*, 2011, Ferguson *et al.*, 2012, Keller *et al.*, 2012, Mekhmoukh *et al.*, 2012, Scully *et al.*, 2012) has been widely demonstrated in the literature. Moreover, in recent years, a number of studies have dealt with the formulation and effectiveness of public policies that attempt to regulate or even ban the advertising of these products (Anderson *et al.*, 2009, Casswell, 2012, Paek and Hove, 2012). However, few studies have investigated the possible similarities in the marketing strategies (O'Donnell and Jeong, 2000) adopted in these industries, in particular the practice of global strategies (Mitry and Smith, 2009) and, therefore, of the commitment to the standardization of consumption habits (Chung, 2009). Despite the warning issued by the Food and Health Research in Europe (FAHRE) (McCarthy *et al.*, 2011) in 2011 regarding the need to consolidate studies into health and nutrition (such as tobacco, alcohol and food), studies that integrate these three industries remain insipient, at least with regard to the understanding of the marketing strategies adopted and their implications for consumer health.

Comparative analyses involving two of these industries have been performed. For instance, studies have observed the use of promotional strategies orienting alcohol consumption as a way to encourage the use of tobacco by young adults (Belstock *et al.*, 2008) and risky populations (Cohen *et al.*, 2011); this was especially prevalent in sports events and music concerts (Jiang and Ling, 2011, Kelly *et al.*, 2011). In another study, in which the content presented on the websites of Philip Morris, Kraft and Nestle was compared, similarities were identified between the tobacco and food industries in the definition of the corporate image (Smith, 2012). Similarities were even found in the dissemination of social responsibility campaigns across of tobacco and soft drinks industries (Dorfman *et al.*, 2012).

Similarities have also been identified in the lobbying and political marketing strategies used in the food and alcohol industries (Miller and Harkins, 2010).

However, even scarcer than comparative studies involving these three industries altogether are those focused on the analysis of the visuoperceptual content used in the promotion of tobacco, alcohol and unhealthy food. It is important to investigate this possible convergence in order to safeguard the population from typically misleading “health halos” produced by marketing campaigns (Chandon and Wansink, 2007a) and consequently, the risk of a generalization effect, the tendency to respond in the same way to different but similar stimuli. Additionally, the relevance of understanding this type of strategy lies in the fact that sensory marketing strategies, especially those that explore the perception of visual elements, are considered effective ways to support the formation of meaning around products and brands, influencing the selection and processing of information, and even encouraging impulsive consumption (Nagpal *et al.*, 2011, Obermiller and Sawyer, 2011, Su *et al.*, 2012). Color, position and size are some of the visual elements used in these strategies.

Color and Marketing

Colors are exploited in marketing for various reasons, such as to augment characteristics of excitability, alertness, activity and strength (red) or competence, intelligence, communication, reliability, logic and seriousness (blue) in relation to the brand (Labrecque and Milne, 2012). When colors are associated with sophisticated names, they seem to promote the purchase decision (Skorinko *et al.*, 2006). Research into Internet marketing has indicated that sites containing interaction between color tone and brightness, employing chromatic colors (e.g., red, green, blue) only as background can stimulate memory and enhance consumer intentions, as long as the consumer is in a good mood (Pelet and Papadopoulou, 2012). The colors used on websites or in commercial environments such as shopping malls, supermarkets, restaurants, bars, travel agencies and banks, for example, seem to influence the

perception of time, relaxing (green, blue) the consumer or provoking impatience and impulsiveness (red, yellow) (Crowley, 1993, Gorn *et al.*, 2004).

The influence of color has also been noted in studies into the perception of food and drink (Spence *et al.*, 2010), indicating that the colors adopted in packaging and utensils (e.g., plates, glasses) can affect taste perception (Shankar *et al.*, 2009, Van Ittersum and Wansink, 2012, Young *et al.*, 2009), the recognition of the physical attributes of the product (e.g., temperature) (Piqueras-Fiszman and Spence, 2012) and even the quantity consumed (Genschow *et al.*, 2012). For example, chocolates shown in brown (instead of other colors) are generally considered more chocolate-flavored (Shankar, Levitan, Prescott and Spence, 2009) and blue colored beverages tend to be associated with menthol flavor (Zampini *et al.*, 2007).

While there are numerous discrepancies between the results of studies with colors, especially on the effect of the color red (which is sometimes associated with pleasure and sometimes with fear), a possible explanation for the influence of color on behavior would be in the hypothesis that it occurs due to conditioned learning, that is through the pairing of colors with other stimuli, which, depending on the adopted color (e.g., red vs. blue) could present different trends in the behavior of the expression (e.g., avoidance, excitability versus approximation, relaxation) (Mehta and Zhu, 2009).

This line of research has encouraged works oriented towards consumer health and fostered public initiatives aimed at prohibiting the use of colors on cigarette packages, for example (Bansal-Travers *et al.*, 2011, Hammond, 2010).

Position and Marketing

The position of the product in the advertisement also appears to influence how consumers perceive it, and therefore, represents another commonly exploited element in marketing. The position of a stimulus influences human behavior to such a degree that, in the field of experimental cognitive psychology, for example, it is debated whether position exerts

greater influence on selectivity of attention than color (Fecteau *et al.*, 2009, Kasten and Navon, 2008). Thus, the effects of the position of the commercial stimulus (either visible or tangible) on consumer behavior have been investigated in studies of perception (Deng and Kahn, 2009, Graham and Jeffery, 2011) and decision making (Atalay *et al.*, 2012).

In a survey that assessed perceived weight from product images printed on the packaging, it was found that the perceived “heavier” positions are the lower, right and bottom-right areas of the image. As a result, it was pointed out that, when promoting products in which weight is considered a positive attribute, the use of images located in those areas are considered favorable. An interesting finding in this study was shown that when the goal is to emphasize a product’s healthy characteristics, its presentation in areas of the image considered “heavier”, rather than in areas considered “lighter” (i.e., upper, left and upper-left areas), tends to weaken the association of the product with healthiness (Deng and Kahn, 2009).

Size and Marketing

The way the consumer responds to the size of a commercial stimulus also appears to be relevant in marketing, and the topic has been explored mainly in research of packaging. This is because evidence has indicated that size can influence the amount purchased (Chandon and Ordabayeva, 2009), the ability to control the consumption (Atalay, Bodur and Rasolofoarison, 2012), the degree of emotional valence (positive versus negative) assigned to the product (Aydinoglu and Krishna, 2012) and perceived status (Dubois *et al.*, 2012) for example. Interestingly, changes in the size of a product appear to be more subtle when the packages and the portions are altered in the three dimensions rather than in only one dimension (Chandon and Ordabayeva, 2009). Thus, consumers tend to increase the amount of items purchased when a single dimension of the size of the product is changed. On the other hand, they tend to reduce the amount acquired when the size is changed in three dimensions.

Due to bias in the perception of size, small packs may increase the risk of overconsumption (do Vale *et al.*, 2008). Small sizes can also confuse the perception of

consumers when it comes to clothing, food and status. Regarding to clothing, small sizes can evoke levels of positive self-perception related to appearance, especially in women (Aydinoglu and Krishna, 2012). By contrast, in research aimed at understanding the relationship between perceived social status and preference for food and drinks, it was found that participants allocated to situations related to low social status tended to choose larger food and drink packages (Dubois, Rucker and Galinsky, 2012).

In short, the use of visuoperceptual content is common in marketing. Based on the accumulated evidence about health halo effects, it is possible that such strategies may influence consumption intentions by increasing selective-accessibility biases. Accordingly, consumers not only tend to make inferences from incomplete information associated with products (e.g., inferring taste) or from other products that represent the same category (e.g., a soda or a healthy juice), but also have to deal with hedonic motivations when making product decisions (Chandon, 2013, Chandon and Wansink, 2007a). Thus, recognizing and investigating the tactical use of visuoperceptual contents in commercial advertising is important not only to safeguard the population from the risk of exposure to misleading advertising, increasing control through previously established means (Grier and Kumanyika, 2010, Weishaar *et al.*, 2012), but also to support monitoring and policy formulation more specifically related to the protection from sensory marketing, for example. Thus, the objective of this study was to investigate the existence of similarities in the strategies used by the tobacco, alcohol and food industries in relation to the variables for the selection of commercial stimuli linked to the products (i.e., color, position, and size).

The intensity with which the of tobacco and alcohol industries use visual strategies in outdoor advertising (Scott *et al.*, 2008), the advancement of “Big Food”, i.e., large transnational corporations that control the production and distribution of ultra-processed food in the world (Monteiro and Cannon, 2012), and with it alerts regarding possible similarities

between the marketing strategies adopted by the tobacco, alcohol and food industries (Brownell and Warner, 2009, Stuckler and Nestle, 2012) also justify this study.

Methods

Data Collection

A total of 150 images were collected, 50 for each category (i.e., tobacco, alcohol and food), all related to advertising available online, and collected from Brazilian websites on the Internet. The images were associated with a web page aimed at advertising the product or directly connected with suppliers and producers. It is important to mention that our primary sources of images were formal marketing and advertising image web banks. However, because the images available at these web banks were not similar to the publicized ones, the data collection was performed from Google Images.

The images of tobacco advertisements were approximately 18 years older than those of alcohol and food, due to restrictive controls that have gradually increased in Brazil since 1988 (Law 12.546 of 2011). For the purpose of this study, it is worth mentioning the two policies that have made the most impact. First, in 1996, the display of tobacco commercials was restricted to the hours between 9PM and 6AM. Later, in 2000, advertisement of tobacco products was banned in magazines, newspapers, billboards, television, radio, Internet, cultural and sports events. Regardless, studies show that “under the radar” advertising strategies are still in effect in Brazil (Borzekowski and Cohen, 2013, Pereira and Veludo-de-Oliveira, 2014).

To standardize image search, the following descriptors were used: for Alcoholic Beverages (alcohol advertising, beverage advertising, marketing alcohol, beverage marketing, alcohol marketing); for Cigarettes or Tobacco (cigarette advertising, tobacco advertising, marketing cigarettes, marketing tobacco); and for Food (food advertising, advertising fast food, food marketing, marketing fast food).

Procedures

Color, Position, and Size

The Corel PHOTO-PAINT X5, contained in the CorelDraw Graphics Suite X5 (Corel Corporation, Canada) was used for measurement of the amount of red, green and blue, and to identify the position of the target commercial stimuli (product and brand). The frequency of color distribution (RGB histogram, i.e., red, green and blue) contained in the 150 collected images was quantified. With the aid of the tools in the CorelDraw package, the images were divided into quadrants. For this procedure, the Image Slicing Tool was used to split the image into four equal parts. The purpose was to highlight the quadrants (A, B, C or D) in which the commercial stimuli linked to the advertising image were positioned. The frequency of quadrant use and the quadrants in which the stimuli appeared were noted.

The software Scion Image, beta 4.0.2 version (Scion Corporation, Frederick, Maryland, USA) was used to measure the size of the target stimuli. After selecting the edges, the selected objects were measured in terms of their proportion to the overall size of the image in pixels. Thus, it was possible to estimate what percentage of the image corresponded to the selected object(s).

Content Analysis

Besides product and brand analyses, a content analysis was conducted to investigate other types of stimuli present in the remainder of the advertisement. The analysis consisted of three broad categories based on the preliminary results of an ongoing study (Rigoni, 2014), which were: 1) visual components (i.e., context or ambience, cartoons, celebrities); 2) product appeal (i.e., convenience, quality, innovation, flavor, saving, winning prizes); and, 3) emotional appeal (i.e., satisfaction, triumph, social acceptance, sports, adventures, happiness, physical attractiveness and beauty, family, fantasy vs. reality, fun, self-confidence, romance, energy, goal achievement). The frequencies of each item in each category were summed and total scores were calculated for tobacco, alcohol, and food industries.

Nutritional Evaluation

For the purpose of nutritional evaluation, the labels corresponding to the products advertised in the food image sample ($N = 50$) were selected and classified as "healthy" or "unhealthy" by two nutritional sciences research assistants, who used objective parameters set by the Brazilian National Sanitary Surveillance Agency (Agência Nacional de Vigilância Sanitária - ANVISA) for distribution of food products in Brazil. These criteria relate to levels of sugar, saturated fat, trans fat, sodium, and nutritional content.

Statistical Analysis

Exploratory data analyses were conducted to assess the studied variables in terms of distribution of frequency, scores, means, medians, standard deviations, and confidence intervals. The Kolmogorov-Smirnov frequency test was used to check the normality of the different variable distributions. Single factor analysis of variance (ANOVA) and the Bonferroni *post-hoc* test were used to compare the groups' use of colors. Additionally, the chi-square test was used to compare the position of product and brand in the image sample, as well as to support the content analysis comparisons. An alpha level (α) of 5% was adopted as significance criterion.

Results

Color

Differences were identified in the use of colors. The Red color was found to occur in similar range, from 50% to 75% in the image categories 'Alcohol' and 'Tobacco'. Blue, in turn, presented similar values in the range from 25% to 50% in the image categories 'Alcohol' and 'Food' and from 50% to 75% in the category 'Tobacco'. The Green color was more accentuated in the images from the category 'Alcohol', with a range from 50% to 75%. The amount of color exposed in the range from 0 to 255 was divided into four categories: 0% to 25%, 25% to 50%, 50% to 75% and 75% to 100%. Groups differed with regard the color used, with $F(2,147) = 3.28, p = .04$ for Green, and $F(2,147) = 4.14, p = .01$ for Red, but not

on the use of color Blue, $F(2,147) = 0.44, p = .64$. A *post hoc* Bonferroni test confirmed differences in the conditions Green color, $p = .03$, and Red color, $p = .01$, between groups of tobacco advertisements and unhealthy food advertisements (Table 1).

Table 1

Results of ANOVA and Bonferroni Post Hoc Test for the Comparison of Use of Colors in the Three Categories of Advertising Images

Colors	1. Alcohol	2. Tobacco	3. Food	ANOVA			Bonferroni <i>p</i> values		
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>F</i>	<i>df</i>	<i>p</i>	1/2	1/3	2/3
Green	136.46(6.40)	122.51(5.81)	144.93(6.49)	3.281*	2	.04	.35	1	.03*
Blue	107.24(6.82)	113.76(6.07)	115.99(7.44)	.446	2	.61	1	1	1
Red	158.32(6.81)	143.30(5.72)	168.21(5.88)	4.147*	2	.01	.26	.77	.01*

Note. The amount of color was measured with histogram tool and exposed in the range from 0 to 255 for each color. *M* = mean, *SD* = standard deviation, *F* = ANOVA statistical test, *df* = degree of freedom, * ($p < .05$).

Position

Regarding the position of the stimuli (product and brand) in the advertisement, a predominance of the use of quadrants “C” and “D” was found in all three industries. Our findings revealed a statistically significant result in quadrant “C”, with $\chi^2(2, N = 150) = 9.75, p < .01$, and in quadrant “D”, with $\chi^2(2, N = 150) = 9.10, p = .01$. The results in terms of the frequency range for each quadrant within the groups are shown in Table 2.

Table 2

Frequency of the Quadrants Used and Qui Square Statistics

Quadrants	Frequency			X^2	df	p
	Tobacco	Alcohol	Food			
A	35	43	32	4.750	2	.09
B	31	41	45	4.955	2	.08
C	35	38	37	9.750*	2	.00
D	33	41	45	9.108*	2	.01

Note. X^2 = Qui Square, df = degree of freedom, * ($p < .05$).

Size

As to the size of the stimulus (product and brand), 78% of advertisements (tobacco 82%, alcohol 88% and food 64%) placed the target stimuli within a range of 0% to 25% of the total image. The Alcohol industry stands out, due to the greater proportion of images (45%) with commercial stimuli occupying between 0% and 25%, this is also true for Tobacco (40%) and Food (31%). Regarding to the Food category, a secondary range stands out due to the proportion of images (18%) with commercial stimuli occupying from 25% to 50%.

Content Analysis

With regards to the content of the remaining 75% of the images, our findings indicated that 62% of the sample showed visual elements, which included context or ambience (46%), cartoons (17.3%), and celebrities (16.7%). Results revealed no significant difference between samples in the use of context or ambience features $\chi^2(2, N = 150) 2.09, p = .35$. The alcohol sample presented celebrity images at a rate of 30% compared with 10% for both food and tobacco, $\chi^2(2, N = 150) 9.60, p < .01$. There was a significant difference in the use of cartoons $\chi^2(2, N = 150) 19.35, p < .01$, which was most prevalent in the food images (36%).

Fifty-eight percent of the sample showed features related to product appeal, among which flavor (24%), quality (21.3%), and innovation (21.3%) were most emphasized. We found no significant difference in the presentation of flavor, $\chi^2(2, N = 150)4.60, p = .10$, or in the use of convenience features, $\chi^2(2, N = 150)4.962, p = .08$.

Emotional appeal features were found in 68.7% of the sample. The most explored were physical attractiveness and beauty (26.7%), happiness (24.7%), and sports (15.3%). There was a significant difference in the use satisfaction features, which was most prevalent in the food (16%) and tobacco (14%) samples, $\chi^2(2, N = 150)8.44, p = .01$. We also found a significant difference in the presentation of adventures $\chi^2(2, N = 150)7.03, p = .03$, which was most common in the food sample (22%). The use of sports features was most prevalent in the tobacco sample (24%), followed by alcohol (12%) and food (10%), though this difference was not significant, $\chi^2(2, N = 150)4.41, p = .11$. We found no significant difference in the use of social acceptance, $\chi^2(2, N = 150)0.76, p = .68$.

Some features did not appear frequently enough to be included in our statistical analyses. However, it could be informative to consider them from a descriptive standpoint.

In the tobacco sample, we noted a predominance of images of people in advertisements, while not all of them were smoking; in some, they were just holding the cigarette. The logos and the trademarks appeared in most of the images, but in some, the brand was highlighted on objects and clothes. Besides smoking, there were other types of products, such as ashtrays and mint drops, for example. As mentioned above, there was a notable appeal to sports and nature (24%), with the use of wide landscapes showing young, beautiful (38%), fun (12%), self-confident (14%), and successful (16%) people, often exalting energy (10%) while practicing sports.

In the alcohol sample, there was a strong appeal to sensuality (40%), showing attractive women in swimsuits or underclothes. Similarly, as noted in the tobacco images, the beverages were commonly linked to contexts related to fun (30%) and sophistication. There

was also a noticeable use of phrases that encouraged the consumption of the product, as well as references to famous people (30%) who drink or prefer a certain brand (16%). Full glasses and bottles, as well as the presence of groups of people in the pictures were predominant features of these images.

In the food sample, the logo and the product were usually presented together. A greater range of colors and appeal related to innovation (38%), flavor (34%), fun (32%), winning prizes (30%), surprise (22%), and convenience (22%) were also used. Unlike the images related to tobacco (4%) and alcohol (12%), in which the human figure was often used, in the unhealthy food images, drawings, cartoons and human caricatures (36%) were commonly presented. The food images also showed a large amount of text per image, which usually reinforced product quality (36%), for example, on a famous brand of chocolates, the slogan "The best chocolate!"

Nutritional Evaluation

Our results showed that almost the entire sample of foods advertised (82%) was immediately classified as unhealthy. The highest percentage of inadequacy was found for saturated fat (44%). As for sodium, 32% of the products exceeded the stipulated limit. A quarter of the products showed high levels of sugar (24%), and 62% of products potentially containing sugar did not have this information on the label, thus possibly underrating this item. Additionally, 4% of the products showed high levels of trans fat. The labels for 18% of the products contained incomplete information, making their classification as either healthy or unhealthy difficult. Despite this limitation, and based on the fact that these products were highly processed and violated the recommendations of the Brazilian agency (ANVISA), they were classified as unhealthy. Therefore, the totality of products advertised on the food image sample was considered "unhealthy".

Discussion

The goal of this study was to investigate the existence of similarities in the strategies used by the tobacco, alcohol and food industries in relation to the variables for the selection of commercial stimuli linked to the products (i.e., color, position, and size). Our results indicate this may be the case, especially between tobacco and alcohol marketing.

In this sample, the analysis of the advertising images indicated similarities regarding the presence of the color blue in the tobacco and alcohol industries. If the color blue is actually associated with intelligence, communication, reliability, logic and integrity (Labrecque and Milne, 2012), a reduced perception of the passage of time (Crowley, 1993, Gorn, Chattopadhyay, Sengupta and Tripathi, 2004), and activates the memory of menthol flavors (Zampini, Sanabria, Phillips and Spence, 2007), the results from this study would suggest that these would be potential features that the industries may have sought to highlight through advertising. Additionally, these findings suggest that behaviors related to closeness and feelings of relaxation (Mehta and Zhu, 2009) may have been associated with the products of these industries. Thus, these results may corroborate research or interventions aimed at regulating the use of colors, especially blue in the advertising for beverages, similarly to those introduced to control colors on cigarette packages, for instance (Bansal-Travers, O'Connor, Fix and Cummings, 2011, Hammond, 2010).

In a similar vein, the observed high frequencies of red and green colors in the food sample might trigger effects of health halos, leading consumers to make inaccurate evaluations about the product (Chandon, 2013, Chandon and Wansink, 2007a). Although the color red is considered capable of motivating ambiguous responses, such as approach or avoidance toward a particular stimuli, it is plausible that its presence in the context of food advertisements may trigger subjective hunger and automatic consumption of food, — i.e., eating without intention or lack of control. Also in accordance with the health halo effect and especially because it is commonly associated with health, it is possible that the prevalent use

of green by the food industry may favor calorie underestimation (Wansink and Chandon, 2006), and also lead to overeating and obesity (Chandon and Wansink, 2007b).

Regarding the position of the commercial stimulus, the use of quadrants “C” and “D” (i.e., at the bottom of the advertising image) was predominant in the sample from the tobacco, alcohol, and food industries. A possible explanation for this similarity might be found in the adoption of the “position effect” strategy. The idea of this strategy is that the visual perception and the weight assessment of a product are mediated by its location within the consumer’s visual field. Remembering that, according to this theory, products displayed at the bottom of the packaging would be considered heavier (Deng and Kahn, 2009). Although any attempt at interpretation may seem speculative, a way of looking at these data would be to take into account the high level of industrialization involved in all three of the investigated product categories. Cigarettes and alcoholic beverages, as well as unhealthy foods (i.e., those high in fat, salt and sugar, as observed in our nutritional evaluation) are similar in that they are ultra-processed (Brownell and Warner, 2009, Stuckler and Nestle, 2012). These products are known as being dense in flavor, and may, therefore, have been associated as “heavy” products in marketing campaigns.

Regarding the size of the commercial stimulus (product and brand), 78% of the advertisements (82% tobacco, 88% alcohol and 64% food) presented commercial stimuli within a range of 0% to 25% of the total advertising image. Although merely descriptive, these results may have indicated a minimalist approach to the representation of these commercial stimuli in advertising images. If the observations regarding the bias in the perception of size are correct (Chandon and Ordabayeva, 2009, do Vale, Pieters and Zeelenberg, 2008), it could be reasonable to assume that representations of commercial stimuli in small proportions may have supported marketing strategies for tobacco, alcohol and unhealthy food. The context in which they appear might convey the main information.

While concern has been directed to color, position, and size, our content analyses suggest that other kinds of similarities in the marketing of tobacco, alcohol, and food industries may also pose risks. Our findings indicate a convergence in presenting visual elements related to context or ambience, as well as product and emotional appeal features, like convenience, flavor, sports, and social acceptance. Since part of the categories did not meet the criteria for statistical analysis, we cannot affirm that there also a tendency to associate other types of stimuli (e.g., triumph, happiness, family interaction, romance, and energy) but this is possible and deserves further attention. Given the qualitative data we have mentioned, it seems that the marketing of tobacco and that of alcohol have more in common with each other than they do with the food industry.

On the other hand, the results of this study show similarities in the use of visuoperceptual content in advertisements for tobacco, alcohol and food, which is consistent with data from previous research that showed convergence in the marketing strategies of those industries (Belstock, Connolly, Carpenter and Tucker, 2008, Cohen, Caburnay and Rodgers, 2011, Dorfman, Cheyne, Friedman, Wadud and Gottlieb, 2012, Jiang and Ling, 2011, Kelly, Baur, Bauman and King, 2011, Smith, 2012). However, it is important to point out some of the limitations to the study. The difficulty of finding suitable software to measure the predominant colors used in the images was one. Moreover, the measure used in these programs does not take into account the interaction of the colors, which is the way in which the human brain processes this information. The division of the images into quadrants was useful for organizing the relevant information in the images, since it facilitated the process of locating and grouping. However, adopting this classification meant the ability to analyze each image, as a whole was lost. We attempted to overcome this limitation with our content analysis.

Finally, it is possible that the present sample of tobacco, alcohol, and unhealthy food images is not representative of advertising outside Brazil. However, considering the tendency

of practice of global marketing strategies, this possibility can actually highlight an opportunity or demand for further replication of these analyses, including advertising samples selected from different cultures. Another limitation was that this study did not include the perception and the behavior of individuals. Despite these limitations, the present research is novel because earlier studies have not involved the analysis of convergence of tobacco, alcohol and food industries altogether, especially in the use of visuoperceptual content. To our knowledge there have been no similar studies conducted. However, more comparative studies can be conducted, such as research based on the analysis of similarities on other sources of exposure to advertising, like on the television advertisements, websites and social networks of these industries.

Further research could identify how the three features analyzed (i.e., color, position, and size) may affect cognition and behavior when combined together in the same advertising. Therefore, more research is needed to determine how to minimize the potentially harmful effects of people's exposure to tobacco, alcohol, and unhealthy food advertising. Results in this line of research would help identify whether cognitive and behavioral peculiarities, such as perceptual biases that may currently be exploited in the marketing strategies of those industries, would provide subsidies for the formulation of policies to protect the health of consumers.

Acknowledgments

We especially wish to thank Dr. John VanMeter and his group at the Center for Functional and Molecular Imaging (CFMI) at Georgetown University for supporting the preparation of this manuscript. We also thank CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) and CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico) for their financial support.

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CHAPTER II

STUDY 2 – UNHEALTHY FOOD COMMERCIALS ON BRAZILIAN TV

Paper Under Review

Viacava, K. R., Simões, R. A. G., Santolim, R. R., Weydmann, G. J., Damasceno, B. V., Tietze, A. W., Vigo, A., Bizarro, L. (2015). *Unhealthy Food Commercials on Brazilian TV*.

Manuscript submitted for publication.

Abstract

Determining and monitoring the amount of unhealthy food commercials on TV is relevant to the prevention and control of obesity. The aim of this study was to determine the proportion of unhealthy food commercials on Brazilian TV and compare it with preexisting data on the frequency and quality of the advertised products. We recorded 14 hours of programming from the three basic Brazilian TV channels with the largest audiences (total = 378 hrs.).

Commercials were classified into 25 categories based on the type of product advertised. We compared the proportions of the types of commercials and types of food using the Pearson Chi-square test. Results revealed that food commercials constitute the category with the second highest amount of airtime at 720 hours (9%), lagging behind the respective channels' TV programming advertising at 1958 hours (26%). Compared with previous data from 2002, the proportion of food commercials on TV decreased by 12%. However, commercials for unhealthy food increased by 16%. These results have implications for the development of contingency plans and public policies aimed at reducing the risks of exposure to unhealthy food commercials on TV.

Keywords: Food commercials, television, unhealthy foods

Introduction

The high density of unhealthy food commercial advertisements on television (TV) is one of the many environmental factors contributing to the rise in obesity. Individuals who spend higher amounts of time watching TV are particularly vulnerable, since the amount of hours of TV watched can by itself affect choice (Fiates, Amboni, & Teixeira, 2008; Kemps, Tiggemann, & Hollitt, 2014), as well as immediate (Blass et al., 2006; Snoek, van Strien, Janssens, & Engels, 2006) and subsequent consumption (Mittal, Stevenson, Oaten, & Miller, 2011). Positive associations between hours of TV watched and body mass index (BMI) were observed in children (Davison, Marshall, & Birch, 2006; Pearson, Salmon, Campbell, Crawford, & Timperio, 2011), such that kids who watched TV for longer periods showed higher levels of BMI. Watching TV also appears to predict higher BMI levels during adulthood (Viner & Cole, 2005). Although fewer hours of TV watching in childhood predicted lower BMI in adolescence, the same was not true in adulthood (French, Mitchell, & Hannan, 2012). A plausible explanation for the influence of TV on food consumption lies in the increased frequency of exposure to unhealthy food commercials (Boyland et al., 2011; Gearhardt, Yokum, Stice, Harris, & Brownell, 2014; Mamun, O'Callaghan, Williams, & Najman, 2013; Yokum, Gearhardt, Harris, Brownell, & Stice, 2014).

Indeed, studies have shown that food commercials can affect consumption of any type of food available, not only the type that has been advertised (Halford, Boyland, Cooper, et al., 2008; Halford, Boyland, Hughes, et al., 2008; Harris, Bargh, & Brownell, 2009). Thus, the effects of commercials on energy intake may not only be a consequence of exposure to a specific product, but also of the generalization to another product that represents the same product category. These indications support the elaboration of content analyses and descriptive studies around the world, with the aim to keep track of the proportion of unhealthy food commercials on TV as a way to mitigate the risks of repeated exposure.

Research on TV food commercials conducted in different countries ($N = 11$, including Brazil) suggests that this type of commercial represents 11% to 29% of the total commercials released during TV programming (Kelly et al., 2010). Studies in South Africa (McHiza, Temple, Steyn, Abrahams, & Clayford, 2013), Australia (Hebden, King, & Kelly, 2011), South Korea (Han, Powell, & Kim, 2013), Spain (Mar Romero-Fernandez, Angel Royo-Bordonada, & Rodriguez-Artalejo, 2013), England (Sixsmith & Furnham, 2010), United Kingdom (Boyland, Harrold, Kirkham, & Halford, 2012), Singapore (Huang, Mehta, & Wong, 2012), Sweden (Prell, Palmblad, Lissner, & Berg, 2011), Switzerland (Keller & Schulz, 2011) and Turkey (Guran et al., 2010) indicate that more than 50% of food commercials tend to promote products with low nutritional content (Hebden et al., 2011; Keller & Schulz, 2011), a figure which can exceed 80%, as observed in Turkey (Guran et al., 2010). An inversion of the food pyramid (i.e., with the promotion of fats and sweets) was observed in the United Kingdom, which categorized a total of 66% of products in food commercials as unhealthy using criteria available in the NP Model or Nutrient Profile model (Jenkin, Wilson, & Hermanson, 2009). In the United States, 9 out of 10 food commercials televised on Saturday mornings show commercial foods high in sodium, sugar, and fat, and generally low in nutritional content (Batada, Seitz, Wootan, & Story, 2008).

Brazil and other Latin American countries seem to follow this trend, with about 60% of the products shown in food commercials classified as fats, oils and sweets (Almeida, Nascimento, & Quaioti, 2002). A study that analyzed nutritional content of advertised foods on five Chilean TV channels indicated that 78% of the commercials were either moderately unhealthy or unhealthy according to a European protocol (i.e., National Food Agency of the United Kingdom, FSAB) (Castillo-Lancellotti, Perez-Santiago, Rivas-Castillo, Fuentes-Garcia, & Tur-Mari, 2010). In Honduras, a similar study observed a total of 69% of TV food commercials advertising unhealthy food (Gunderson, Clements, & Neelon, 2014), i.e., food items that are high in calories, sugar, or fat (Ramirez-Ley et al., 2009). In Brazil, however, the

available data span the period from August 1998 to March 2000, and therefore need to be updated.

Although a recent study looked at Brazilian TV food commercials targeted to children (Henriques, Sally, Burlandy, & Beiler, 2012), little is known about the proportion of unhealthy food commercials targeted to the general public. Despite the provisions issued by the Brazilian Advertising Self-Regulation Code (Código Brasileiro de Autorregulamentação Publicitária, CONAR), which admonished the encouragement of excessive consumption and the belittling of healthy eating (CONAR, 1965), studies that monitor the content of food commercials on TV remain incipient. Thus, this study aimed to determine the proportion of unhealthy food commercials on Brazilian TV and compare it with preexisting data on the frequency and quality of the advertised products.

Because the methodology for this type of study has evolved over time, it was not possible to completely replicate the protocol adopted in the previous study (Almeida et al., 2002). Simultaneous and continuous recordings of the programming in different channels are examples of such developments, which differentiate the present study from the former. Another essential change resulted from the Food and Agriculture Organization's (FAO, 2014, 2015) and the World Health Organization's (WHO, 1998) recommendation to shift from classifying foods based on their nutritional content (e.g., Food Pyramid) to a simplified classification based on a set of guidelines. In this study we tried to adhere to this method by incorporating parameters established in the Dietary Guidelines for the Brazilian Population (Guia Alimentar para a População Brasileira), edition 2014 (Brasil, 2014). However, we also analyzed nutritional content using the Brazilian National Sanitary Surveillance Agency (Agência Nacional de Vigilância Sanitária, ANVISA) protocol in Resolution RDC No. 24/2010 (ANVISA, 2010).

Methods

Data Collection

Our data consisted of recorded TV programming of the three open channels with the highest audience in Brazil, i.e., Globo, Record, and Sistema Brasileiro de Televisão (SBT), according to the global ranking published by the Brazilian Institute of Public Opinion and Statistics (Instituto Brasileiro de Opinião Pública e Estatística, IBOPE) (IBOPE, 2013), which is recognized as the leading institute in the measurement of TV and radio audience in Brazil and Latin America. Data was recorded using a Panasonic Digital Video Recorder (DVR), model DMR-ES10, and it consisted of recording of 14 hours of TV programming in each of the three channels, between 8AM and 10PM.

The recordings were made during a period of one week and two weekends in June 2013. We selected this period in particular because it was considered relatively neutral for seasonal marketing campaigns (e.g., Christmas, Mother's Day). The media used for video recording were 81 optical discs type of Digital Versatile Disc (DVD) for up to 6 hours of recording, which was made simultaneously in the three channels. Subsequently, the advertised recorded data was carried out in a Microsoft Excel spreadsheet formatted according to the categories detailed below.

The observation of commercials and the recording of data were made by eight research assistants (RAs) in a first round of data collection. The same RAs also participated as analysts in a second round of observation in which the recordings were exchanged. This procedure allowed the reconciliation of data in situations where the recording performed in the first round was not complete or sufficiently clear.

Qualitative Analysis

The Dietary Guidelines for the Brazilian Population (Brasil, 2014) were adopted as criteria for classifying the advertised food with regards to quality. This guide aimed to encourage healthier food consumption taking into account the characteristics of each

population in each region. It presents four groups of food according to grade of processing as follows: 1) “raw food”, 2) “minimally processed”, 3) “processed foods”, 4) and “ultraprocessed foods”. The guide makes recommendations to eat raw or minimally processed foods, which are classified as “healthy foods”, and states that “processed foods,” especially those “ultraprocessed,” must be avoided as much as possible, as they tend to be “unhealthy” due to the industrialization processes applied.

For a more detailed nutritional evaluation, the labels corresponding to the products advertised were selected and classified as "healthy" or "unhealthy" by ten nutritional sciences research assistants (RAs), who used objective parameters set by ANVISA in Resolution RDC No. 24/2010 (ANVISA, 2010) for the distribution of food products in Brazil. These criteria relate to levels of sugar, saturated fat, trans fat, sodium, and nutritional content (Table 1). Disagreements between opinions were analyzed in a consensus meeting. For the purpose of this study, it is worth mentioning that although there were several attempts to suspend the RDC No. 24/2010 since its formulation (Henriques, Dias, & Burlandy, 2014), particularly at the request of the Brazilian Association of Food Industries (Associação Brasileira das Indústrias da Alimentação, ABIA), these requests have been withdrawn. According to ANVISA, to date, the RDC No. 24/2010 (ANVISA, 2010) is still current.

Table 1

Nutritional Parameters as ANVISA N° 24/2010

Item	Parameters
Sugar	Amount equal to or greater than 15g of sugar per 100g or 7.5g per 100ml in the way they are displayed for sale.
Saturated Fat	Quantity less than 5 g of saturated fat per 100g or 2.5g per 100ml in the form as it is exposed for sale.

Trans Fat	Amount equal to or greater than 0.6 g of trans fat per 100g or 100ml in the way it is exposed for sale.
Sodium	Amount equal to or greater than 400mg of sodium per 100g or 100ml in the way it is exposed for sale.
Beverages with low nutritional value	Soda, artificial drinks and beverages and concentrates for the preparation of drinks guarana syrup-based or currant and tea ready for consumption. Also included in this definition those added caffeine, taurine, glucuronolactone or a substance that acts as a stimulant of the central nervous system.

Commercials were classified into three main categories: "food commercial" (solid or liquid, including soft drinks), "non-food commercial" (unrelated to food and with no food in the commercial) and "commercial of grocery stores". In the general category of "food commercial", the advertisements were classified as showing "solid food" or "liquid food". The general category of "non-food commercial" was classified into one out of the 24 selected non-food categories (see Table 2).

Quantitative Analysis

For the statistical analysis, the proportions of homogeneity test based on the Pearson Chi-square test was used to compare the proportions of the types of commercials and types of food. The Yate's continuity correction for 2 x 2 contingency tables was used. Also, the standardized residuals were adopted to assess the local association in contingency tables. Confidence intervals for the major proportions of the study were calculated in order to have a reference for estimation of the statistics. All analyses were performed using the Statistical Analysis System (SAS), version 9.3, at a significance level of 5%.

Results

The collected data resulted in 378 hours of programming and $N = 7369$ commercials released, recorded, and analyzed. Commercials for food products were the second most frequent category on TV, following commercials for entertainment (Table 2). The total number of commercials in the three channels was as follows: 2565 (34%) in SBT, 2431 (32%) in Record, and 2372 (32%) in Globo. There was no difference between channels in the proportion of food commercials to the other types of commercials, with food commercials accounting for 9% of all advertisements, representing a decrease of 12% compared to the previous study (Almeida et al., 2002). Overall, there was no change in the proportion of food commercials during weekdays ($p = 0.26$), considering all five days (i.e., Monday to Friday) or channels. However, there was a decrease in the proportion of food commercials in the evenings (from 10.81% to 8.36%, $p = 0.01$), and was significantly different between Globo and SBT.

Table 2

Commercial Categories, Frequencies and Percentages

Categories	Freq.	%	Freq. Cum.	% Cum.
1 Entertainment	1958	26.57	1958	26.57
2 Food	720	9.77	2678	36.34
3 Government	711	9.65	3389	45.99
4 Beauty products	531	7.21	3920	53.20
5 Telecommunications	506	6.87	4426	60.06
6 Medicines	442	6.00	4868	66.06
7 Stores	411	5.58	5279	71.64
8 Hygiene products	384	5.21	5663	76.85
9 Financial services	316	4.29	5979	81.14
10 Cars	290	3.94	6269	85.07
11 Cleaning products	268	3.64	6537	88.71
12 Domestic appliances	204	2.77	6741	91.48

13	Other products	107	1.45	6848	92.93
14	Clothes	99	1.34	6947	94.27
15	Sports	78	1.06	7025	95.33
16	Magazines/Newspapers	61	0.83	7086	96.16
17	Real state services	55	0.75	7141	96.91
18	Educational services	38	0.52	7179	97.42
19	Grocery stores	36	0.49	7215	97.91
20	Health services	35	0.47	7250	98.39
21	Alcoholic beverages	30	0.41	7280	98.79
22	Tourism	27	0.37	7307	99.16
23	Food industry	24	0.33	7331	99.48
24	Pet products	20	0.27	7351	99.76
25	Toys	18	0.24	7369	100.00

On weekends, the frequency of food commercials was significantly higher in the morning and afternoon (12.4%) than in the evening (7.5%), $p < 0.01$. These differences were not observed during weekdays. Also on weekends, there was a tendency for releasing more food commercials compared with weekdays (10% vs. 9%), though this difference was not significant, $p = 0.06$ (Figure 1).

The percentage of unhealthy food commercials was 75%, indicating an increase of 16% compared to the previous study (Almeida et al., 2002). Within the “food commercial” category, 69% (CI 65% to 72%) of commercials advertised solid foods (e.g., chocolate bars, biscuits) while only 31% advertised non-solid (e.g., milk drink) foods. Comparing the times of day, commercials of solid foods predominated during the day, but were a little less frequent in the morning (59%) than in the afternoon (71%) and evening (73%), differences which were significant at $p < 0.01$. The “raw food” subcategory appeared rarely, comprising only 1% (95% CI: 0.35 to 1.88) of the released commercials, and only within the “grocery stores” category.

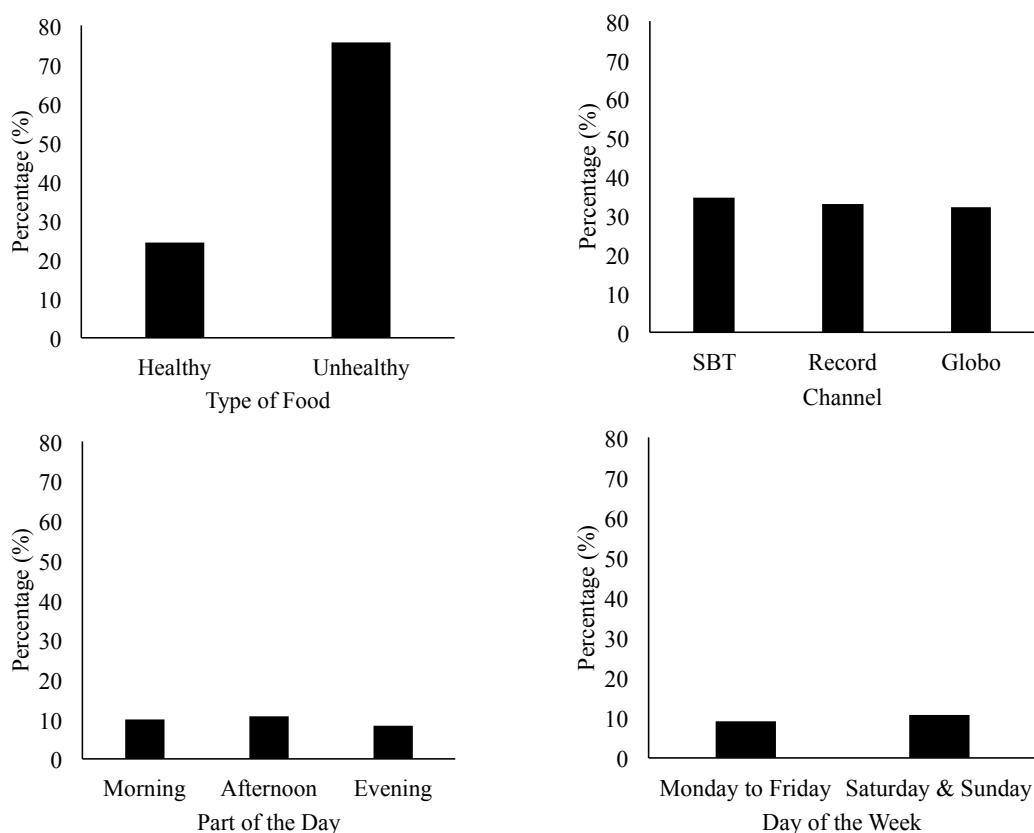


Figure 1. Proportion of food commercials by type (healthy or unhealthy), channel, part of the day, and day of the week

In accordance with the Dietary Guidelines for the Brazilian Population (Brasil, 2014), the food sample was classified as ultraprocessed (99%), since the publicized food commercials were essentially meats and sausages, chocolate, soft drinks and hamburgers. With regards to the critics of the labels, using the ANVISA Resolution RDC No. 24/2010 (ANVISA, 2010), most products have saturated fat above the limits (54%), slightly fewer than half contained high levels of sodium (42%), and a quarter had elevated sugar levels (26%). Though less commonly, there were also products of low nutritional value (10%) and trans fat (9%).

Discussion

The aim of this study was to determine the proportion of unhealthy food commercials on Brazilian TV and compare it with preexisting data on the frequency and quality of the products advertised. The overall results from this study are consistent with previous records

(Almeida et al., 2002; Kelly et al., 2010). With regards to quantity, our findings showed that food commercials account for 9% of the total amount of transmitted commercials on TV which is not much lower than the previously observed international range of 11% to 29% (Kelly et al., 2010). Compared to the value of 22% obtained in the previous Brazilian study in 2002 (Almeida et al., 2002), we found that 19% of the commercial advertisements were food-related, which is also surprisingly lower than previously recorded. However, even though there was a reduction in the proportion of food commercials released, our qualitative analyses indicated that the amount of unhealthy food commercials increased by 16% (Almeida et al., 2002).

Our results suggest that a vast majority of food commercials advertised ultraprocessed products (99%), which could be regarded as unhealthy, according to the Dietary Guidelines for the Brazilian Population (Brasil, 2014). Moreover, 76% of the food commercials violated the nutritional recommendations of ANVISA in Resolution RDC No. 24/2010 (ANVISA, 2010). This figure was 16% higher than reported in the previous study, which used the Food Pyramid method for nutritional analysis (Almeida et al., 2002). Given that we adopted a different protocol, it is possible that the change observed in the proportion of unhealthy food commercials is more a consequence of the criteria adopted than a representation of an actual decrease in the quality of advertised food overtime. Future follow-ups could ascertain whether this is the case by adopting the same protocol used in this study.

With regards to our quantitative results, there were no differences between the channels, both in relation to the total of overall commercials released, as to the percentage of food commercials. Commercials for food were equally distributed across the channels (i.e., Globo, Record, and SBT), for all times of day analyzed, and for all days of the weeks. Therefore, regardless of how the audiences of the channels may differ, individuals who spend higher amounts of time watching TV in Brazil tend to be similarly exposed to food commercials. Altogether, our qualitative and quantitative findings indicate that commercial

advertisements for food are not only consistent, but also essentially encourage the consumption of ultraprocessed foods, which appears to infringe on the provisions issued by CONAR (CONAR, 1965), thus deserving further considerations.

One limitation of this study was that the analyses were restricted to the number of released commercials by title, and did not consider the amount of exposure (i.e., the duration or the repetition of each commercial). Another limitation was the limited standardization of data entry (e.g., spelling of products and brands), making it harder to carry out a statistical convergence analysis, and limiting the use of reentered data to specific reconciliations. Future studies could benefit from the creation of a legend of products and brands that could be adopted at the time of recording data. However, the creation of subtitles of this kind depends on frequent follow-ups of the advertised products.

Despite these limitations, this study offers an update on the proportion of unhealthy food commercials on Brazilian TV. Due to the risks of increased energy intake as a consequence of repeated exposure to these advertisements, our results have implications to the prevention and control of obesity. They can help the development of contingency plans and public policies aimed at reducing exposure to unhealthy food commercials on TV.

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CHAPTER III

STUDY 3 – ATTENTIONAL BIAS FOR FOOD IMAGES AFTER EXPOSURE TO FOOD COMMERCIALS ON TV

Paper in Preparation

Viacava, K.R., Weydmann, G. J., Tietze, A. W., Santolim, R. R., Bizarro, L. (2015).

Attentional bias for food images after exposure to food commercials on TV. Manuscript in preparation.

Abstract

Exposure to food commercials can increase consumption by modifying the attention to environmental cues related to food. We investigated the effects of exposure to TV commercials for unhealthy food on attentional bias (AB) for food images. Participants were 54 young adults (18-25 years; 27 female, 18.50-24.99 BMI), who were randomly assigned to one of three 20min TV programming conditions: a) 12min neutral program intercalated by two 4min blocks commercial food; b) 12min neutral program with two blocks of 4 min commercial services; or c) 20min neutral programming without commercials. Then, participants performed a Visual Probe Task in which pairs of food and non-food images concealed a probe (up or down arrow) for either 100ms, 500ms or 2000ms. The task was to indicate the direction of the arrow by pressing one of two buttons on a keyboard. The AB was observed by the difference in reaction times when the arrow replaced the images. Questionnaires assessed subjective hunger (Grand Hunger Scale) and positive and negative affect (PANAS). The non-commercial condition has not increased attention to food. The bias was negative and different than zero at SOA 2000ms. The interaction between time and condition indicated that AB may be independent of type of commercial, but positive bias was observed after food commercial. Watching TV increased subjective hunger, and reduced positive and negative affect. We concluded that commercial advertisements can alter attention to food, and watching TV per se can influence affect and subjective hunger.

Keywords: advertisements, food, attentional bias, subjective hunger, affect

Introduction

Food advertising on television (TV) has been indicated as one of the environmental determinants of overweight and obesity. Studies suggested that exposure to food commercials on TV can trigger automatic consumption, — i.e., eating without intention or lack of control (Adachi-Mejia et al., 2011; Andreyeva, Kelly, & Harris, 2011; Faria, Vendrame, Silva, & Pinsky, 2011). This has been demonstrated in children (Anschutz, Engels, & Van Strien, 2009; Boyland et al., 2011), adolescents (Gearhardt, Yokum, Stice, Harris, & Brownell, 2014; Mekhmoukh, Chapelot, & Bellisle, 2012; Yokum, Gearhardt, Harris, Brownell, & Stice, 2014), and young adults (Harris, Bargh, & Brownell, 2009; Koordeman, Anschutz, van Baaren, & Engels, 2010). However, little is known about the cognitive mechanisms underlying the processing of commercial information and how they trigger eating behaviors, especially in young adults (Anschutz, Engels, van der Zwaluw, & Van Strien, 2011; Scully, Dixon, & Wakefield, 2009). Investigating this issue in this population in particular has become a pressing matter due to the fact that research has identified the transition from adolescence into adulthood as a vulnerable period in establishing eating habits (Larson, Laska, Story, & Neumark-Sztainer, 2012; Larson, Neumark-Sztainer, Harnack, et al., 2008; Larson, Neumark-Sztainer, Story, et al., 2008).

Besides examining the effects of the amount of TV watched by individuals (Blass et al., 2006; Mittal, Stevenson, Oaten, & Miller, 2011; Snoek, van Strien, Janssens, & Engels, 2006; Zimmerman & Bell, 2010), behavioral studies have looked at the immediate effects of food commercials on consumption. For instance, one group studied the effects of commercials as measured by men and women's consumption of potato chips and chocolate balls, and found that these two groups were differentially affected, since women showed increased consumption during the food commercials, whereas men consumed more during the neutral ones (Anschutz et al., 2011). Food commercials also influenced the choice of food in children between three and eight years old, since they tended to choose the food advertised in

the commercial, regardless of parental influence (Ferguson, Munoz, & Medrano, 2012). Accumulated findings are not limited to unhealthy food commercials, as evidence of the effectiveness of commercials in getting children to prefer vegetables has also been demonstrated (Nicklas et al., 2011).

In spite of that, it can be a mistake to think that food commercials affect only the target audiences for which they were created. If exposure to food commercials is capable of triggering automatic eating behaviors, then it is plausible that their messages can trigger consumption by individuals in different stages of development. Also, as previously demonstrated, food commercials affect consumption of any type of food available, not only the one that has been advertised (Halford et al., 2008; Harris et al., 2009).

Evidence suggests that selective attention (Parvanta et al., 2010) and memory of food commercials on TV may play a role in these processes (Martin, Coulon, Markward, Greenway, & Anton, 2009). However, the knowledge about the immediate effects of commercials on cognition is still in its infancy (Berger, Wagner, & Schwand, 2012; Kenning & Plassmann, 2008). So far, results suggest that although individuals might have a natural lack of interest in commercials, devoting little to no cognitive effort to processing (Berger et al., 2012), their content might be automatically processed (Heath, Nairn, & Bottomley, 2009; Treleaven-Hassard et al., 2010). Also, as a consequence of the mere-exposure effect, the influence of an advertisement may increase with repeated exposure, since individuals tend to enhance their attitudes towards stimuli that they are most familiar with (Morgenstern, Isensee, & Hanewinkel, 2013; Zajonc, 1968).

Due to the accumulated body of evidence about the tendency of individuals to direct attention toward food cues, it is important to understand the impact of commercials, especially those using visuoperceptual food-related content, on attention. Not only does selective attention to food cues seem to be more accurate and faster than to non-food cues (Nummenmaa, Hietanen, Calvo, & Hyona, 2011), but also sensory adaptation, or the

decreased attention allocated to stimuli, occurs more slowly for food cues (especially highly caloric ones) than for non-food stimuli, as demonstrated by measurements of visual evoked potentials (Lietti, Murray, Hudry, le Coutre, & Toepel, 2012).

This tendency to select potentially important stimuli (positive or negative), such as sources of rewards, pleasure, satiety (di Pellegrino, Magarelli, & Mengarelli, 2011), or danger (Williams, Mathews, & MacLeod, 1996) to the detriment of other environmental stimuli, is called attentional bias. Attentional bias can be affected by several factors, such as mood (Hepworth, Mogg, Brignell, & Bradley, 2010), stress (Newman, O'Connor, & Conner, 2008), psychological traits (Tapper, Pothos, & Lawrence, 2010), sensitivity to reward (Brignell, Griffiths, Bradley, & Mogg, 2009), restraint status (Veenstra, de Jong, Koster, & Roefs, 2010; Werthmann, Roefs, Nederkoorn, Mogg, et al., 2013), eating disorders (Svaldi, Tuschen-Caffier, Peyk, & Blechert, 2010), and hunger (Loeber, Grosshans, Herpertz, Kiefer, & Herpertz, 2013). Individuals with normal body mass index (BMI) tend to show attentional bias for food only in fasting (but not fed) conditions, while obese individuals can show it in both (Castellanos et al., 2009; Gearhardt, Treat, Hollingworth, & Corbin, 2012; Nijs, Muris, Euser, & Franken, 2010; Werthmann et al., 2011).

It is assumed that primary reinforcement images (such as food) are capable of capturing attention because they trigger a cascade of neural events that involve the activation of the reward system, inducing motivated behaviors such as approach or avoidance (Kullmann et al., 2013; Lawrence, Hinton, Parkinson, & Lawrence, 2012; Volkow, Wang, & Baler, 2011; Yokum, Ng, & Stice, 2011). Thus, these events may lead to increased incentive salience (Robinson & Berridge, 1993), exacerbating the desire (craving), promoting automatic consumption (Hou et al., 2011), and self-endorsing intake (Kemps & Tiggemann, 2009; Werthmann, Roefs, Nederkoorn, & Jansen, 2013).

Selective attention assessments can be obtained by measuring attentional bias through different tasks and methods, as reviewed (Field, Munafo, & Franken, 2009). Among the most

common measures of selective attention are the Stroop Task, the Dual Task, the Attentional Blink Task, and the Visual Probe Task, as well as electrophysiological and eye movement measures. In the Visual Probe Task, a small probe is concealed by either the target stimulus or a control stimulus, both of which are presented simultaneously on the computer screen. Once the stimuli disappear, the probe — e.g., a dot, an arrow, letters, or geometric figures— is displayed, replacing the position occupied by one of the two previous stimuli. Typically, participants are instructed to respond the position of the probe as quickly as possible, and the reaction times for trials where the probe was concealed by the target stimuli are compared with those for trials where it was concealed by control stimuli (Field, Munafo, & Franken, 2009).

The Visual Probe Task was originally developed for anxiety studies (Macleod, Mathews, & Tata, 1986), based on the premise that people tend to respond faster to a probe presented in the area to which attention was previously allocated (Navon & Margalit, 1983; Posner, Snyder, & Davidson, 1980). Thus, if participants' attention is directed to the target stimulus (e.g., food image), then this will lead to longer reaction times if the probe they must respond to appears in the position of the control stimulus. The target and control stimuli in this task can be presented at different times, which allows for the measuring of stimulus onset asynchrony (SOA), or the time interval between the beginning of one stimulus and another (e.g., 100ms, 500ms, and 2000ms). This, in turn, allows for the measuring of different components of the attention networks, such as alerting, orienting, and executive attention (Posner & Petersen, 1990; Posner & Rothbart, 2007).

Therefore, in accordance with the dual process model (Hofmann, Gschwendner, Friese, Wiers, & Schmitt, 2008; Wiers et al., 2007), reaction times observed for SOAs lower than 500ms are generally interpreted as automatic (unaware), while longer reaction times are interpreted as controlled (aware). Although the distinction between automatic and controlled processes as an all-or-none view seems to be more didactic than realistic (Cohen, Dunbar, &

McClelland, 1990; Moors & De Houwer, 2006), these considerations are convergent with psychophysiological evidence that the initial processing of visual stimuli in the primary visual cortex is devoid of awareness (Rees, Kreiman, & Koch, 2002), as well as evidence that the time interval between perception and awareness is approximately 500ms long (Block, 2005).

Taken all together, if exposure to food commercials on TV is associated with automatic consumption of food, then it is plausible that this exposure might change the attentional processing of food-related information. Hence, the aim of this study is to assess whether exposure to unhealthy food commercials on TV increases attentional bias for food images using the Visual Probe Task. Our hypothesis is that attentional biases for food images will (i) be present and (ii) be stronger in participants exposed to a high density of unhealthy food commercials on TV relative to controls.

Methods

Participants

Our total sample of participants consisted of 58 college students (18-25 years old; 29 female) from the Universidade Federal do Rio Grande do Sul - UFRGS, Brazil, selected from 18 different courses (34% psychology, 24% economics, 41% others). Participants were recruited via social networking websites and posters. The sample size calculation was performed using the G*Power 3 software (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007), considering a moderate effect size of 0.50. Participants had normal levels of BMI (between 18.50 and 24.99) according to standards set by the World Health Organization (WHO, 2004). As instructed during recruitment, participants were also expected to have had lunch by 12PM, or approximately one hour before arrival in the laboratory in order to control for being neither hungry nor just fed when data collection started at 1PM.

Instruments and Materials

The instruments and materials used included: 1) 8min of unhealthy food commercials (15"- 30"), and 8min of non-food commercials (15" - 30") selected based on frequencies of exposure to TV (from highest to lowest), and obtained from a previous study (under review) that had products classified as "healthy" or "unhealthy" adopting a criteria set by the Brazilian National Sanitary Surveillance Agency (ANVISA); 2) a 20min neutral video (i.e., a documentary of hummingbirds); 3) a scale of subjective hunger known as "Grand Hunger Scale" (Grand, 1968); 4) a scale of affect known as "Positive and Negative Affect Scale - PANAS" (de Carvalho et al., 2013; Watson, Clark, & Tellegen, 1988); 5) an adult weighing scale; and 6) measuring tape for height. For the Visual Probe Task, we used 21 pairs of highly caloric food (target) and non-food (control) images matched on size, shape, and color. These images were selected from a database, developed and maintained by the Laboratório de Psicologia Experimental, Neurociências e Comportamento – LPNeC (UFRGS).

Grand Hunger Scale

The Grand Hunger Scale was used to assess each participant's state of hunger through four self-report questions: (a) time of the last meal (estimated from a minimum of 15 minutes); (b) subjective hunger (indicated on a 7-point scale from "no hunger" to "extremely hungry"); (c) estimate of how much of his/her favorite food the participant would be able to eat after testing (also indicated on a 7-point scale, ranging from "nothing" to "as much as I can"); and (d) estimated time until the next meal (estimated from a minimum of 15 minutes). The scores of the second and third questions are combined to form a subjective hunger score for each participant, which is then divided by the total sample average. The higher this score, the greater the hunger indicator (Grand, 1968).

Positive and Negative Affect Scale - PANAS

PANAS is a 20-word instrument designed to measure positive and negative affect (Watson et al., 1988). The words are: "active", "alert", "attentive", "determined",

“enthusiastic”, “excited”, “inspired”, “interested”, “strong”, “afraid”, “ashamed”, “distressed”, “guilty”, “hostile”, “irritable”, “jittery”, “nervous”, “proud”, “scared”, and “upset”.

Participants were asked to report how much each word corresponded to their feelings at the time of the experiment using a 5-point scale ("little or nothing" to "extremely"). We used the Brazilian-validated version, which excludes the word “proud” (de Carvalho et al., 2013). Item scores of each category were summed; higher scores indicated either more positive or more negative affect.

Procedures

Participants were randomly assigned to one of three 20min TV programming conditions: 1) “food commercial” - 12min of neutral programming (a video documentary of hummingbirds) with two blocks of unhealthy food commercials, lasting 4min each; 2) “non-food commercial” - 12min of neutral programming with two blocks of non-food commercials also lasting 4min each; or 3) “no commercial” - 20min of uninterrupted neutral programming. Before watching one of these three TV programming conditions, participants reported pre-session levels of subjective hunger and affect, using the Grand Hunger and PANAS scales. After answering the scales and watching the allocated TV programming, they performed a Visual Probe Task (Figure 1). Lastly, post-session measures of subjective hunger and affect levels were collected, and each participant’s BMI was calculated.

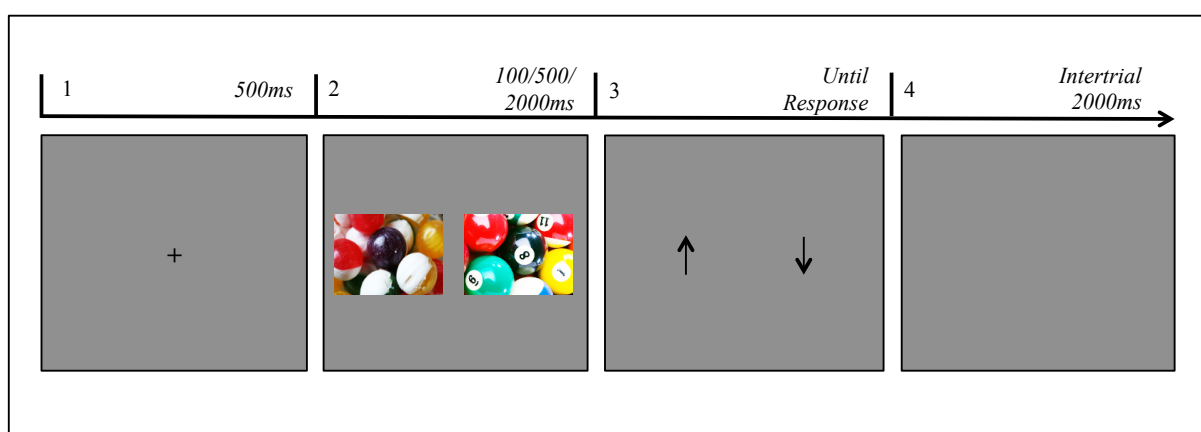


Figure 1. Sequence of events in the Visual Probe Task.

Data collection was conducted in private and lasted approximately 40 minutes. After reading and signing the informed consent, participants received the following instruction: “Your first task will be to relax and watch a TV program that will last for 20min. Then you will play a computerized task. Before starting the task, you will answer some questions and complete the training. Once the task has begun, you will see a cross in the middle of the screen and you must look directly at this cross. After a pair of images appears, an up or down arrow will replace one of the images. Your task will be to identify the position of the arrow and press the corresponding key on the numeric keyboard as soon as possible. Finally, you will answer a few more questions on the computer and provide some personal information”.

To perform the Visual Probe Task, participants sat one meter away from a computer LCD monitor (15-inch, Dell). The Visual Probe Task began with a fixation cross displayed for 500ms in the middle of the screen (Event 1). The cross was then replaced by a pair of images displayed side by side with three randomized SOAs: 100ms, 500ms, and 2000ms (Event 2). Then, a probe (up or down arrow) replaced one of the images (Event 3). The arrow remained on the screen until participant indicated its direction by pressing one of two keys in the numerical computer keyboard (Event 4). The task comprised 153 trials (144 experimental and 9 training). For experimental trials, 12 pairs of food and non-food images were presented four times for each SOA (i.e., left, right, and replacing the up or down arrow). Pairs of images used for experimental trials ($n = 12$) differed from those used for training ($n = 9$). Each pair of images was presented equally often on the left as on the right side of the screen. The position of the probe was equally distributed per image type (food and non-food), and also appeared equally often on both sides of the screen. The order of trials was randomized for each participant. This protocol was adapted from previous studies (Cunha, Deluchi, Pires, Gonçalves, & Bizarro, 2011; Lopes, Pires, & Bizarro, 2014; Peuker & Bizarro, 2014), and the task was programmed and administered using E-Prime (Psychology Software Tools, Pittsburgh, PA).

Statistical Analysis

Reaction times $< 200\text{ms}$ and $> 2000\text{ms}$ were excluded from the analysis. Incorrect responses (3%) were included, since the high overall accuracy observed suggested an effect consequence of stimuli interference and not task difficulty. Attentional bias was computed for each participant by subtracting the mean reaction time in the conditions where the arrow replaced the food images from the mean reaction time in the conditions where the arrow replaced the control images (Mean RT Control – Mean RT Food). A faster reaction time to the probe when it was preceded by an image of food indicated attentional bias. Positive results were interpreted as an approach to food images, while negative results were taken as avoidance.

After exploratory data analyses, the Shapiro-Wilk test was used to check the normality of the different variable distributions. We performed repeated measures ANOVAs to investigate either reaction time or attentional bias as dependent variables, using group (TV programming conditions) as the between-subjects factor, and SOA (100/500/2000ms) as the within-subjects factor. Age was the coverable since we found a positive correlation between age and attentional bias (Table 1). One-sample t -tests were performed in the whole group for the different SOAs to test whether attentional bias scores were significantly different from zero. Paired-samples t -tests were used to compare hunger and affect before and after one of the three TV programming conditions. We used the Pearson's correlation test (2-tailed) to evaluate the relationships between different study variables. An alpha level (α) of .05 was adopted as significance criterion. We performed correction for multiple comparisons using the Bonferroni test. All analyses were performed with IBM SPSS Statistics for Mac (version 22).

Results

As previously mentioned, the sample consisted of 58 college students (18-25 years old; 29 female). However, during the data collection, we excluded four subjects because their

BMI was out of the normal range, thus obtaining a sample size of 54 subjects, as calculated considering a medium effect size ($d = 0.5$). Later, for the purposes of analysis, we excluded six other subjects from the sample — one subject was excluded because his/her accuracy score on the Visual Probe Task was more than 3 *SD* lower than the accuracy sample mean ($M = 96.8$, $SD = 6.8$), another because his/her attentional bias score was an outlier ($M - 2.9 SD$), and four others because their pre-session measures of subjective hunger were higher than five (1-7 points scale), which might increase attentional bias on pre-test.

Body Mass Index (BMI)

Participants ($N = 48$) were classified as being in the normal BMI range ($M = 22.0$, $SD = 1.76$, $CI 95\%: 18.52 - 24.96$). Mean BMI per group is shown on Table 2. We found no correlations between BMI and the other study variables (Table 1).

Age

The average age of participants was 21.75 years ($SD = 2.00$; range: 18 to 25 years). We found a marginally significant positive correlation between age and attentional bias at SOA 2000ms $r(46) = .28$, $p = .05$ (2-tailed), suggesting that higher ages were associated with attentional bias at the executive phase of attention (Table 1). We did not find a significant correlation between age and overall attentional bias $r(46) = .04$, $p = .76$ (2-tailed).

Reaction Time

The mean reaction time was 609.58 ($SD = 121.00$, $CI 95\%: 448.83 - 1113.83$). Reaction time scores were greater for food images ($M = 612.18$, $SD = 123.05$) than for non-food images ($M = 606.97$, $SD = 119.84$), though this difference was not significant according to the paired-samples *t*-test, $t(47) = 1.72$, $p = .09$.

Attentional Bias

We conducted a 3x3 repeated measures ANOVA, using the three TV programming conditions as the between-subjects factor, SOA (100/500/2000ms) as the within-subjects factor, and age as the covariable. We found no main effect of conditions $F(2, 88) = 1.22$, p

= .30, but a marginal significant interaction between SOA and conditions $F(4, 88) = 2.23, p = .07$. There was a main effect of SOA on attentional bias $F(2, 88) = 4.09, p = .02$ as well as a significant interaction between SOA and age $F(2, 88) = 4.09, p = .03$. Attentional bias for food images shifted from approach to avoidance with longer SOAs: 100ms ($M = 3.10, SE = 3.86$); 500ms ($M = -7.24, SE = 5.65$); and SOA 2000ms ($M = -10.33, SE = 4.15$), and this difference was significant between SOAs 100ms and 2000ms, according to the post-hoc Bonferroni test ($p = .04$).

To investigate whether attentional bias for food images was present, one-sample t -tests were performed in all groups for the different SOAs to test whether attentional bias scores were significantly different from zero. The only significant result was at SOA 2000ms, $t(14) = -2.47, p = .01$. Attentional bias scores were negative at SOA 2000ms in all three conditions, but the magnitude was greater at the “no commercial” condition ($M = -10.35, SD = 29.53$), followed by the “non-food commercial” ($M = -9.94, SD = 29.99$), and the “food commercial” ($M = -6.26, SD = 28.77$).

Additionally, a 2x3 repeated measures ANOVA was performed to test whether there were any significant differences in attentional bias when comparing the means between both “commercial” conditions (food and non-food) and the “no commercial” conditions. We observed a significant interaction between SOA and condition $F(2, 90) = 3.20, p = .04$, suggesting that the effect of SOA on attentional bias may depend on the presence of commercial advertisements. Attentional bias was significantly different from zero $t(32) = -2.25, p = .03$ and negatively greater in the “commercial” condition ($M = -7.64, SE = 3.68$) compared to the “no commercial” condition ($M = .12, SE = 5.49$).

In order to test for differences in attentional bias when comparing the means of “food commercial” and “non-food commercial” conditions, another 2x3 repeated measures ANOVA was conducted. Results revealed no significant interaction between SOA and condition $F(2, 60) = 1.24, p = .29$, indicating that the effect of SOA on attentional bias may

not be different between the two types of commercial advertisements. However, a positive attentional bias toward food images was observed only in the “food commercial” condition at SOA 100ms ($M = 12.66$, $SD = 25.42$).

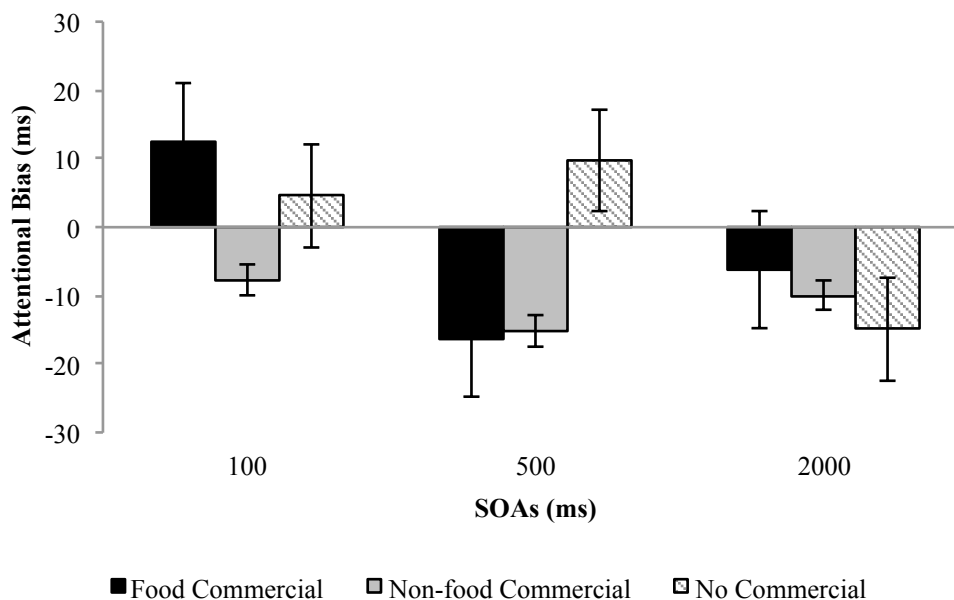


Figure 2. Mean and mean standard error (bars) of attentional bias (ms) per groups and SOAs.

Subjective Hunger

Participants scored higher for subjective hunger after responding to the task and watching TV programming ($M = 2.75$, $SD = 1.17$) than they did before the session ($M = 2.25$, $SD = .81$). A paired-samples t -test indicated that this difference was statistically significant, $t(47) = -3.44$, $p = .01$. The subjective hunger mean was highest in the “food commercial” condition ($M = 14.06$), followed by the “non-food commercial” ($M = 13.50$) and the “no commercial” ($M = 13.36$) conditions (Figure 3). This difference was demonstrated by a main effect of condition in our repeated measures ANOVA, $F(1, 45) = 31.63$, $p < .001$, as well as a significant interaction between time and condition $F(2, 45) = 4.25$, $p = .02$. The post-hoc Bonferroni test, however, did not confirm these between-group differences. We did not find correlations between subjective hunger and the other study variables (Table 1).

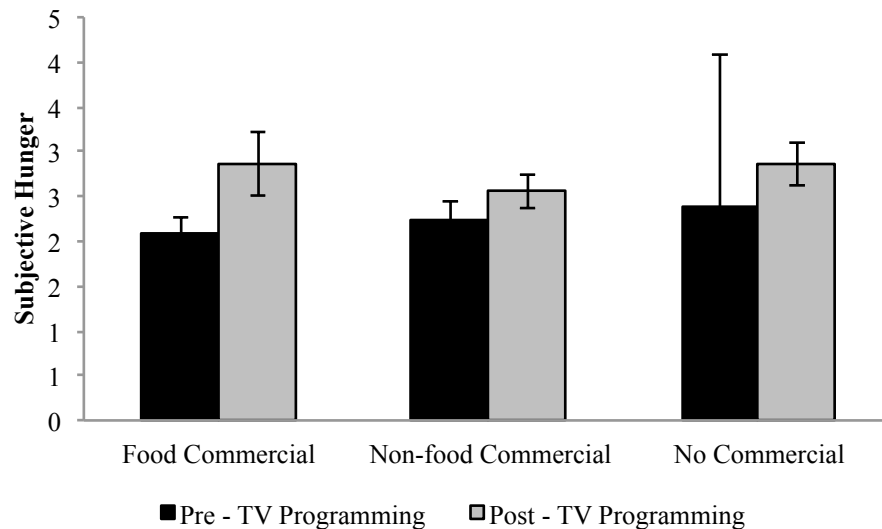


Figure 3. Pre- and post-TV programming subjective hunger means and mean standard errors (bars) per condition.

Positive Affect

Participants scored higher for positive affect before watching their respective TV programming conditions and responding to the task ($M = 29.75$, $SD = 5.41$) than they did after the session ($M = 26.04$, $SD = 6.27$) (Figure 4). A paired-samples t -test indicated that this difference was statistically significant, $t(47) = 5.35$, $p = .01$. The positive affect mean was highest in the “no commercial” condition ($M = 29.10$), followed by the “food commercial” ($M = 28.60$), and the “non-food commercial” ($M = 26.30$) conditions. The repeated measures ANOVA revealed positive affect score differences between conditions, $F(1, 45) = 26.88$, $p < .001$, but no significant interaction between time and condition $F(2, 45) = 0.20$, $p = .81$. We did not find correlations between positive affect and the other study variables (Table 1).

Negative Affect

Participants scored lower for negative affect pre-session ($M = 14.72$, $SD = 3.67$) than they did post-session ($M = 12.54$, $SD = 2.44$) (Figure 5). A paired-samples t -test indicated that this difference was statistically significant, $t(47) = 5.12$, $p = .01$. The repeated measures ANOVA showed significant differences for negative affect between conditions, $F(1,45) =$

31.63, $p < .001$, and a significant interaction between time and condition, $F(2,45) = 4.25$, $p = .02$. These between-group differences were not confirmed by a post-hoc Bonferroni test. We did not find correlations between negative affect and the other study variables (Table 1).

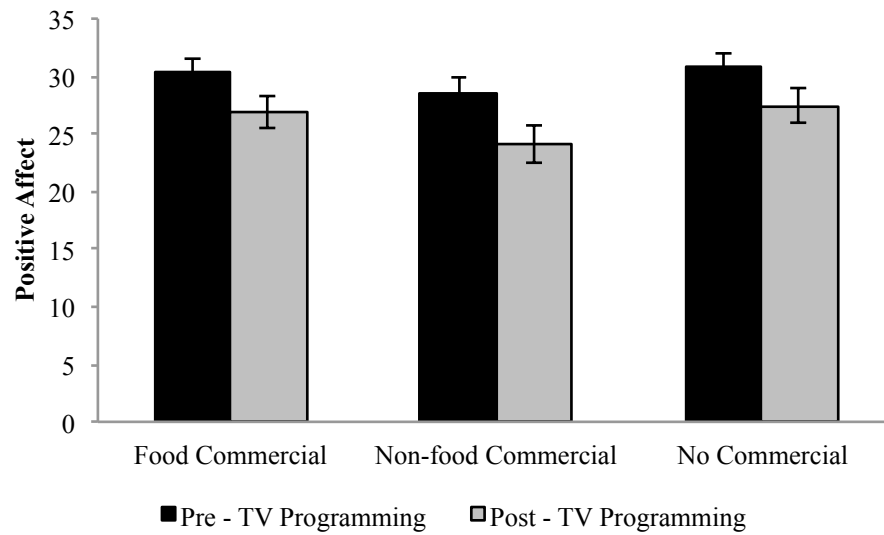


Figure 4. Pre- and post-TV programming positive affect means and mean standard errors (bars) per condition.

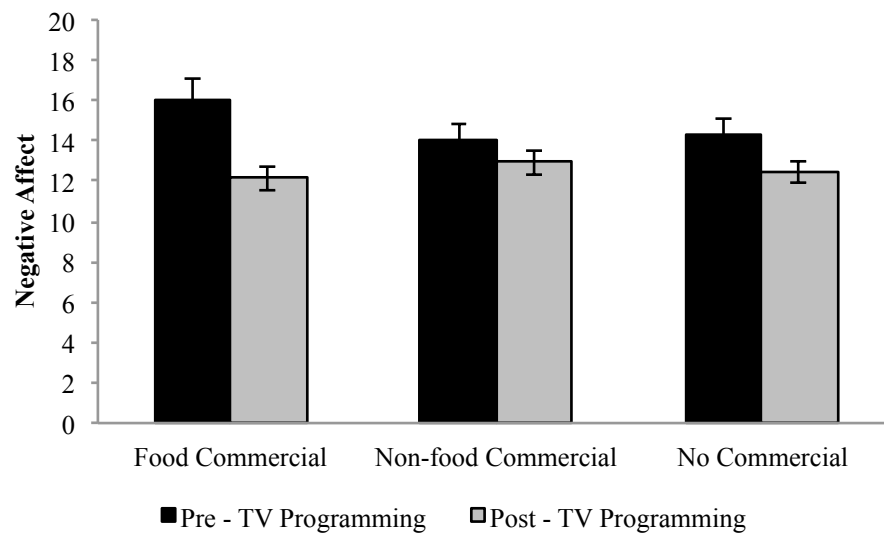


Figure 5. Pre- and post-TV programming negative affect means and mean standard errors (bars) per condition.

Table 1

Pearson's Correlations Between Study Variables (N = 48)

	1	2	3	4	5	6	7	8	9
1. Age (years)	1	-.08	.23	-.27	.05	.28*	-.13	.07	.02
2. Gender (M =1, F = 2)		1	-.26	-.11	-.17	-.21	-.07	-.14	.00
3. BMI (kg/m ²)			1	.05	.05	.00	-.18	-.00	.06
4. AB 100				1	.11	.03	.07	-.01	.11
5. AB 500					1	.17	-.15	.09	-.09
6. AB 2000						1	.04	.27	.20
7. Subjective Hunger ^a							1	-.02	-.17
8. Positive Affect ^a								1	-.07
9. Negative Affect ^a									1

Note. *Significant at .05 level (2-tailed); ^a total scores calculated from the sum of pre- and post-session responses; AB = attentional bias.

Table 2

Means, Standard Deviations (SD) and Confidence Intervals (CI) for Study Variables in the Three TV Programming Conditions (N = 48)

	Food Commercial			Non-food Commercial			No Commercial		
	Mean	SD	CI	Mean	SD	CI	Mean	SD	CI
Age (years)	22.00	2.17	18.00 – 25.00	21.94	1.76	19.00 – 25.00	21.26	2.15	18.00 – 25.00
BMI (kg/m ²)	22.67	1.47	20.00 – 24.86	22.19	2.07	18.52 – 24.96	21.40	1.49	18.71 – 24.90
RT Food 100	602.93	105.7	438.00 – 899.00	610.38	147.58	471.00 – 1109.00	601.73	106.53	448.00 – 833.00
RT Food 500	614.80	91.45	470.00 – 884.00	614.77	171.39	456.00 – 1216.00	603.26	102.08	461.00 – 842.00
RT Food 2000	623.66	130.0	463.00 – 1042.00	621.50	146.85	443.00 – 1099.00	614.60	105.81	441.00 – 840.00
RT Non-food 100	615.53	116.2	494.00 – 968.00	602.72	151.13	445.00 – 1079.00	606.20	110.91	468.00 – 875.00
RT Non-food 500	598.60	87.72	455.00 – 828.00	599.50	145.51	484.00 – 1102.00	612.93	113.66	464.00 – 913.00
RT Non-food 2000	617.66	124.2	473.00 – 1012.00	611.38	137.37	468.00 – 1078.00	599.73	106.26	411.00 – 842.00
AB 100 ^a	12.66	25.42	-24.00 – 69.00	-7.72	25.74	-46.00 – 46.00	4.53	31.23	-59.00 – 42.00
AB 500 ^a	-16.26	39.18	-81.00 – 55.00	-15.22	39.01	-114.00 – 43.00	9.96	38.32	-49.00 – 91.00
AB 2000 ^a	-6.26	28.77	-63.00 – 50.00	-9.94	29.99	-78.00 – 44.00	-14.93	29.53	-61.00 – 44.00
Subjective Hunger	17.33	3.35	13.00 – 25.00	16.83	4.44	10.00 – 26.00	18.20	5.74	9.00 – 30.00
Positive Affect ^b	57.20	8.84	43.00 – 73.00	51.61	12.85	28.00 – 71.00	58.20	9.77	42.00 – 78.00
Negative Affect ^b	27.46	6.50	19.00 – 41.00	27.00	5.50	20.00 – 38.00	26.73	5.11	21.00 – 37.00

Note. ^a Means shown are estimated marginal means before controlling for age; RT = reaction time (ms); AB = attentional bias (ms); ^b total scores calculated from the sum of pre (before) and post (after) responses.

Discussion

The aim of this study was to test whether exposure to unhealthy food commercials on TV increases attentional bias for food images using the Visual Probe Task. We hypothesized that attentional biases for food images would (i) be present and (ii) be stronger in participants exposed to a high density of unhealthy food commercials on TV as compared to controls. Results showed evidence of negative attentional bias at SOA 2000ms, thus confirming our first hypothesis. We also found a significant difference between bias at SOAs 100ms and 2000ms. These results are consistent with the dual process model (Hofmann et al., 2008; Wiers et al., 2007), and compatible with the view of attention as a continuous, and not an all-or-none, phenomenon, therefore capable of evolving from automatic to controlled (Cohen et al., 1990; Moors & De Houwer, 2006).

The observed transition from positive to negative bias toward food images suggests an approach – avoidance pattern, which has been previously detected in lean adults (Shank et al., 2015), restraint eaters (Veenstra & de Jong, 2012), as well as in overweight and obese individuals who are trying to lose weight (Werthmann et al., 2011). Although these SOAs tend to be considered part of a more controlled stage of attention where biases should be subject to executive regulation (Posner & Petersen, 1990; Posner & Rothbart, 2007), it is possible that this avoidance was not only facilitated by awareness of the stimuli themselves, but also by the fact that participants were not hungry and had normal BMIs. It is also possible that if they had not met these criteria, biases for food images could have been higher, even during longer SOAs (Castellanos et al., 2009; Gearhardt et al., 2012; Loeber et al., 2013; Nijs et al., 2010; Werthmann et al., 2011).

The hypothesis that differences in attentional bias would be a result of exposure to a high density of unhealthy food commercials on TV was not confirmed, since there was no evidence of main effect of TV programming conditions in our results. Unexpectedly, however, we found that effects of SOA on attentional bias might be independent of type of commercials,

suggesting that either food or services commercials could affect attention to food. Because advertisements in general are designed to drive emotional responses, and emotions are known to encourage food choice and consumption, it is plausible that non-food commercials, such as commercials for services, could play a role in guiding attention to food. Even though avoidance to food images was observed in all three conditions at SOA 2000ms, the disengagement from the control images was faster after exposure to both commercial conditions, and even faster after the food commercials. Along with a greater approach to food images at SOA 100ms after exposure to food commercials, we can argue that these findings reflect a possible interference of the experimental manipulation, and not necessarily of the food stimuli salience (Nummenmaa et al., 2011). Negative mood and subjective hunger (Hepworth et al., 2010) are also unlikely to explain the observed bias, since we controlled for subjects' hunger, and found no associations between attentional bias and these variables.

Perhaps one of the reasons we did not find the hypothesized effect is that a block of the neutral video was presented immediately after the second commercial block and just before the Visual Probe Task, which could have washed out any potentially stronger effect of the “food commercial” manipulation. An additional factor could be that the neutral video was not arousing enough to engage the participants' attention, as suggested by our results of affect, using the PANAS scale. Remarkably, the use of a nonemotional documentary was previously considered as a limitation in a study that did not find the expected higher alcohol consumption in young men after exposure to alcohol advertising (Koordeman, Anschutz, & Engels, 2012). Presenting the neutral video right before the task and not testing the emotional valence of the video were two of the limitations of this study.

To the best of our knowledge, no other study to date has investigated the impact of unhealthy food TV commercials on attentional bias for food images using the Visual Probe Task, or analyzed the possible effects of three types of TV programming altogether, — i.e., “food commercial”, “non-food commercial,” and “no commercial”. In doing this, our design

extends the findings of attentional bias studies toward a more ecologically valid research setting. Conversely, having three conditions of TV programming could help simulate the content that people may actually be exposed to on TV, which involves different types of programs, some with commercials, others without them.

Accordingly, our self-report measures of subjective hunger and affect revealed that independently of the TV programming condition, watching TV may increase subjective hunger levels and alter affect, changing positive and negative valences toward a more neutral state. Together, these results might complement previous findings that the amount of TV watched might compromise healthy patterns of food consumption (Blass et al., 2006; Mittal et al., 2011; Snoek et al., 2006; Zimmerman & Bell, 2010). Although we did not find a main effect of condition on subjective hunger, the relative effect observed suggests that exposure to “food commercial” is more likely to affect subjective hunger than exposure to the other conditions. The same cannot be said with regards to the affect results, since the changes observed were significantly different across all conditions.

Furthermore, it would be interesting to know whether small age differences in young adulthood play a role in the immediate effects of food commercials. As suggested by our correlation analysis, attentional bias for food images during a 2000ms SOA may be more prevalent in later stages of young adulthood development. Because cognitive control is expected to gradually increase with age, it is possible that the attentional biases observed at SOA 2000ms could reflect an increased incentive salience toward food cues (Robinson & Berridge, 1993) perhaps due to the mere-exposure effect (Morgenstern et al., 2013; Zajonc, 1968). Although aging does not guarantee repeated exposure, it is likely that the degree of exposure to food commercials might, in average, also increase with time. Future studies should investigate this issue, as these findings seem to shed light on previous findings indicating young adulthood as a period of vulnerability in establishing eating habits (Larson et

al., 2012; Larson, Neumark-Sztainer, Harnack, et al., 2008; Larson, Neumark-Sztainer, Story, et al., 2008).

In conclusion, we found that commercial advertisements can affect attention to food, and watching TV per se can influence affect and subjective hunger. The present study represents an attempt toward identifying possible risk factors for increased energy intake in young adults, making contributions not only to prevent obesity in this population, but also to add to the growing literature on the immediate effects of unhealthy food commercials on TV. Although we have found no absolute effects of food commercials on the study variables, the demonstrated results do not rule them out. Because commercial advertising on TV is repetitive, its effect may be influenced by the frequency of exposure to a particular product or by a generalization to another product that represents the same category.

Acknowledgments

We especially wish to thank Dr. John VanMeter and his group at the Center for Functional and Molecular Imaging (CFMI) at Georgetown University for supporting this study. The first author thanks her thesis project committee: Dr. Elizeu Macedo (Mackenzie), Dr. Lilian Stein (PUCRS), and Dr. Gustavo Gauer (UFRGS), as well Dr. Antonio Rangel (Caltech) for providing valuable comments on the early versions of this study. We wish to thank all of our collaborators at UFRGS, especially Dr. Homero Dewes and Dr. Álvaro Vigo. We also thank CAPES for their financial support.

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CHAPTER IV

STUDY 4 – PRELIMINARY STEPS TOWARD A MEDIATION MODEL OF ATTENTIONAL BIAS IN THE RELATIONSHIP OF EXPOSURE TO ALCOHOL ADVERTISING AND ATTITUDINAL RESPONSES IN ADOLESCENTS

Paper in Preparation

Viacava, K. R, Fishbein, D. H., and VanMeter, J. W. (2015). *Preliminary steps toward a mediation model of attentional bias in the relationship of exposure to alcohol advertising and attitudinal responses in adolescents*. Manuscript in preparation.

Abstract

Repeated exposure to alcohol advertising is considered a risk factor for underage drinking since it increases positive responses toward alcohol possibly due to the mere exposure. Here we show the first two out of four steps toward a mediation model of attentional bias (AB) among adolescents, following Baron and Kenny's method. We therefore examined (i) the relationship between exposure to alcohol advertising and attitudes and perceptions toward alcohol ads, and (ii) associations between exposure to alcohol ads and AB for both alcohol-related and emotional negative words. Participants were recruited as part of the Adolescent Development Study (ADS, funded by NIAAA), a prospective longitudinal neuroimaging study of alcohol initiation and escalation. To date, a subset of forty healthy right-handed adolescents (mean age = 14.51 yrs.; 21 females) enrolled in the ADS performed an Emotional Counting Stroop (ecStroop) task during fMRI testing, and completed the Media Exposure Questionnaire. Although female adolescents reported less exposure to alcohol advertising than males, results revealed positive associations between advertising exposure and attitudes and perceptions in females (but not in males). There was also evidence of association between advertising exposure and neural AB activations, which included reward network areas, such as the caudate, putamen, insula, hippocampus, and inferior and middle frontal gyri. Altogether, these findings have implications for the identification of risk factors for future alcohol misuse by adolescents.

Keywords: alcohol advertising, exposure, attentional bias, adolescents, fMRI

Introduction

Exposure to alcohol advertising is one of the many risk factors for alcohol misuse by adolescents (Hastings, 2011; Lin, Caswell, You, & Huckle, 2012; Ross et al., 2014; Tucker, Miles, & D'Amico, 2013). Evidence indicates that repeated exposure to alcohol advertising not only increases the likelihood that adolescents will start drinking (Hastings & Sheron, 2013; Jackson et al., 2014; Morgenstern, Isensee, Sargent, & Hanewinkel, 2011a, 2011b), but also predicts increased intake among those who already consume alcohol (Anderson, de Bruijn, Angus, Gordon, & Hastings, 2009; Bogart, Collins, Ellickson, & Klein, 2006; Grenard, Dent, & Stacy, 2013). Despite indications of associations between advertising and drinking (Ellickson, Collins, Hambarsoomians, & McCaffrey, 2005), the precursors of drinking behaviors and the ways in which they are potentially mediated by advertisements remain unknown. Identifying these precursors is very important considering the impact that alcohol consumption can have on adolescent development (Gordon, Harris, Mackintosh, & Moodie, 2011; Pieters, van der Vorst, Engels, & Wiers, 2010; Zeigler et al., 2005).

The influence of marketing on the progression of alcohol misuse may involve both distal (e.g., advertising exposure) and proximal (e.g., liking ads) factors (McClure, Stoolmiller, Tanski, Engels, & Sargent, 2013). Although individuals tend to devote little to no cognitive effort to the processing of advertisements, it seems that their contents can still be processed, even without awareness (Treleaven-Hassard et al., 2010). As a consequence of the mere-exposure effect (MEE), the influence of an advertisement can increase with repeated exposure, since individuals tend to enhance their attitudes towards the stimuli they are most familiar with (Bornstein, 1989; Morgenstern, Isensee, & Hanewinkel, 2013; Zajonc, 1968, 2001). Liking alcohol ads is an example of an attitudinal response to marketing, and may be a consequence of existing familiarity with commercials (Grimes & Kitchen, 2007; Hekkert, Thurgood, & Whitfield, 2013). It is also a proximal factor that may increase the chances of

engaging in drinking behaviors (McClure et al., 2013; McClure, Stoolmiller, Tanski, Worth, & Sargent, 2009).

While there are different views regarding the need for conscious awareness in the MEE (de Zilva, Vu, Newell, & Pearson, 2013), liking what is familiar is claimed to be independent of awareness, and has been positively correlated with unconscious familiarity (Hansen & Waenke, 2009). Furthermore, liking doesn't always increase with exposure; it can also be diminished by repeated exposure, particularly when the stimuli represent a threat (Crisp, Hutter, & Young, 2009). There is also evidence that negative mood could inhibit the MEE, suggesting that negative emotional states could prime the evaluation of previous exposures (Kawakami, 2012). This is more likely to occur in females than males (Roberts & Gettman, 2004). In a similar vein, a reduction of the MEE was also observed in individuals with greater levels of anxiety (Ladd & Gabrieli, 2015). Together, these studies indicate a potential relevance of affective processes in understanding the MEE.

One interesting feature of the MEE is that it could be interpreted in terms of a continuum between "habituation" and "boredom". While habituation may enhance affect due to familiarity, the boredom of excessive exposure to particular stimuli may diminish or even extinguish the MEE (Bornstein, 1989; Robinson & Elias, 2005). More importantly, this habituation-boredom relationship may reflect an inverted U-shaped curve, in which large MEE should be expected to occur somewhere between initial habituation and the onset of boredom (Bornstein, 1989; Robinson & Elias, 2005). This idea is particularly relevant to the present study, since it highlights a possible relative risk of MEE as a result of moderate compared to high levels of alcohol advertising exposure. Another interesting characteristic of the MEE is that it may be modulated by selective attention (Yagi, Ikoma, & Kikuchi, 2009), since a previous study demonstrated that not only the repeated, but also the attended stimuli were evaluated more positively than either novel or unattended ones (Huang & Hsieh, 2013).

Remarkably enough, selective attention to alcohol-related stimuli is also associated with behavioral responses toward alcohol, such as alcohol use and misuse, which was observed in adolescents and adults (Cox, Brown, & Rowlands, 2003; Janssen, Larsen, Vollebergh, & Wiers, 2015; Willem, Vasey, Beckers, Claes, & Bijttebier, 2013; Zetteler, Stollery, Weinstein, & Lingford-Hughes, 2006). The tendency of selecting potentially important stimuli (positive or negative), such as sources of reward, pleasure, satiety (di Pellegrino, Magarelli, & Mengarelli, 2011), or danger (Williams, Mathews, & MacLeod, 1996), to the detriment of other environmental stimuli is called attentional bias (AB). AB is considered an automatic behavior (Stormark, Laberg, Nordby, & Hugdahl, 2000). As a result of associative learning, AB can indicate cue-reactivity responses of drug-related stimuli (Carter and Tiffany, 1999) and represents an additional area of vulnerability in cases of addiction or predisposition to addiction (Dager et al., 2014; Robbins & Ehrman, 2004).

Studies suggest that primary reinforcement images are capable of capturing attention because they trigger a cascade of neural events which involve the activation of the reward system (Hester & Luijten, 2014) and dopamine release in the ventral striatum (Heinz et al., 2004). Important corticostriatal structures include the anterior cingulate gyrus, the amygdala, and the nucleus accumbens. Activity in these areas appears to predict selective attention and induction of motivated behaviors (Franken, 2003) such as approach or avoidance (Hogarth, Dickinson, Janowski, Nikitina, & Duka, 2008). These events can lead to increased incentive salience (Robinson & Berridge, 1993) exacerbating desire (craving) and promoting consumption. They can also be particularly critical during adolescence (Spear, 2000, 2013) due to peaks of dopamine in the prefrontal cortex (Lewis, 1997) and limbic system (Andersen, Dumont, & Teicher, 1997), as previously observed during this stage of development.

AB can be measured through different tasks and methods (Field, Munafò, & Franken, 2009). The most traditional measure is a modified version of the classic Stroop task (Stroop, 1992) known as the Emotional Stroop (Williams et al., 1996). During the task, participants

are instructed to quickly and accurately identify the color of the words (e.g., neutral, emotionally relevant, and/or related to the addiction) and try to ignore the semantic content of the words. AB is measured as the reaction time (RT) to name the color. It is assumed that the longer the RT, the greater the emotional interference evoked by the word (Cox, Fadardi, & Pothos, 2006; Field et al., 2009). The Emotional Counting Stroop (ecStroop) task is an adapted version of the Emotional Stroop task developed to access emotional interference during studies through functional neuroimaging, which requires minimal movement (Bush, Whalen, Shin, & Rauch, 2006; Whalen, Bush, Shin, & Rauch, 2006). In the ecStroop task, the words appear vertically on the screen (1-4 times), and the participants are asked to press the button corresponding to the number of times the word was listed. As with the Emotional Stroop, RT is used as a measure of AB in the ecStroop task.

Therefore, if exposure to alcohol advertising is associated with attitudes and perceptions toward alcohol ads in adolescence leading to increased risk of initiation and escalation of drinking behavior due to the MEE, it is plausible that selective attention to alcohol-related and emotional negative words may play a role in this process. Thus, the aim of this study is to perform the first two out of four steps toward a mediation model of AB in the relationship between exposure to alcohol advertising and attitudes and perceptions in adolescents. We therefore expected (i) a relationship between exposure to alcohol advertising and attitudes and perceptions toward alcohol ads, and (ii) associations between exposure to alcohol ads and AB for both alcohol-related and emotional negative words.

Methods

Data Collection

This study was carried out at the Center for Functional and Molecular Imaging (CFMI), in Georgetown University, Washington, DC, United States. Participants were 40 healthy (mean age = 14.51 yrs.; 21 females), right-handed adolescents recruited as part of the Adolescent Development Study (ADS), a longitudinal neuroimaging study of alcohol

initiation and escalation. The conduct and execution of this study was carried out with Institutional Review Board (IRB) approval from Georgetown University and the University of Maryland, School of Medicine. Participants signed assent forms and their parents signed an informed consent form.

Instruments and Procedures

Media Exposure Questionnaire

The Media Exposure Questionnaire or MEQ was an instrument developed to assess frequency of exposure to alcohol marketing. Based on the work by Collins, Ellickson, McCaffrey, and Hambarsoomians (2007) and Fleming, Thorson, and Atkin (2004), the questionnaire contained 27 questions, divided into four categories, which were: “sports TV programs”, “non-sports TV programs”, “magazines”, and “attitudes and perceptions”. Participants used a 5-point scale (Appendix G) to report how often they watched TV programs (sports and otherwise) or read magazines, which contained alcohol marketing according to a licensed Nielsen database. Sports TV programs included: “Professional Football”, “Professional Basketball”, “College Football”, “College Basketball”, “NASCAR races” and “Sports Center”, as well as the channels “ESPN”, “ESPN2”, “FOX” and “Sports Net”. Non-sports TV programs also ranked as popular with adolescents by Nielsen and that aired alcohol ads were: “Pawn Stars”, “Daily Show”, “Bar Rescue”, “Sons of Anarchy”, “American Pickers”, “Fast N Loud”, “Hardcore Pawn”, “E! News”, “Ghost Adventures”, and “White Collars Brawlers”. Following the same protocol, the included magazines were “ESPN Magazine”, “OK!”, “Rolling Stone”, “Maxim”, and “Wired”. Nielsen’s report for number of ads in each media was used to weight the participant’s frequency of watching and reading, allowing the calculation of exposure scores for each participant by summing their responses and dividing by 1000 (Collins et al., 2007). This approach was used for all three types of media: sport TV programs (maximum score = 151), non-sport TV programs (maximum score = 35), and magazines (maximum score = 64).

We also assessed five variables thought to be valid indicators of attitudes and perceptions toward alcohol marketing (Fleming et al., 2004). Participants used a 4-point scale (ranging from never to usually) to report how often the following statements applied to their attitudes: “enjoyed seeing alcohol ads”, “showed which drinks were most popular,” “helped adults to find out about new brands of liquor,” “helped adults to find out which brands impress other people,” and “told adults which brands of alcohol taste best.” Total attitudes and perceptions scores were calculated for each participant by summing their responses (minimum = 1 and maximum = 20).

Alcohol Risk and Misuse Assessments

Each adolescent and one of their parents responded separately to the Drug Use Screening Inventory (DUSI) (Tarter and Kirisci, 2001) to assess whether and how much alcohol and other illicit substances the adolescent was consuming (Appendix H). The DUSI was collected on an Internet based system that is run by eCenter Research Inc. The output is in the form of a density score ranging from 0 to 100 percent. Based on a factor analysis with >80% predictability, a subset of ten questions from the DUSI were used to classify the adolescents as either Low-risk, Medium-risk, or High-risk of future adolescent substance use disorder (SUD) (Kirisci et al. 2013). Slight differences in question structure were applied for males and females. Furthermore, another self-report measure of alcohol and substance misuse was collected using an Internet based modified-version of the Alcohol Use Disorders Identification Test (AUDIT) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), to determine whether the adolescent’s use rose to the level that should be brought to the attention of the parents (Appendix I). We modified the AUDIT so that individuals could not be identified by their names, only by their ID numbers.

Emotional Counting Stroop Task

This ecStroop task was based on a previously validated protocol (Bush et al., 2006; Whalen et al., 2006). It consisted of eight blocks of 20 trials each. There were three

conditions — one with neutral words (4 blocks), one with emotional negative words (2 blocks), and another with alcohol-related words (2 blocks). The task order was counterbalanced between participants, and the presentation of words in each condition was randomized. The words remained on screen for 1500ms, and were presented vertically between one and four times (Figure 1). Participants were instructed to indicate the number of times each word was listed on the screen by pressing the corresponding button box. The box had four buttons and participants used four fingers. The average RTs for each condition were calculated, where longer RTs represented interference.



Figure 1. Examples of single trials for the three types of stimulus in the ecStroop task. In all examples, the correct answer would be 4, 3, 2 from left to right correspondingly.

Additionally, behavioral AB was computed separately for both alcohol-related and emotional negative words for each participant by subtracting the mean reaction time in the conditions with neutral words from the mean reaction time in the conditions with interference words: $AB = (\text{Mean RT}_{\text{interference}} - \text{Mean RT}_{\text{neutral}})$. Positive results were interpreted as an approach to the stimuli and negative as an avoidance. The task was administered using E-Prime software (version 2.0). To control for anticipatory responses, RTs <200ms were excluded from further analysis.

Experimental Procedures

Standard safety screening procedures for functional magnetic resonance imaging (fMRI) were applied before each scanning session. Participants performed an ecStroop task in either the real MRI ($N = 33$) or the mock scanner ($N = 7$) for adolescents who had orthodonture (3 females) that would create artifacts in the fMRI data. After the scanning

sessions, they completed the MEQ and provided self-report measures of alcohol risk and misuse using the DUSI and AUDIT.

MRI Data Acquisition

MRI data were acquired using a 3T Siemens Tim Trio MRI Scanner (Erlangen, Germany) and a 12-channel head-coil at the Center for Functional and Molecular Imaging at Georgetown University Medical Center. Head movement was minimized using padding to hold each participant's head firmly yet comfortably inside the head coil. High-resolution (T1-weighted) anatomical images were acquired using a magnetization prepared rapid acquisition gradient echo (MPRAGE) scan (TR/TE = 1900 /2.52 ms, TI = 900 ms, flip angle = 9°, FOV = 250 mm, 176 slices with a thickness of 1.0 mm, effective resolution = 1mm³, scan time = 4:18 min). Structural scans were examined for gross neurological findings. Functional images were collected to examine each participant's neural activity during the ecStroop task (TR/TE = 2500/30 ms, resolution = 3.0 mm³, and total time = 4:33 min). We used SPM8 (Wellcome Department of Cognitive Neurology, London, UK) to preprocess the fMRI data. Each participant's images were corrected for slice timing, realigned, coregistered to the anatomical image, and spatially normalized.

Statistical Analysis

The sample size calculation was performed using the G*Power 3 software (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007), which indicated that a minimum sample size of 31 subjects would be needed assuming a small effect size of .30. Independent-samples *t*-tests were used to test for gender differences regarding age as well as to compare participants' means in the MEQ variables, and the Chi Square test was used to test for independence between gender and race and gender and risk for alcohol use. Pearson correlations were used to test linear associations between the study variables, and a hierarchical multiple regression approach was applied to test for a quadratic relationship

between exposure and attitudes and perceptions scores. Logarithmic transformations were applied to normalize the distribution of the MEQ variables.

A repeated measures analysis of variance (ANOVA) was performed to assess main effects in the ecStroop task. Multiple comparisons were accounted for using Bonferroni correction, and an alpha level (α) of 5% was adopted as significance criterion. We also performed a whole-brain fMRI analysis regressing the MEQ scores separately for emotional>neutral and alcohol>neutral, using both one-sample *t*-tests and one-way ANOVAs, including advertising exposure scores as a covariate, with results reported at $p < .01$, uncorrected for multiple comparisons, and a cluster extent threshold of $k > 10$ voxels.

The Baron and Kenny's Causal-Steps Test (Baron & Kenny, 1986) was adopted for establishing the first two out of four steps towards the mediation model (Figure 2). This model assumes that the effect of an independent variable (X) on a dependent variable (Y) is transmitted through a third intervening, or mediating, variable (M). That is, X causes M, and M causes Y (Fritz & MacKinnon, 2007). Accordingly, the mediation test involves four steps, which are: 1) test whether the independent variable correlates with the dependent (i.e., c); 2) test whether the independent variable correlates with the mediator (i.e., a); 3) test whether the mediator correlates with the dependent variable (i.e., b); and 4) estimate whether the potential mediator affects the relationship between independent and dependent variables (i.e., c').

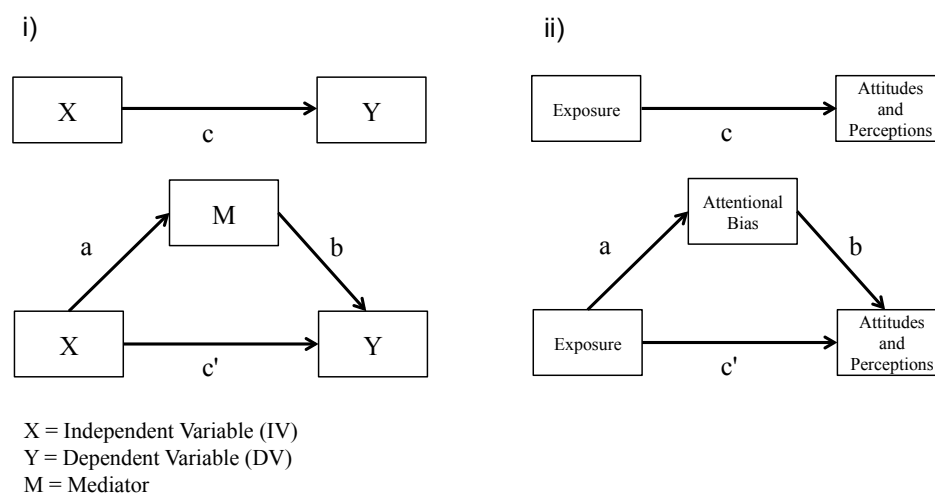


Figure 2. Baron and Kenny's (1986) mediation model (i) and study hypothesis (ii).

The mediation is confirmed only if all the four steps lead to significant results, and if c is smaller than c' , ideally zero. In the social sciences, however, it is plausible to infer a partial mediation when all of the first three steps (i.e., a , b , and c) are significant, but not the fourth (i.e., c') (Baron & Kenny, 1986). One challenge in testing for complete mediation is the unrealistic large sample size required to detect a mediation effect ($\sim 20,000$), considering a .80 power and assuming a small effect size of .14. Alternatively, partial mediation effects required a much smaller sample size to obtain the same statistical power (~ 500) (Fritz & MacKinnon, 2007). Since the mediation was not tested at this point of this study, the sample size calculation was not performed. Further considerations on this topic may involve an alternative for estimation of statistical power analysis for mediation, based on the bootstrap method through the Monte Carlo simulation (Zhang, 2014).

Results

Sample Characteristics

Males and females did not differ in terms of age $t(38) = .03, p = .96$ (male $M = 14.52, SD = .60$; female $M = 14.51, SD = .89$) or race $\chi^2(3, N = 40) = 1.75, p = .62$, although most participants were Caucasian (62%). Also, they had similar classification in DUSI $\chi^2(2, N = 40) = 3.11, p = .21$ (male $M = 2.78, SD = .53$; female $M = 2.90, SD = .43$) with 90% scoring for low risk of alcohol misuse. There was no significant difference between males and females for alcohol misuse $t(38) = -1.10, p = .27$. However, four participants (10%) of the sample have started drinking alcohol, three of whom were females and one was at medium risk for alcohol misuse.

Media Exposure Questionnaire

Males may be more exposed to alcohol advertising than females (male $M = 24.15, SD = 19.39$; female $M = 13.57, SD = 6.09$), as indicated by overall exposure score $t(38) = 2.11, p = .04$. However, both genders had similar scores when each type of media was considered separately (Table 1). A negative correlation between gender and exposure was also observed

$r(38) = -.32, p = .04$ (male = 1, female = 2), supporting the increased exposure among males (Table 2).

Higher exposure to alcohol advertising was associated with more positive attitudes and perceptions in females $r(38) = .39, p = .04$, but not males $r(38) = .04, p = .43$ (Figure 3). Despite this tendency, genders did not differ regarding attitudes and perceptions toward alcohol ads $t(38) = 1.87, p = .06$. Dispersion observed on males suggests a possible pattern of an inverted U-shaped curve, which could reflect a quadratic relationship and reflect a boredom pattern as suggested by the MEE model, where the association between variables could indicate an increase until a certain point and then a decrease. However, the hierarchical multiple regression test failed to find significant effect ($\beta = -.08, t(37) = -.46, p = .64$). Furthermore, we found a positive correlation between age and attitudes and perceptions, which reflects older adolescents having a more positive attitudinal responses toward alcohol advertising $r(38) = .34, p = .02$.

Table 1

Descriptive Values of Exposure and Attitudes and Perceptions Toward Alcohol Advertising by Gender (N = 40)

Variables	Total Sample (N = 40) <i>M(SD)</i>	Males (N = 19) <i>M(SD)</i>	Females (N = 21) <i>M(SD)</i>	<i>p</i> value
Exposure score	18.60(14.87)	24.15(19.39)	13.57(6.09)	.04
Sports TV programs	36.55(50.53)	49.15(56.23)	25.14(42.96)	.10
Non-sports TV programs	8.25(2.49)	8.00(1.59)	8.47(3.12)	.62
Magazines	15.82(4.22)	15.36(4.44)	16.23(4.07)	.44
Attitudes and perceptions	10.60(3.52)	11.52(2.71)	9.76(3.99)	.06

Note. M = mean; SD = standard deviation; *p* value = difference between genders according to independent *t*-test (2-tailed).

Table 2

Pearson's Correlations Between Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender (M = 1, F = 2)	1	-.00	.00	.12	.09	.05	.09	.11	.14	.05	-.32*	-.29	.17
2. Age		1	-.14	-.27	.02	.01	.01	-.18	-.19	-.23	.03	.34*	.16
3. Race			1	-.10	-.34*	-.35*	-.32*	.19	.19	.13	.18	.02	-.02
4. Risk for alcohol				1	.29	.25	.29	-.15	-.11	-.22	.12	.10	-.13
5. AC neutral words					1	.97**	.99**	-.30	-.39*	-.42**	.12	-.08	-.27
6. AC negative words						1	.98**	-.35*	-.44**	-.47**	.16	-.03	-.27
7. AC alcohol words							1	-.33*	-.42**	-.46**	.13	-.07	-.25
8. RT neutral words								1	.87**	.88**	-.18	-.09	.08
9. RT negative words									1	.88**	-.23	-.20	.12
10. RT alcohol words										1	-.19	-.09	.10
11. Exposure score											1	.23	-.12
12. Attitudes and perceptions												1	-.01
13. Drinking alcohol													1

Note. *Significant at .05 level (2-tailed); **significant at .01 level (2-tailed); AC = accuracy; RT = reaction time (ms)

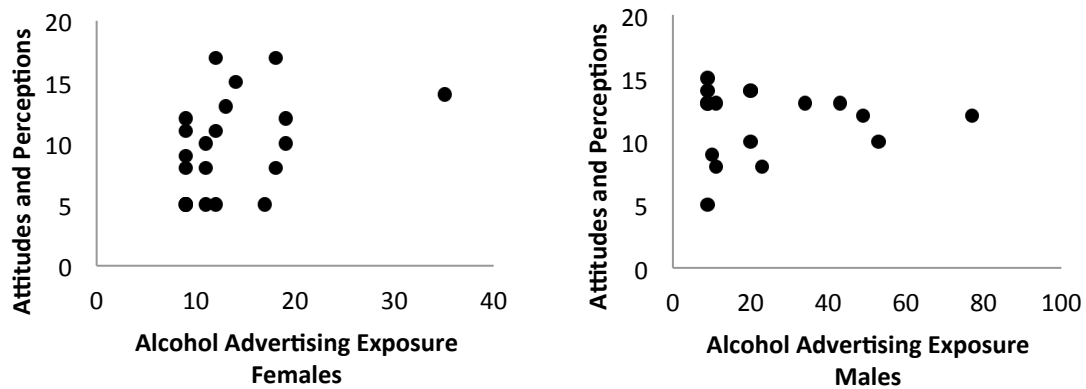


Figure 3. Dispersion diagram for exposure to alcohol advertising and attitudes and perceptions by gender.

Behavioral Results

Overall, the accuracy on the task was high (91%), and convergent with the protocol (Bush et al., 2006; Whalen et al., 2006). For behavioral analyses of the ecStroop task, we performed two separate 3 (Type of word) x 2 (Gender) repeated measures ANOVAs — one for the reaction time data and another for the accuracy data. One subject was excluded from these analyses due to having an accuracy score of 10% ($M = 48$ SD), and a second was excluded due to having incomplete behavioral data, for a total of two excluded subjects ($N = 38$). Reaction times lower than 200ms were also excluded to avoid anticipatory responses.

Participants' reaction times were greater for alcohol-related words ($M = 758.99$, $SE = 13.39$), followed by emotional negative ($M = 752.79$, $SE = 14.88$) and neutral words ($M = 715.57$, $SE = 13.39$), as revealed by a main effect of type of word $F(2,72) = 20.21$, $p < .001$ (Figure 4). A *post hoc* Bonferroni test confirmed the differences between the emotional negative and neutral ($p < .001$) conditions, as well as between the alcohol and neutral ($p < .001$) conditions, suggesting an interference effect of those stimuli. There was no main effect of gender $F(1,36) = 1.16$, $p = .28$ and no interaction between type of word and gender $F(2,72) = .62$, $p = .53$.

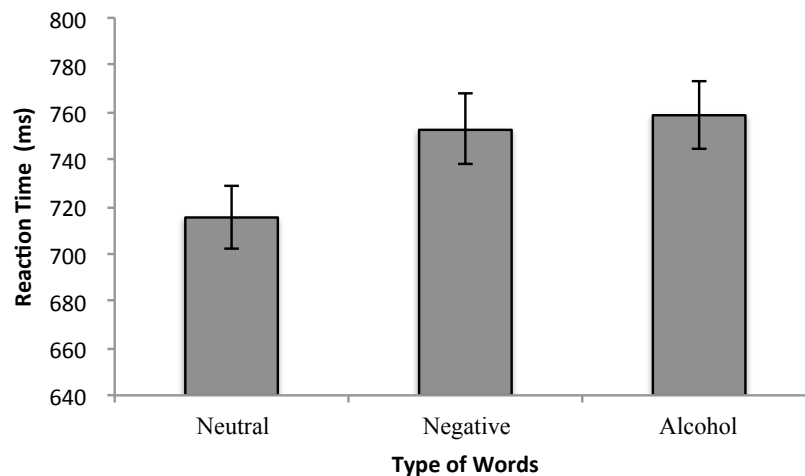


Figure 4. Mean of reaction time (ms) per type of words for the ecStroop task (N = 38).

Regarding the accuracy results, we found a significant main effect of type of word. Accuracy scores were lower for alcohol words ($M = 18.00$, $SD = 1.23$), compared to emotional negative ($M = 18.39$, $SD = 1.55$) and neutral ($M = 18.36$, $SD = 1.23$) words, as indicated by a main effect of type of word ($F(2,72) = 3.33$, $p = .04$). This effect is mainly due to a difference between emotional negative and alcohol words ($p = .04$). Males ($M = 18.81$, $SE = .28$) showed a higher accuracy score on the task compared to females ($M = 17.75$, $SE = .27$), ($F(1,36) = 7.33$, $p = .01$). However, there was no evidence of interaction between type of word and gender $F(2,72) = .56$, $p = .56$.

There was positive AB for both alcohol-related ($M = 43.41$, $SE = 6.91$) and emotional negative words ($M = 43.41$, $SE = 6.91$), which could suggest an approach to those stimuli, since both the mean AB for alcohol words ($t(38) = 6.42$, $p < .001$) and for emotional negative words ($t(38) = 4.21$, $p < .001$) were significantly different from zero. However, neither a main effect of type of word $F(1, 36) = .65$, $p = .42$ or gender $F(1,36) = .16$, $p = .68$ nor an interaction between these variables were observed $F(1, 36) = 1.02$, $p = .31$.

There was a positive correlation between behavioral AB to alcohol words and exposure to alcohol advertising in non-sports TV programs $r(36) = .33$, $p = .04$, such that a greater behavioral AB was associated with higher levels of advertising exposure, at least in

non-sports TV programs. There was no association between behavioral AB and the other study variables, including the total alcohol advertising exposure score.

fMRI Results

The ecStroop task activated a network involved in attention, response selection, motor planning and response (Table 3), all of which were previously described as expected brain responses (Bush et al., 2006; Whalen et al., 2006). Because of the gender difference observed in the MEQ results for the exposure score, neural activities were examined by gender.

Alcohol > Neutral

Exposure to alcohol advertising was positively associated with activations in limbic and frontal areas, during alcohol > neutral trials, such that higher exposure to alcohol advertising correlated with greater emotional interference in the processing of alcohol-related words. Females showed these positive associations in the anterior cingulate cortex (ACC), inferior and middle frontal gyri, supplementary motor area (SMA), as well as in the precuneus, thalamus, insula, amygdala and hippocampus. Positive associations were also observed in males, and included areas such as the inferior and middle frontal gyri, ACC, thalamus, and amygdala. We also found negative associations between frontal areas and exposure to alcohol advertising in females (but not in males), which could suggest lower executive regulation (Figure 5). The analysis of gender differences indicated a significant greater activation for females than males in the neural reward network, which included the caudate, putamen, insula, hippocampus, and inferior and middle frontal gyri (Figure 6).

Emotional Negative > Neutral

Results also indicated a negative association between exposure to alcohol advertising and reward-related activation during emotional negative > neutral trials in males, such that emotional negative words evoked greater activity in participants with lower advertising exposure and less activity in those with higher exposure. Activated areas included the ACC, caudate, putamen, hippocampus, insula, and inferior and middle frontal gyri (Figure 7, see

also Table 4). There were no positive associations observed in this contrast for males. We found neither positive nor negative associations for females.

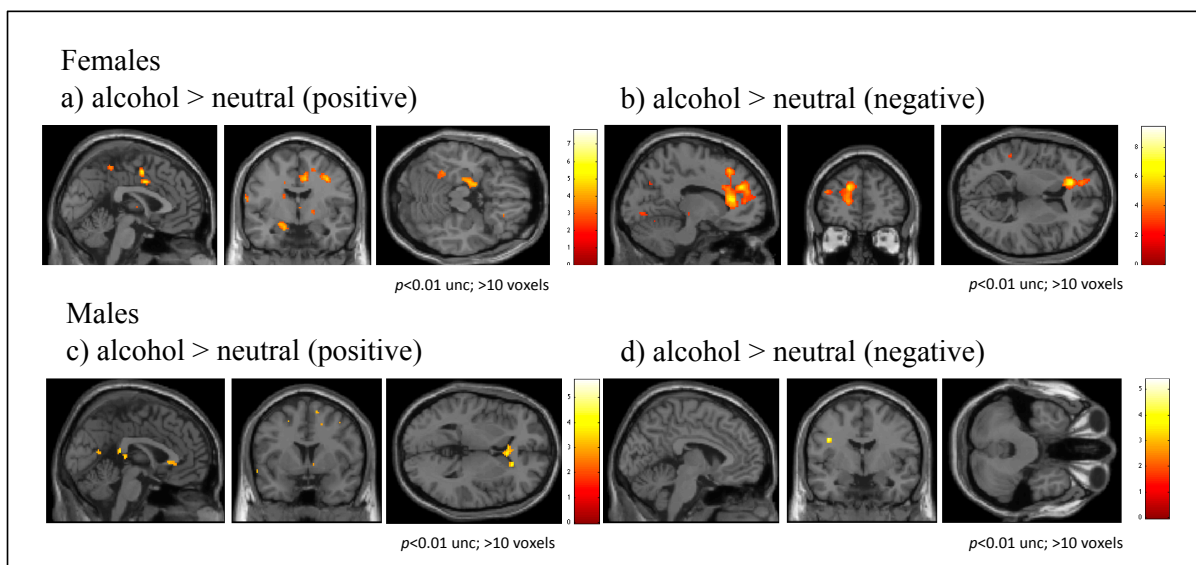


Figure 5. Whole-brain activations for alcohol > neutral using alcohol advertising exposure as a covariate for females (a, b) and males (c, d).

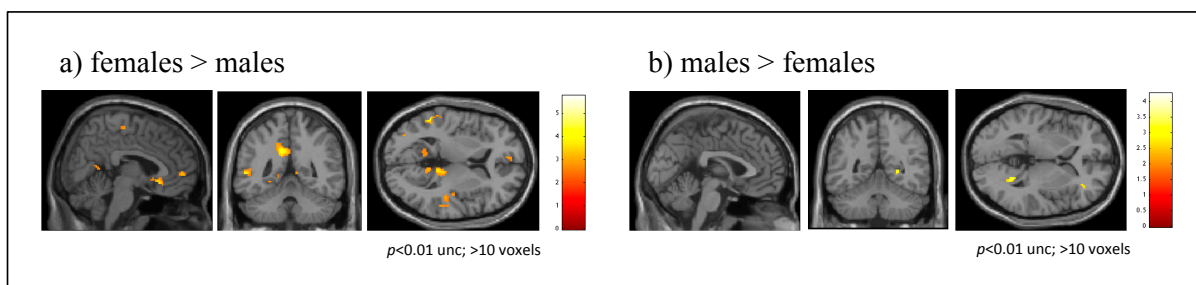


Figure 6. Whole-brain activations in the group comparison for alcohol > neutral using alcohol advertising exposure as a covariate.

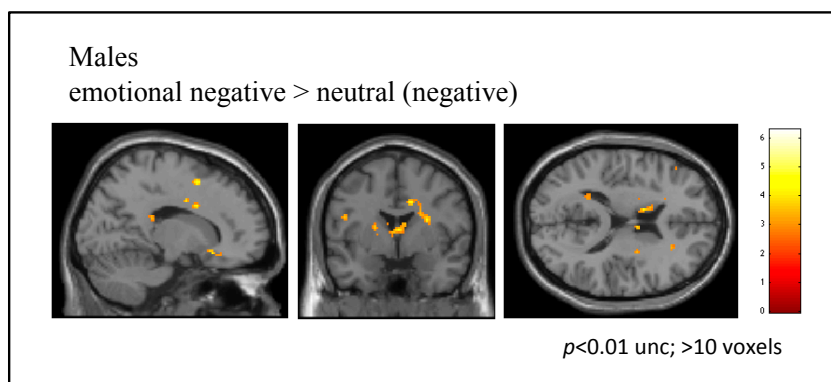


Figure 7. Whole-brain activations for emotional > neutral in males, using alcohol advertising exposure as a covariate.

Table 3

Whole-brain Activations for Alcohol > Neutral in Both Males and Females using Alcohol Advertising Exposure as a Covariate

Area	Cluster Size	<i>t</i> -value	MNI Coordinates		
			<i>x</i>	<i>y</i>	<i>z</i>
<i>Males</i>					
Amygdala	17	5.71	26	-2	-16
Thalamus	32	5.67	12	-28	8
Inferior frontal gyrus	116	4.47	-48	14	26
Superior temporal gyrus	152	4.12	40	-58	26
Anterior cingulate cortex	98	3.64	8	24	-10
Putamen	18	3.48	-28	12	-6
Middle frontal gyrus	24	2.76	24	0	48
<i>Females</i>					
Thalamus	115	6.66	14	-24	14
Supplementary motor area	633	5.65	-2	-2	50
Posterior cingulate	145	5.54	-8	-36	24
Pre-central gyrus	39	5.29	-64	-4	18
Amygdala	182	5.07	-16	-2	-14
Putamen	93	4.98	-18	6	0
Middle frontal gyrus	69	4.52	-38	22	40
Inferior frontal gyrus	94	4.41	-54	4	22
Hippocampus	182	4.24	-22	-16	-20
Insula	148	3.81	30	26	8
Superior temporal gyrus	12	3.60	-50	-40	10
Caudate	98	2.97	8	14	-8
Anterior cingulate cortex	148	2.88	16	32	18
Post-central gyrus	39	2.57	-62	-12	16

Note. Activations significant $p < .01$, uncorrected, $k > 10$; BA = Brodmann area.

Table 4

Whole-brain Activations for Emotional > Neutral for Males using Alcohol Advertising Exposure as a Covariate

Area	Cluster Size	t-value	MNI Coordinates		
			x	y	z
<i>Males</i>					
Middle frontal gyrus	33	6.29	-14	6	54
Middle temporal gyrus	15	4.63	48	56	6
Caudate	63	4.50	-12	10	18
Superior frontal gyrus	150	4.27	14	10	54
Inferior frontal gyrus	13	3.69	-48	2	22
Hippocampus	39	3.67	-22	-36	-2
Putamen	16	3.54	-20	0	12
Anterior cingulate cortex	35	2.92	20	36	14

Note. Activations significant $p < .01$, uncorrected, $k > 10$; BA = Brodmann area.

Discussion

The aim of this study was to perform the first two out of four steps toward a mediation model of AB in the relationship between exposure to alcohol advertising and attitudes and perceptions in adolescents. We therefore expected (i) a relationship between exposure to alcohol advertising and attitudes and perceptions toward alcohol ads, and (ii) associations between exposure to alcohol ads and AB for both alcohol-related and emotional negative words. Our results revealed positive associations between advertising exposure and attitudes and perceptions in females (but not in males), thus partially fulfilling the first step in testing for mediation. The second step was also completed, since we found evidences of associations between advertising exposure and neural AB for both alcohol-related and emotional negative words. These results were inferred from the analysis of both media exposure and attitudes and responses toward alcohol ads, as well as from the observation of limbic-frontal activations

during the ecStroop task. They are convergent with the notion that early adolescent exposure to alcohol advertising may increase attitudinal responses toward alcohol (Collins et al., 2007), and consistent with the dual process model of information processing during adolescence (Wiers et al., 2007).

Our preliminary steps toward a mediation model of AB are encouraging, although mostly for females, as we did not find a significant association between exposure and attitudes and perceptions in males. Even though males reported greater exposure to alcohol advertising than females, probably as a consequence of alcohol advertising exposure in sports TV programs, and showed a possible pattern of a quadratic correlation that could have indicated a boredom stage due to overexposure (Bornstein, 1989; Robinson & Elias, 2005), our statistical analysis did not confirm the relationship. Despite that, we found evidence of positive associations between advertising exposure and neural AB toward alcohol cues in both genders, suggesting a link between advertising exposure and emotional interference processing of alcohol-related words. A negative association between advertising exposure and neural AB toward alcohol was also found in females, especially in areas related to executive regulation. Moreover, females' greater reward network activations and lower levels of advertising exposure suggest a potential risk for habituation and MEE (Bornstein, 1989; Robinson & Elias, 2005), as a result of moderate rather than higher levels of advertising exposure.

With regards to the negative association between exposure to alcohol advertising and reward-related activation observed during emotional negative > neutral trials in males, perhaps one interpretation for this result could be found in the cue-reactivity paradigm (Carter and Tiffany, 1999), more precisely in the Incentive Model. Accordantly, responses should be expected to occur in the same direction of the drug (i.e., drug-like). Because alcohol can temporarily reduce negative mood and this positive incentive for drinking is commonly exploited in marketing campaigns, then adolescents could be expected to exhibit less

reactivity to emotional negative cues when exposed to a high density of alcohol advertising. Therefore, the negative correlation between alcohol advertising exposure and reactivity to emotional negative cues could indicate a possible risk factor for alcohol misuse in male adolescents. The Withdrawal Model (i.e., the expectation of drug-opposite reactivity effects) might be less likely to explain this result, since it is based on the abstinence theory and these participants are alcohol naïve.

While we found evidence of correlations between advertising exposure and neural AB with both alcohol and emotional negative-related words, there were no associations related to behavioral AB. However, this does not rule out the mediation hypothesis. While behavioral and neural measures are likely to correlate, they are different processes. Since neurocognitive effort is expected to regulate behavior (Lewis & Todd, 2007), it is plausible that neural effort may happen first. Evidence of associations between exposure to alcohol advertising and neural AB could be the first indication of a possible deficit of executive regulation in processing alcohol-related information. Because AB to alcohol cues is associated with alcohol misuse in adolescents (Janssen et al., 2015; Willem et al., 2013; Zetteler et al., 2006), preliminary symptoms of such biases deserve further consideration. Longitudinal follow-up, planned in the ADS, could clarify whether this is the case by tracking a possible progression of AB from neurocognitive effort to behavioral response.

Further steps in testing for mediation should include the analysis of associations between AB and attitudes and perceptions toward alcohol advertising (i.e., step three). Ultimately, a multiple regression model should be built to estimate potential mediator effects on the relationship between exposure to alcohol advertising and attitudes and perceptions (i.e., step four). Besides the need of a larger sample size (Fritz & MacKinnon, 2007), advanced analyses must define which variables of neural AB should be included in the model. One way to overcome this limitation could be through the selection of region(s) of interest (ROIs). In

order to obtain a bias-free set of ROIs, we could alternatively examine the brain activity of the subjects not included in this analysis.

Additionally, future studies should consider including measures of awareness of alcohol advertising in the mediation model, as awareness is pointed as a proximal factor which may also increase the chances of adolescents engaging in drinking behaviors (McClure et al., 2013; McClure et al., 2009). Although it is argued that effects of repeated exposure are independent of awareness (Hansen & Waenke, 2009), there is still no consensus on this topic (de Zilva, Vu, Newell, & Pearson, 2013). Thus, it could be informative to investigate if or to what extent different levels of awareness of alcohol advertising could be interacting with AB in mediating potential MEEs.

Furthermore, it would also be interesting to know whether small age differences in adolescence could play a role in the progression of attitudes and perceptions toward alcohol advertising. As indicated by our correlation analysis, attitudinal responses toward alcohol advertising were positively associated with age. Because cognitive regulation is expected to gradually increase during adolescence (Spear, 2000, 2013), it is plausible that the association observed could reflect an increased incentive salience toward alcohol cues (Robinson & Berridge, 1993) perhaps due to the MEE (Morgenstern et al., 2013; Zajonc, 1968). Although aging does not guarantee advertising exposure, it is likely that the degree of exposure to alcohol advertising might, in average, also increase with time, which could perhaps lead to a cumulative effect. Maturation differences between genders could be also considered in further analyses since it could help to explain the stronger general brain activation in females.

The present study presented a protocol that is convergent with previous studies aimed to investigate associations between alcohol advertising and drinking behavior in adolescents. However, the design proposed here differs in terms of measurement and methodology. To the best of our knowledge, this is the first study of this nature to investigate both automatic motivational processes, such as AB, combined with functional neuroimaging methodology.

Therefore, the results of this study could not only contribute to the identification of risk factors for future alcohol misuse by adolescents, but may also elucidate the neural bases of these risk factors, which could be useful in determining policies to mitigate these effects.

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CHAPTER V

DISCUSSION

The primary aim of this thesis was to investigate the role of exposure to commercial advertising on attentional bias for food and alcohol cues in healthy subjects. This idea was inspired by evidence that repeated exposure to food and alcoholic beverage advertising increases the risk of automatic consumption, i.e., eating and drinking without intention or with a lack of control. Individuals who spend higher amounts of time watching television (TV) are particularly vulnerable, since TV advertisements are still some of the most effective. Evidence shows that the amount of hours of TV watched per se can affect choice (Fiates, Amboni, & Teixeira, 2008), as well as both immediate (Blass et al., 2006; Engels, Hermans, van Baaren, Hollenstein, & Bot, 2009; Snoek, van Strien, Janssens, & Engels, 2006) and subsequent consumption (Mittal, Stevenson, Oaten, & Miller, 2011).

Besides preference for a sedentary lifestyle, a plausible explanation for the influence of TV on consumption lies in the increased frequency of exposure to commercials because of extensive TV watching. Although there is a growing understanding between experts that the effects of commercial advertising may be due to frequency of exposure viewing (Anderson, de Bruijn, Angus, Gordon, & Hastings, 2009; Chang et al., 2014), the relative contribution of which cognitive mechanisms are involved in the processing of commercial information and how they drive responses that affect consumption is not clear. Thus, in this thesis, we aimed to address this problem through the development of the four empirical studies previously presented. Altogether, these studies comprised three analytical challenges, as follows.

Our first challenge was learning how visual content (such as color, position and size) are implemented in marketing, with particular interest in the marketing of industries that are known as critical public health risks and cost drivers (i.e., tobacco, alcohol, and food). We overcome this issue throughout our first study, entitled “It is pleasant and heavy: convergence of visual contents in tobacco, alcohol, and food marketing in Brazil” (chapter I). The results

of this study offered evidence of similarities in the strategies used by these three industries with regards to the variables for the selection of commercial stimuli linked to the products. More importantly, through the process of preparing this manuscript, we were able to review a significant amount of empirical evidence supporting the tactical use of cognitive and behavioral strategies for sales and marketing purposes (Brownell & Warner, 2009).

We obviously do not believe that all marketing campaigns are unsafe or that marketing should be banned from applying such available knowledge. On the contrary — we are actually in favor of increasing research and evidence-based management practices in marketing, especially, although not only, for promoting healthy behaviors. However, for the interest of safeguarding the population from misleading marketing promotions (like those of tobacco, alcohol and unhealthy food), healthy managers and policy makers should embrace such evidence, instead of continuing to propagate the naïve notion that such campaigns are based on pure imaginative processes, and not on systematic tactical strategies grounded on cognitive and behavioral sciences.

Our second challenge was selecting advertising exposure measures. To address this topic, we designed our studies adopting three of the mainstream types of advertising exposure assessment: (i) content analysis of TV commercials (study 2), (ii) NIELSEN multiple media database, and (iii) self-report measures (study 4). This approach allowed us to understand and share the strengths and weaknesses of these three alternative exposure assessments. For instance, the possibility of collecting data directly from the television media was by far the most positive point of the content analysis performed in study 2. By taking this procedure, we were able to assess the commercial advertisements directly from the channels they were being released, thus allowing us to perform first-hand analyses, using both quantitative and qualitative methods. Besides, because we had the actual commercial videos, we were able to create a database of ecologically valid, high frequency advertised commercials for future experimental researches, which we, in fact, used in our third study. However, the downside of

the content analysis's method was that it was extremely time consuming, and this was experienced throughout the whole process (i.e., from data collection to data analysis). Accordingly, this approach required a relative large number of research assistants (~15 students, in total), thus increasing the number of potential data entry errors, particularly due to the ample room left for different interpretations.

In order to overcome the abovementioned content analysis's limitations, we decided to take a different approach on the forth study. Essentially, we tried to accomplish our goal of measuring exposure through the acquisition of a licensed media database from NIELSEN, as well as through self-report measures of advertising exposure from our participants. Through the NIELSEN database, we were able to have prompt access to the frequency of commercial advertisements we were interested in quantifying (i.e., alcohol commercials) which, in turn, prevented us from spending excessive amounts of human resources and time on data collection. However, compared to the content analysis, by taking this approach, we missed the chance to access the time and context in which the commercials were being released on the media. We also lost access to the commercial videos and, consequently, we missed detailed information about brands and products. Finally, the self-report measures of advertising exposure were essential in this particular approach, since they allowed us to create individual exposure scores by weighing our participants' responses according to the frequency obtained from NIELSEN. The main disadvantage of the self-report measures was that we needed to rely on our participants' memory recall, thus allowing potential biases, such as under or overestimation of media exposure levels.

The third and closing challenge of this thesis was to decide which cognitive process to study and how to measure it. Consumer behavior researchers have a long tradition in investigating decision-making, but not selective attention. Thus, the choice for investigating attentional processes, particularly attentional biases, was largely influenced by the research environment in which this work was created. As planned and predominantly developed at

Laboratório de Psicologia Experimental, Neurociências e Comportamento (LPNeC), Brazil, this study was built upon the LPNeC's expertise in investigating attentional bias, especially with the Visual Probe Task (Cunha, Deluchi, Pires, Gonçalves, & Bizarro, 2011; Lopes, Pires, & Bizarro, 2014; Peuker & Bizarro, 2014; Peuker, Lopes, & Bizarro, 2009). Fortunately, albeit recently, the interest in understanding the role of attention in decision-making and consumption has begun to flourish, particularly with the rise of neuroeconomics and consumer neuroscience fields and the growing acceptance of the Attentional Drift Diffusion Model (Krajbich, Lu, Camerer, & Rangel, 2012). Because of its relevance to the field, it could not be overlooked in the development of this thesis, hence deserving the following considerations.

The general idea of the model is that it should be possible to predict or affect choices by manipulating the time of visualization to a stimulus (Armel, Beaumel, & Rangel, 2008; Krajbich et al., 2012). The subjacent notion is that individuals make choices primarily assigning value to an item, and then selecting the most valuable option (Lim, O'Doherty, & Rangel, 2011; Litt, Plassmann, Shiv, & Rangel, 2011). The model proposes that value can be expressed through a function of visual attention, thus attributing an important role to attentional bias (Armel et al., 2008). Our first consideration was that we could apply this model to test for advertising exposure effects on decision making, using our measures of attentional biases as depended variables. Contrariwise, after taking a closer look, we concluded that this should not be the case, remembering that in our tasks, participants indicate the position of a probe on the Visual Probe Task (study 3) or the number of instances of a word on the Emotional Counting Stroop Task (study 4), neither of which include images of the actual product nor require choosing for products.

Despite the apparent unsuitability of the Attentional Drift Diffusion Model, we believe that this thesis adds value to the field of neuroeconomics, especially to the subfield of consumer neuroscience, shedding light on the understanding of the role of selective attention

in the processing of commercial information. By combining well-established protocols of advertising exposure and incorporating valid and reliable measures of attentional bias from experimental psychology, this study as a whole adds new parameters for investigating consumer behavior. With regards to the attentional bias tasks, the Visual Probe Task was considered suitable for study 3. It not only allowed for the measuring of different components of the attention networks, but also for the assessment of response latencies, providing indexes of either approach-avoidance or engagement-disengagement. Although the Emotional Counting Stroop task did not permit all these assessments, it provided a measure of attentional bias at the executive processing phase of attention. It was appropriate for study 4, especially due to the motion and temporal constraints associated with fMRI.

In sum, we found similarities in the use of visuoperceptual content in advertisements for tobacco, alcohol and food in Brazil (study 1); and high proportion (75%) of unhealthy food commercials in the Brazilian television (study 2). We found that commercial advertisements can affect attention to food, and watching TV per se can influence affect and subjective hunger in young adults (study 3). Results also revealed associations between exposure to alcohol marketing and limbic-frontal activations in adolescents (study 4). According to our main hypothesis, the first part was confirmed, since behavioral attentional bias for food images (study 3) and neurocognitive bias toward alcohol-related words (study 4) were observed. The second part was only partially supported. Although participants exposed to a high density of commercial advertisements (food and services) showed attentional bias for food images in study 3, moderate rather than higher density of alcohol advertising exposure was correlated with neurocognitive bias in study 4. Altogether, these results present public health management and policy implications, particularly for reducing the risks of excessive food consumption and alcohol misuse in healthy populations in different stages of development (i.e., adolescents and young adults).

Finally, we recall the warning issued by the Food and Health Research in Europe (FAHRE) (McCarthy et al., 2011) with regards to the need to consolidate studies in health and nutrition (such as tobacco, alcohol and food). Future studies should test for generalization effects of advertising exposure, or more precisely, for cross-cue-reactivity (Cunha, 2010; Cunha & Bizarro, 2011). It is important to know if exposure to commercial advertisements for one class of product (e.g., alcohol or food) could drive automatic motivational responses, such as attentional bias, to another product (e.g., tobacco). If this is the case, this subject deserves further consideration.

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APPENDICES

APPENDIX A

STUDY 5 (COLLABORATION) – ATTENTIONAL BIAS MODIFICATION: METHODS, RESULTS AND CLINICAL RELEVANCE

Accepted for Publication

Lopes, F., Viacava, K. R, Bizarro, L. (2015). Attentional bias modification: Methods, results, and clinical relevance. *Trends in Psychiatry and Psychotherapy*.

Abstract

Attention bias is the tendency of a person to direct or maintain attention to a specific class of stimuli and it may play an important role in the etiology and maintenance of mental disorders such as anxiety, depression and addiction. A modification of this bias has been studied in order to be a form of additional treatment for these disorders, with focus on automatic processing. The purpose of this systematic literature review is to compare methods, evidence of success and potential for clinical application of studies on the technique of attentional bias modification (ABM). The databases consulted were Web of Knowledge, PubMed and PsychInfo, with the descriptors attentional bias modification, attentional bias manipulation and attentional bias training. We investigated empirical articles written in English in the past ten years (2002-2012). The results of the articles that investigated ABM using Visual Probe Task showed that the majority (80%) succeeded in training the AB in the predicted direction, and 66% of them generalized results to other measures correlated with the symptoms, suggesting that this technique has potential clinical utility. However, future research on this topic should consider studies with an evaluation of effectiveness to seek greater methodological standardization and maximize applicability.

Keywords: attentional bias, modification, manipulation, training, visual probe task

Introduction

Attentional bias is the tendency of a person to direct or maintain attention to a particular class of stimuli (Williams, MacLeod & Mathews, 1996; Lopes, Peuker & Bizarro, 2008). Individuals affected by emotional disorders such as anxiety, depression, phobias, post-traumatic stress disorders, eating disorders and addiction have increased attention toward events (words or images) related to their pathologies (Williams et al., 1996; Peuker, Lopes and Bizarro, 2009). In addiction behavior, for example, attentional bias seems to be related to greater frequency and intensity of drug use, since drug-related stimuli produce a variety of responses associated with its effects, including craving, excitement and difficulty sustaining abstinence (Robbins & Ehrman, 2004). Similarly, the attentional system of anxious patients can be more distinctly sensitive and biased in favor of threats than other environmental stimuli (Bar-Haim et al., 2007). Thus, attentional bias may play an important role in etiology and maintenance of these mental disorders.

Based on the fact that the attention to events related to a pathology acts to complicate the treatment, attentional bias modification (ABM) has been recently studied as a strategy of implicit training for attention to disengage from threatening events related to anxiety (Amir et al., 2009; MacLeod et al., 2002; Schmidt et al., 2009) and to prevent relapse in alcoholics (Field et al., 2007; Schoenmakers et al., 2007) and smokers (Attwood et al., 2008; Field et al., 2009). To manipulate the attentional bias, we developed a modified version of Visual Probe Task (MacLeod et al., 2002). In the standard Visual Probe Task used to assess the presence of attentional bias (MacLeod, Mathews & Tata, 1986), a pair of images, one related to the pathology (target) and one control (with the same context of the target, but without any clue related to the pathology), is displayed side by side simultaneously on the screen of a computer. After a brief period, the two images disappear and a small stimulus (e.g., an arrow) is presented in place of one of the two images. Participants must observe the arrow and indicate its direction as soon as possible, while it replaces with equal frequency (50%) the target

images and the control images. The latency of responses serves as an indicator of visual attention to the stimuli presented (Townshed & Duka, 2001). Thus, smaller reaction times when the arrow replaces a particular class of stimuli indicate an attentional bias to this type of stimulus.

This modified version of the Visual Probe Task differs from the standard task only in the frequency with which the arrow replaces relevant and non-relevant images. The participants are randomly allocated to groups that differ in terms of probe location, that is, in the group that was trained to increase attentional bias (attend group), most of the time (or 100% of the times) the arrow replaces the relevant image, whereas in the group trained to reduce attentional bias (avoid group), the arrow replaces the non-relevant image. As participants detect and respond as quickly as possible to the probe location, they tend, with time and repetition, to direct their attention to relevant images (attend group) or to non-relevant images (avoid group). In the training for the attention modification to reduce the bias, the arrow always replaces non-relevant images. Thus, the implicit rule to attend automatically to stimuli that are non-anxiogenic or unrelated to the drug is learned. The objective of the attentional training is to have this learning to avoid or "disengage" attention generalized to real situations of exposure to cues, so that the user is able to ignore the relevant stimulus. As a result, the addict would not have an increase in craving, raising the chances of maintaining abstinence, and the anxious patients would have no increase in the levels of anxiety.

The objective of this review is to compare methods, evidence of success and potential for clinical application of studies on the technique of attentional bias modification. The main foci of analysis will be the method and the results of the selected articles. This systematic literature review will present an overview of the evidence related to the use of the technique of attentional bias modification, by applying systematic and explicit methods to search, review critically and have a synthesis of the selected information. It may be useful to integrate the information from a set of separate studies made on this topic, which may present

conflicting and/or coincident results, and identify possible limitations that need evidence, contributing to the orientation for future research.

Method

A systematic literature review was conducted in the second half of 2012, operationalized through electronic search of articles indexed in the databases Web of Knowledge, PubMed and PsychInfo. These bases were consulted investigating the past ten years (2002-2012) using the following descriptors: attentional bias modification, attentional bias manipulation and attentional bias training. The search was limited to empirical articles written in English.

From the search strategies described, the articles were preselected. These were assessed independently by two authors, according to the following inclusion criteria: to be focused on investigating visual attentional bias modification, to be an experimental study, to have an abstract available, and to be a human research. Finally, excluding duplicates, an analysis of concordance among the researchers was performed, culminating with the final selection of articles. Figure 1 shows the flow chart of all steps of the systematic search.

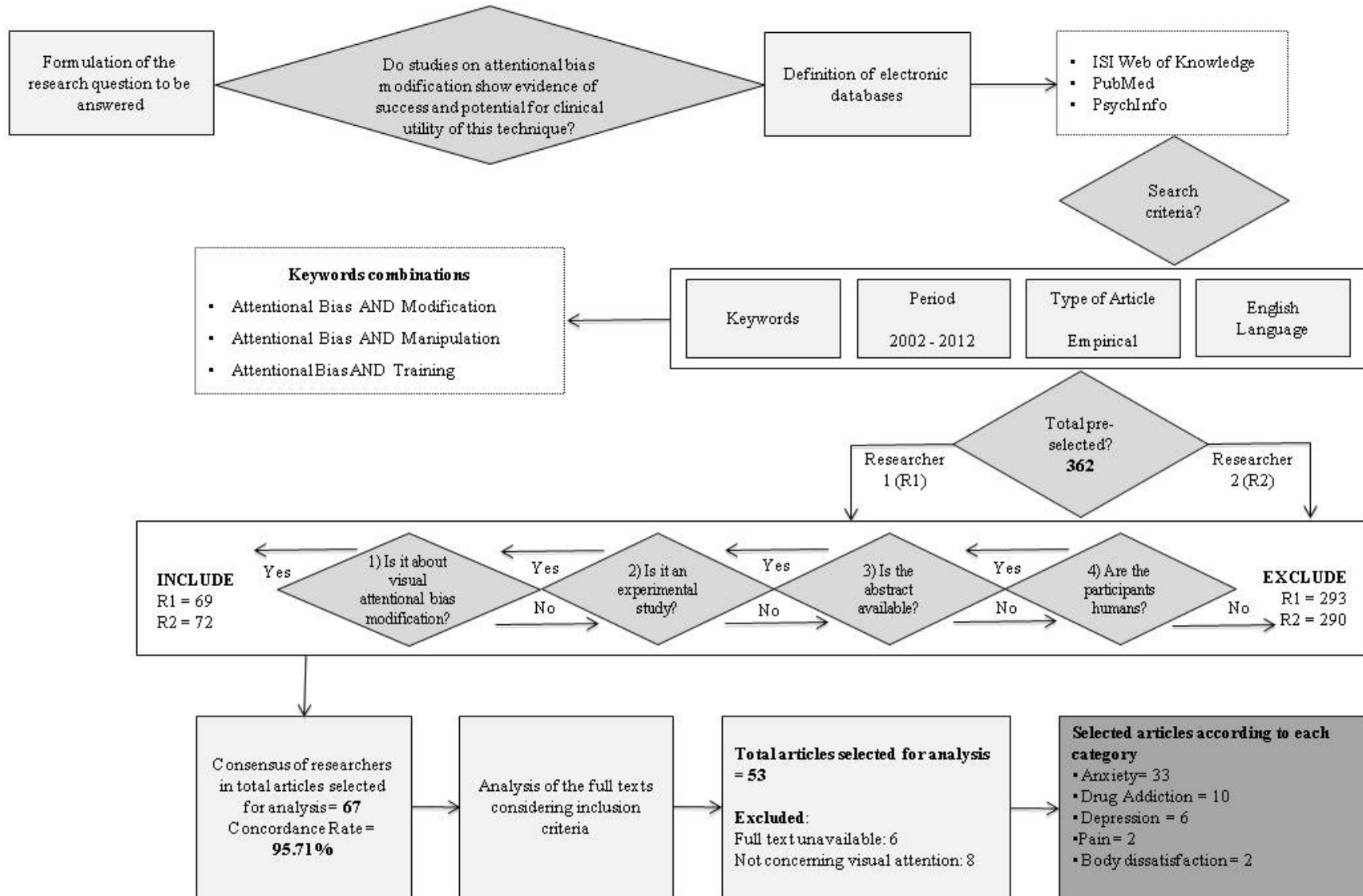


Figure 1. Flow chart of the steps of the systematic search.

Results

Searches in the three databases mentioned, according to their keywords, resulted in 362 articles. Excluding duplicates and considering those that met the inclusion criteria, 69 articles were selected by the researcher 1, and 72 articles by the researcher 2. After a joint analysis of the researchers, there was a consensus that 67 articles met the previously established criteria, resulting in a concordance rate of 95.71%, obtained by the following equation: $\text{total compatible articles} \div (\text{total compatible articles} + \text{total incompatible articles}) = \text{compatibility index}$. However, in the pursuit of full texts, 6 articles were not available and 8 articles were assessed as not concerning visual attentional bias, which resulted in the final selection of 53 articles.

The 53 articles were analyzed and categorized according to their main subject of research: anxiety (33), drug addiction (10), depression (6), pain (2) and body dissatisfaction (2), as illustrated in Figure 2.

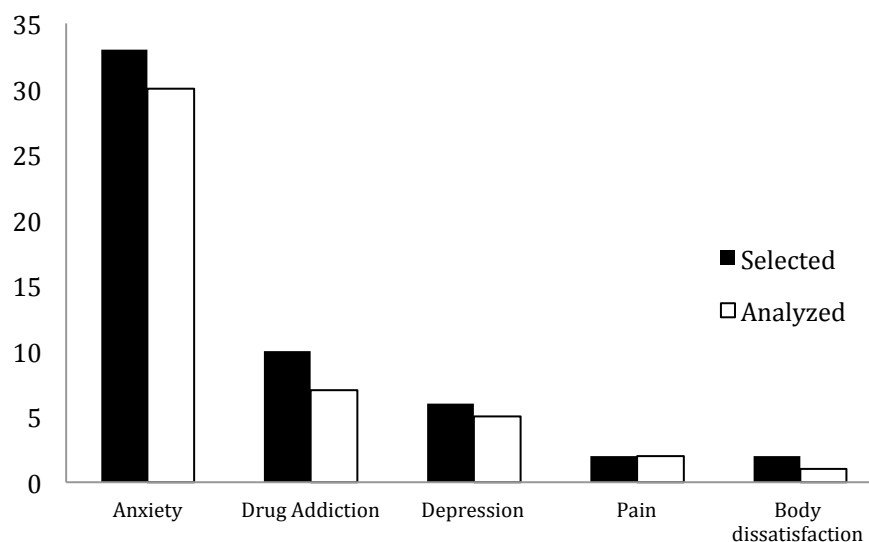


Figure 2. Total articles selected and analyzed by category.

The analysis of the method, presented in Table 1, includes articles that used as a task of attentional bias modification the Visual Attention Task Probe (or Dot Probe Task), since they were the majority (45). The 8 other items used other experimental methods such as "touch the face" (Dandeneau et al., 2004; Dandeneau et al., 2007); "alcohol attention-control

training program" (AACTP, Fadardi et al., 2009); "goal instructions" (Johnson et al., 2009); "structure and semantic task" (Hirsch et al., 2011); "visual search paradigm" (Smeets et al., 2011), and "push or pull the joystick" (Wiers et al., 2010; Wiers et al., 2011). These were excluded from analysis of the method and, consequently, from the results, due to the diversity of paradigms. The analysis of results is presented separately for each category

Table 1

Reviewed Articles (N = 53)

Categories / quantity using VPT	Participants Per group	Groups	AB Modification Task				
			N Sessions	N Trials	N Images / words	SOA (ms) Software	Probe
Anxiety (30)	Mean = 27	Avoid / Control (11)	1 (17)	160-200 (8)	From 8-72 face	500 (22)	Letters E/F(13)
	Mode = 20	Attend / Avoid (7)	8 (5)	201-300 (8)	pairs (20)	700 (3)	Dot . /: (9)
		Attend / Control (6)	4 (2)	301-400 (2)	From 12-96	750 (1)	Arrow >/< (3)
		Avoid (3)	5 (2)	401-500 (1)	word pairs (10)	20 / 480	Arrow ↑/↓ (3)
		Attend / Avoid / Control	7(1)	501-600 (5)	Threat-Neutral	(2)	Letters q/m (1)
		(2)	2 (1)	701-800 (2)	Neutral-angry	100/500	Arrow →/←(1)
		Attend + and Avoid - /	14 (1)	960 (1)	Threat-happy	(1)	
		Control (1)	10(1)		Angry-happy	30/100/15	
			Spider-	00(1)			
			cow/neutral	Delphi,			
			Positive-neutral	Eprime,			
				Inquisit			
Drug	Mean = 27	Attend / Avoid (2)	1 (6)	224 (2)	From 14-30	500 (5)	Arrow ↑/↓ (5)

Addiction (7)	Mode = 20	Attend / Avoid / Control	5 (1)	240 (1)	image pairs	50 / 500	Dot . (1)
		(2)		512 (1)	Neutral and	(1)	Dot . /: (1)
		Avoid / Control (3)		528 (2)	drug-related	200 / 500	
				560 (1)		(1)	
					MEL,		
					Inquisit,		
					Eprime		
Depression (5)	Mean = 25 Mode = 16; 25; 30	Attend + and Avoid - /	1 (4)	80 (1)	From 20-51	500 (3)	Dot . (3)
		Control (1)	10 (1)	160 (1)	word pairs	500 /	Dot . /: (2)
		Attend + / Control (2)	28 (1)	220 (1)	depression-	1000 (1)	
		Avoid - / Control (1)		481 (1)	neutral	1500 (1)	
		Attend + / Attend - (1)		576 (1)	adaptive /		
				maladaptive			
				positive-neutral			
				positive-			
				negative			
				negative-neutral			

Pain (2)	Mean = 24 Mode = 27	Avoid / Control (2)	1 (1) 4 (1)	320 (2)	40 Word pairs pain-neutral	500 (2)	Letters p/q (2)
Body	Mean = 19	Attend - / Attend +	1 (1)	240 (1)	20 positive	500 (1)	Arrow >/< (1)
Dissatisfaction	Mode = 19	Attend - / Attend + / Control (1)			shape/weight 20 negative shape/weight 20 low calorie food 20 high calorie food 20 neutral		

Note. The numbers in parentheses indicate the number of articles concerning that item. Category Depression includes Mood and Self-esteem. Category Anxiety includes Stress and Worry. + means positive; - means negative. TG means training groups. VPT means Visual Probe Task.

Anxiety

This category included articles with topics about anxiety (24), worry (4), stress (4) and emotional vulnerability (1), totaling 33. Regarding the method used to train the bias, three studies did not use the Visual Probe Task (Dandeneau et al., 2007; Hirsch et al., 2011, Johnson et al., 2009), but not all the thirty analyzed articles used the same stimulus (they varied with words and faces), nor they used similar SOAs (which ranged between 20 and 1500ms). Of the eleven studies comparing Avoid (to threat) and Control group, only three found no difference between the groups after training (Boettcher et al., 2012; Calbring et al., 2012, Julian et al., 2012). In the remaining eight studies, there were differences between groups, and the Avoid group decreased the AB for threat when compared to the control group, but only four of these studies showed a correlation of AB after training with reduced symptoms of anxiety (Amir et al., 2009; Hazen et al., 2009; Schmidt et al., 2010; See et al., 2009). The other four studies (Amir et al., 2011; Eldar et al., 2010; Koster et al., 2010; Reese et al., 2010) showed no effects of generalization of AB reduction or correlations with other variables.

Of the seven articles that compared Avoid (to threat) with Attend group, five found a difference between groups, as Attend group increased AB for threat, while Avoid group decreased it – three of which generalized to new stimuli and/or other measures (Browning et al., 2010; MacLeod et al., 2002; MacLeod et al., 2007), suggesting potential clinical utility, and two of them did not correlate with other measures (Van Bockstale et al., 2011; Van Bockstale et al., 2012). The two remaining studies showed, successively, that ABM was efficient in inducing an AB for threat, but inefficient in inducing a bias away from threat (Eldar et al., 2008) and that ABM was efficient in both groups only in those that had AB in the pretest (O'Toole, 2012).

On the other hand, all studies that compared Attend with Control Group found effect in ABM. Of the six studies that compared Attend and Control group, two manipulated the

group Attend to threat or to negative stimuli (Heeren et al., 2012b; Krebs et al., 2010) and four manipulated the group Attend to positive stimuli (Hayes et al., 2010, Li et al., 2008, Taylor et al., 2011; Wadlinger et al., 2008). The first two found that the treated groups increased the AB for threat or negative stimuli compared to the Control group, and that effects correlated with higher anxiety scores (Heeren et al., 2012b) and were potentiated by explicit instructions before performing the training (Krebs et al., 2010). Likewise, the four studies that performed a positive-training increased AB for positive stimuli, besides the negative correlation with anxiety (Li et al., 2008) and stress reactivity (Taylor et al., 2011), fewer negative thought intrusions in a worry test (Hayes et al., 2010) and generalization to other measures of stress (Wadlinger et al., 2008).

Finally, of the three articles that used only the Avoid group, one did not perform a post test because it did not find AB for threat in the baseline (Coward et al., 2011), and the other two found a reduction in the post-training AB, with effects generalized to other scales and self-reported symptoms of anxiety, worry and depression (Amir et al., 2012; Brosan et al., 2011). Likewise, the study that trained groups to attend to positive and avoid to negative found that the disengage and disengage re-engage groups decreased AB for threat, and these groups showed less anxiety scores. However, the two studies (Heeren et al., 2012; Klump et al., 2010) that used groups Avoid, Attend and Control found divergent results. In the first study, Avoid group showed less AB for threat than did both the Attend and Control groups (no difference between Avoid and Control), and Avoid group decreased more in self-reported, behavioral and physiological measures of anxiety than did the other two groups. The second study found no difference between groups after training.

Drug Addiction

In this category were included articles with specific topics about alcohol (7) and tobacco smokers (3), totaling 10. Regarding the method used to train the bias, three studies did not use the Visual Probe Task (Fadardi et al., 2009; Wiers et al., 2010; Wiers et al., 2011),

and all the seven studies analyzed used the same stimulus (drug-neutral images), varying only in the SOAs (200 and 500ms). The two papers that used groups Attend (to drug) and Avoid (Atwood et al., 2008; Field et al., 2005) found differences between groups, since Attend group increased, and Avoid group decreased AB. Moreover, in the study with smokers the post-training AB correlated positively with craving to smoke in the Attend group, but only among men (Atwood et al., 2008); and in the study on alcohol, the Attend group increased the urge to drink and consumed more beer than the Avoid alcohol group did (Field et al., 2012). On the other hand, of the three articles that compared Avoid (to drug) and Control group, only the two studies about alcohol (Shoenmakers et al., 2007; Shoenmakers et al., 2010), but not the article on tobacco smokers (McHugh et al. 2010), found differences between the groups at post-test, since in one of them the AB of Avoid decreased only to old stimuli and did not correlate with craving (Shoenmakers et al., 2010), and in the other article the AB of Avoid group decreased compared to the Control group in the SOA 500ms (but not in 200ms) and generalized to new stimuli, but did not correlate with craving (Shoenmakers et al., 2007). In the latter, which held the largest number of trials in this category, although the AB did not correlate with craving, the Avoid group participants took longer to relapse and were discharged earlier than the Control group.

Finally, of the two articles comparing Attend (to drug), Avoid (to drug) and Control group, the study with tobacco smokers found differences at post-test among groups only for old stimuli, with a higher AB in the Attend compared to other groups (no difference between the Avoid and Control groups), but this difference did not remain on the following day (Field et al., 2009), and ABM had no effects on subjective craving or behavioral measures of tobacco seeking. The study about alcohol (Field et al., 2007) found difference only when it analyzed AB separately in each group (ANOVA 2X2), while the AB increased in the Attend alcohol group from pre to post test and this effect was evident for both old and new stimuli. In addition, the Attend group increased craving only among participants who were aware of the

experimental contingencies during attentional training. There were no group differences in the alcohol consumption.

Depression

In this category were included articles with specific topics about depression (4), self-esteem (1) and mood (1), totaling 6. Regarding the method used to train the bias, only one study did not use the Visual Probe Task (Dandeneau et al., 2004), but not all the five analyzed articles used the same stimulus (they varied between words and faces), nor the same SOAs (they varied between 500 and 1500ms). Both articles that used Attend (to positive) and Control groups (Browning et al., 2012; Haeffel et al., 2012) showed differences among the groups, as the Attend group was much more likely to attend to adaptive stimuli relative to maladaptive stimuli than participants in the control condition. In addition, positive ABM using faces (but not words) was able to reduce two risk measures of depressive recurrence (Browning et al., 2012), and the Attend group reported fewer depressive symptoms and had greater persistence on a difficult laboratory (Haeffel et al., 2012).

The article that compared Attend to positive with Attend to negative groups found differential AB according to age, since for young adults, negative training resulted in fewer post-training fixations to the most negative areas of the images, whereas positive training appeared more successful in changing older adults' fixation patterns. Furthermore, young adults did not differ in their moods as a function of training, whereas older adults in the train negative group had the worst moods after training (Isaacowitz et al., 2011). On the other hand, both the article that compared Attend (to positive) and Avoid (to negative) group with Control group using 10 session trainings (Baert et al., 2010), as the article that compared Avoid and Control using a single-session training (Tsumura et al., 2012) found ABM procedure did not change AB compared to the control procedure.

Pain

In this category the 2 articles had pain as the main theme and used virtually the same method of bias modification, with SOA of 500 ms and 40 pairs of words (pain-neutral) as a stimulus. The results of the two studies of the article that used groups Avoid and Control (Sharp, 2012) showed no difference between groups at post training, but in study 1 the group Avoid reported fewer days in pain and less average pain at a 3-month follow-up. In study 2, benefits of ABM emerged 6 months later for disability and anxiety sensitivity scores. The article that used groups Attend (to pain) and Control (McGowan, 2009) showed that group Attend led participants to report pain more quickly and strongly than those in the control conditions, but pain at tolerance did not distinguish between the groups.

Body Dissatisfaction

In this category were included studies that explored the effect of attention training on levels of satisfaction with their own body, considering that the AB for body parts negatively evaluated may have a causal relationship with eating disorders and body dissatisfaction. Two articles were identified, and only one of them used the paradigm of Modified Visual Probe Task. In this one, women participants were randomly allocated to Attend to negative shape/weight words, positive shape/weight words, negative (high calorie) food words, positive (low calorie) food words or neutral words. Participants allocated to the control group were instructed to attend to neutral words paired with stimuli that induce body dissatisfaction. The results demonstrated that the AB induction to negative shape/weight and negative food words raised the body dissatisfaction and dietary restriction. On the other hand, the induction of AB to positive shape/weight words and positive (low calorie) food words showed no significant difference when compared to the control group. This study provides evidence supporting the relationship between selective attention and body satisfaction, pointing out the use of the attention training as a possible additional technique to clinical intervention.

Discussion / Conclusion

Evaluating the results of articles that investigated the attentional bias modification using the Visual Probe Task (n = 45) together, it is possible to observe that most of them (80%, n = 36) were successful in a trained group, since AB had been successfully manipulated in the expected direction. Of these, 66% (n = 24) generalized results to other measures correlated to the symptoms, suggesting that this technique has potential for clinical utility. The studies of Anxiety (83%) and Drug addiction (85%) had the highest rates of success in the training, since the rates of training effectiveness in AB for Depression and Pain were smaller (60% and 50%, respectively).

The analysis by categories has demonstrated that most studies on ABM so far investigated Anxiety, probably because the Visual Probe Task Modified was developed to manipulate the AB for emotional vulnerability (McLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). This study has opened doors for many others in the area of anxiety, stress, worry and expanded to depression, drug addiction, pain and body dissatisfaction. However, there is still much to research in these areas, since there are few studies on pain and body dissatisfaction, for instance, which does not allow firm conclusions about the effectiveness of the technique.

Some methodological issues of the analyzed articles drew attention. The first is that training to Attend seemed to modify the AB more easily than training to Avoid. This was evidenced in studies that compared groups Attend/Avoid (Eldar et al., 2008), and Attend/Avoid/Control (Field et al., 2007, Field et al., 2009), which showed a difference in the AB of group Attend compared to others, whereas several studies comparing Avoid/Control groups (Boettcher et al., 2012; Calbring et al., 2012; Julian et al., 2012; McHugh et al., 2010) found no difference among the groups at post training. However, for depression this looks interesting, since Attend to positive generates benefits for the participant, but for drug

addiction and pain there is no clinical utility in this type of training. Thus, studies of ABM in these two categories should consider the use of designs only with groups Avoid and Control.

The second question concerns the number of training sessions. Of the 45 studies analyzed, only 17 used more than a training session, 13 of the category anxiety, 2 of depression, 1 of drug addiction and 1 of pain, but the results were controversial. In category anxiety, the number of sessions did not seem to impact the training success, since studies using a larger number of sessions found no differences between groups in greater proportion than those that used only one session. The same occurred in the categories Depression and Pain. On the other hand, in the category drug addiction, the study that carried out the greatest number of training sessions had the most successful results and clinical utility (Shoenmakers et al., 2010), since five-training sessions indicated that ABM among alcohol-dependent patients was effective and affected treatment progression, as Avoid group patients took longer to relapse and were discharged before the Control group. Thus, at least in the area of drug addiction, future research should investigate whether multiple training sessions practiced on consecutive or alternate days, but not on the same day, would enhance post-training success the longer-term persistence of training effects.

The third and final question regards the diversity of method. While everyone has used the same evaluation paradigm (Modified Visual Probe Task), there was great variety in the number and amount of stimuli used in each study, in the number of trials and training contingencies. Images and faces, for example, were more effective than words (Browning et al., 2012), and explicit instructions about the purpose of training (awareness contingency) improved its efficiency (Field et al., 2007; Krebs et al., 2010). Moreover, only a few used new stimuli in post training and performed follow-up studies, which allows to analyze the effects of generalization and the effects of training in a short, medium and long term. Lack of standardization both in method and in statistical analysis may produce different results due to the use of different stimuli or statistical test chosen. Studies evaluating efficacy are important

to guide the designs of new studies on the subject and to maximize the standardization of future investigations.

Finally, these results add to the growing body of literature which suggests that pursuing attention-based interventions is a novel and promising approach that can have a potential clinical utility to an additional intervention. However, post-training group differences are not enough to consider that ABM training procedures can lead to behavioral changes. For this objective, it is necessary that the effects of training generalize to real life situations, correlate with improvement in symptoms and, especially, that they maintain in the long term. In terms of research design, that means using different stimuli in training and post training; making longitudinal studies; and standardizing the method based on the evidence that has been more effective, such as a higher number of training sessions on alternate days, stimuli with more ecological validity, assessment of the impact of the awareness of training contingencies and assessment of the presence of AB as a prerequisite for the completion of training. These suggestions may help to determine the effects of training in future studies and possible application of this technique as additional to the available treatments for disorders such as anxiety, depression and addiction.

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APPENDIX B

SUPPLEMENTAL MATERIALS FOR STUDY 1

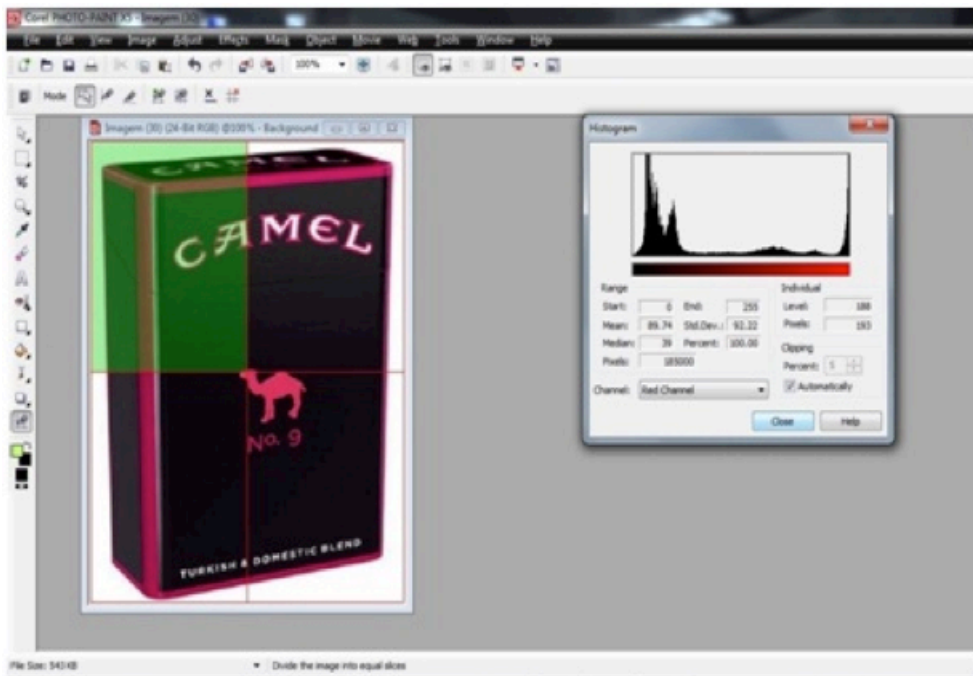


Figure A. Frequency of the colors obtained using the Histogram tool.



Figure B. Image divided into four parts using Image Slicing tool from the Corel program.

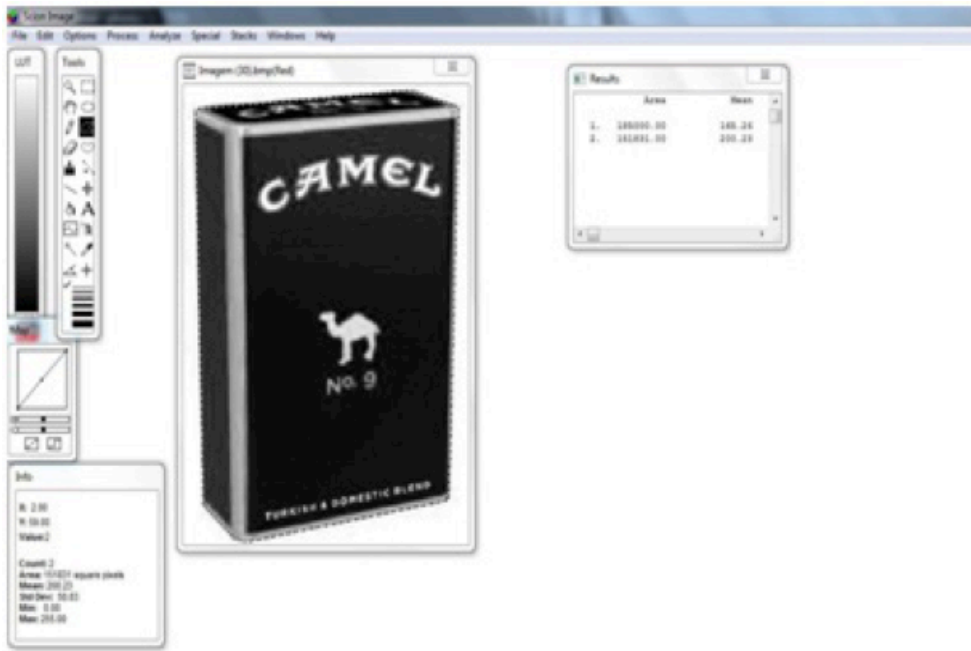


Figure C. Screenshot depicting the use of the measurement tool in the Scion Image.

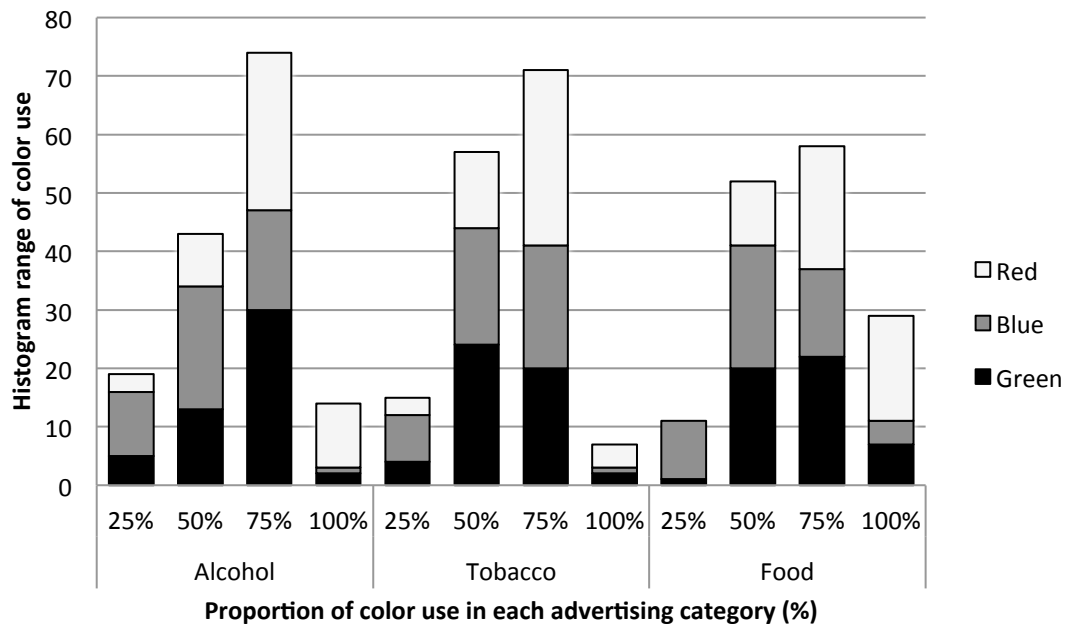


Figure D. Frequency of the colors in the categories of advertising images.

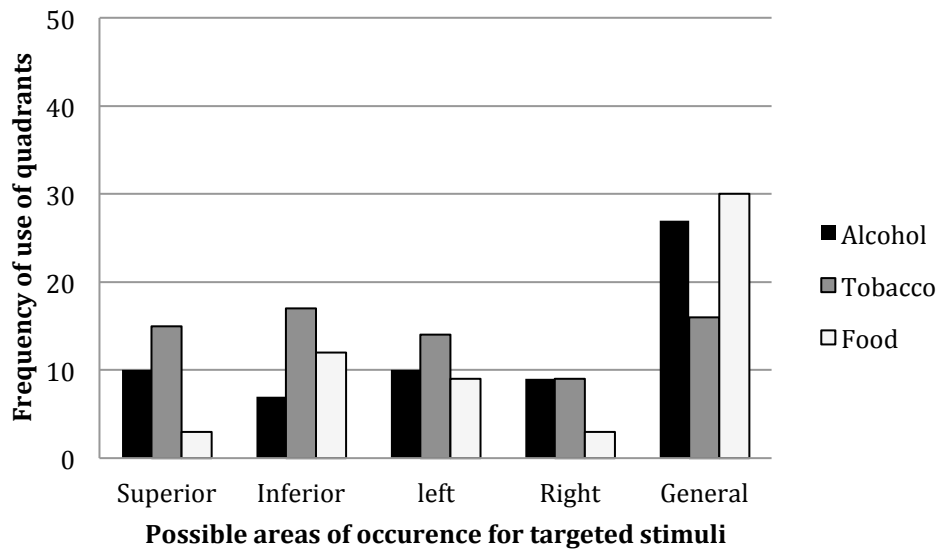


Figure E. Position frequencies of the commercial stimulus.

Note. The presence of commercial stimuli divided among five possible areas of the advertising images: superior, inferior, left, right, general. The figure depicts the distribution of quadrants use in each of the categories of advertising images.

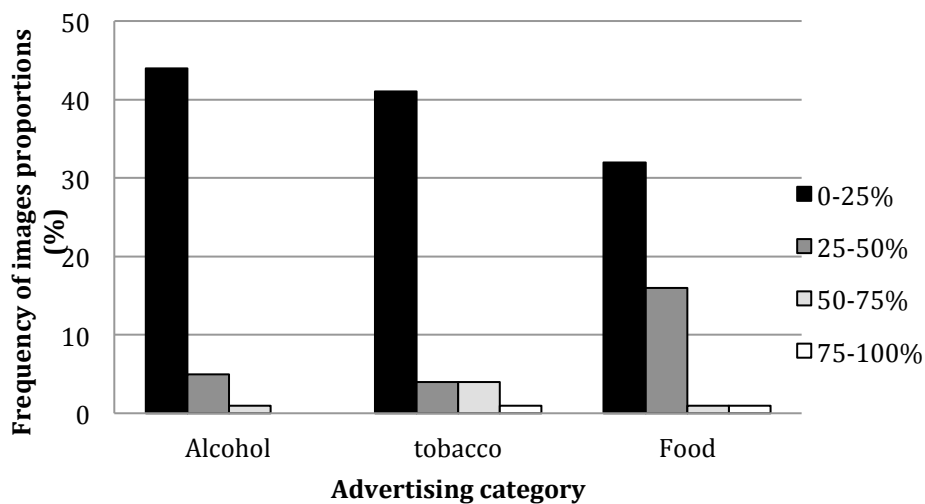


Figure F. Size proportion frequency distribution of the commercial stimuli.

Table 3

Frequency of Cases Divided by Categories (n = 50) of Size Proportion Considering the Use of the Product in Advertising Strategies

Groups	Frequency			
	0-25%	25-50%	50-75%	75-100%
Tobacco	41	4	4	1
Alcohol	44	5	1	0
Food	42	16	1	1

Table 4

Frequency of the Content Analysis Categories Used and Qui Square Statistics

Categories	Frequency (%)			X^2	df	p
	Tobacco	Alcohol	Food			
Visual components	31	47	42			
Context or ambience	24 (48%)	26 (52%)	19 (38%)	2.093	2	.35
Cartoons	2 (4%)	6 (12%)	18 (36%)	19.355*	2	.00
Celebrities	5 (10%)	15 (30%)	5 (10%)	9.600*	2	.00
Product appeal	24	35	86			
Convenience	5 (10%)	4 (8%)	11 (22%)	4.962	2	.08
Quality	4 (8%)	10 (20%)	18 (36%)	11.758*	2	.00
Innovation	4 (8%)	9 (18%)	19 (38%)	19.904*	2	.00
Flavor	11 (22%)	8 (16%)	17 (34%)	4.605	2	.10

Saving ^a	0 (0%)	1 (2%)	6 (12%)	9.291*	2	.01
Winning prizes ^a	0 (0%)	3 (6%)	15 (30%)	23.846**	2	.00
Emotional appeal	94	61	68			
Satisfaction	7 (14%)	0 (0%)	8 (16%)	8.444*	2	.01
Triumph ^a	8 (16%)	4 (8%)	2 (4%)	4.412	2	.11
Social acceptance	9 (18%)	6 (12%)	7 (14%)	.746	2	.68
Sports	12 (24%)	6 (12%)	5 (10%)	4.416	2	.11
Adventures	7 (14%)	2 (4%)	11 (22%)	7.038*	2	.03
Happiness ^a	2 (4%)	0 (0%)	2 (4%)	2.055	2	.35
Phys. attract./beauty	19 (38%)	20 (40%)	1 (2%)	23.386**	2	.00
Family interaction ^a	1 (%)	0 (0%)	2 (4%)	2.041	2	.36
Fantasy vs. reality ^a	1(2%)	2 (4%)	8 (16%)	8.437*	2	.01
Fun ^a	6 (12%)	15 (30%)	16 (32%)	6.530*	2	.03
Self-confidence ^a	7 (14%)	0 (0%)	0 (0%)	14.685*	2	.00
Romance ^a	3 (6%)	4 (8%)	2 (4%)	.709	2	.70
Energy ^a	5 (10%)	1 (2%)	3 (6%)	2.873	2	.24
Goal achievement ^a	7 (14%)	1 (2%)	1 (2%)	8.511	2	.01

Note. X^2 = Qui Square, *df* = degree of freedom, * ($p < .05$), ** ($p < .001$), ^a cells have expected count less than 5.

APPENDIX C

GRAND HUNGER SCALE FOR STUDY 3 (in Portuguese)

Escala de Fome

Número do Participante: _____

Data: ___/___/_____ Horário: _____

1. Qual foi o horário da sua última refeição?

2. Com quanta fome você se sente agora? (Marque um “x” no número que melhor indica o quanto de fome você está sentindo no momento. Por exemplo, se você não está com fome, marque um “x” próximo ao número “1”, se está com muita fome, marque um “x” próximo ao número “7”)

Nenhuma fome

Muita fome

1 2 3 4 5 6 7

3. Quanto do seu alimento favorito você seria capaz de comer nesse momento? (Por favor marque um “x” próximo ao número que melhor indica o quanto de seu alimento favorito você seria capaz de comer agora).

Nada

O máximo que eu puder

1 2 3 4 5 6 7

4. Que horas você pretende comer novamente?

APPENDIX D

CONSENT FORM FOR STUDY 3 (in Portuguese)

Termo de Consentimento Livre e Esclarecido

Estamos realizando uma pesquisa para investigar a relação entre programas de televisão, cognição e comportamento. Para tanto, precisamos da sua colaboração. Inicialmente você assistirá uma programação de televisão em um ambiente confortável. A sua tarefa é relaxar e prestar atenção na programação que será televisionada por 20min. Em seguida, você será conduzido(a) para outro computador onde desempenhará uma tarefa computadorizada de atenção. Assim que a tarefa for iniciada aparecerá uma cruz no centro da tela e você deverá fixar os olhos nesta cruz. Logo após aparecerá um par de imagens, seguida de uma seta, para cima ou para baixo, substituindo uma das imagens. A sua tarefa será identificar a posição da seta e pressionar, o mais rapidamente possível, a tecla correspondente no teclado numérico do computador. Antes de começar o estudo faremos um treino. Por último, você responderá uma escala e fornecerá alguns dados pessoais. A duração total dessa atividade será de aproximadamente 1h35min.

Os riscos são mínimos tendo em vista a origem da programação (considerada livre para divulgação, conforme legislação brasileira), destacando-se o tempo de permanência no laboratório como principal prejuízo. Por outro lado, participar de um estudo experimental pode representar uma oportunidade de conhecer um laboratório de pesquisa, além de contribuir para ampliar o conhecimento acerca dos efeitos de assistir televisão sobre a cognição e o comportamento.

Sua contribuição é voluntária e poderá ser interrompida a qualquer momento, incluindo o período de realização da tarefa experimental ou do preenchimento de algum instrumento. Sempre que desejar, poderá solicitar informações sobre os procedimentos. Além disso, todos os cuidados serão tomados para garantir a confidencialidade das informações, preservando a sua identidade. Dados individuais coletados no processo de pesquisa não serão informados à instituição envolvida. Todo o material desta pesquisa será mantido em sigilo no Instituto de Psicologia/UFRGS e será destruído após cinco anos.

Desde já, agradecemos sua contribuição para o desenvolvimento desta atividade de pesquisa e colocamo-nos à disposição para esclarecimentos. A pesquisadora orientadora e responsável é a Prof.^a Dra. Lisiane Bizarro Araújo, do Programa de Pós-Graduação em Psicologia do Instituto de Psicologia da Universidade Federal do Rio Grande do Sul (UFRGS), e a autora deste projeto é a doutoranda Keitiline Ramos Viacava. A equipe poderá ser contatada pelos telefones (51)3308-5363 ou (51)8143-2500, e pelo e-mail keitiline.viacava@ufrgs.br. Esta pesquisa foi aprovada pelo Comitê de Ética em Pesquisa do Instituto de Psicologia da UFRGS, localizado na Rua Ramiro Barcelos, 2600, Porto Alegre – RS, CEP: 90035-003, fone: (51)3308-5698, e-mail: cep-psico@ufrgs.br.

Concordo em participar do presente estudo,

Nome completo do(a) participante

Assinatura do(a) participante

Data ____/____/____

Assinatura do(a) pesquisador(a)

APPENDIX E

DECLARATION OF PARTICIPATION FOR STUDY 3 (in Portuguese)



Universidade Federal do Rio Grande do Sul - UFRGS

Instituto de Psicologia

Laboratório de Psicologia Experimental, Neurociências e Comportamento – LPNeC

DECLARAÇÃO DE PARTICIPAÇÃO

Declaro que o (a) estudante universitário (a) _____ participou voluntariamente como sujeito de pesquisa neste laboratório, em um estudo voltado a investigar os efeitos de assistir televisão sobre a cognição e o comportamento, tendo cumprido a carga horária aproximada de 1h.

Porto Alegre, ___ de _____ de 2014.

Keitiline R. Viacava, MSc

Doutoranda em Psicologia - LPNeC/UFRGS

APPENDIX F

PROCEDURES OF DATA COLLECTION FOR STUDY 3 (in Portuguese)

PROCEDIMENTOS DE COLETA DE DADOS

DATA: ____/____/____

DOUTORANDA EM SALA: Keitiline Viacava, MSc

ASSISTENTE DE PESQUISA EM SALA: _____

1. Ligar as luzes e o ar condicionado
2. Pegar os computadores na sala 12 e ligá-los na 10
3. Identificar qual é a condição e qual é o número do participante
4. Abrir o vídeo correspondente à condição que o participante será alocado
5. Abrir E-Run e salvar com o número do participante
6. Desligar o celular
7. Receber e dar boas vindas ao participante
8. Solicitar que o participante desligue o celular
9. Informar ao participante que: “Estamos investigando os efeitos de assistir televisão sobre a cognição e o comportamento. Inicialmente, você irá responder a uma escala breve nesse computador e, em seguida, assistirá a uma programação de TV nesse monitor por 20min. Após, você retornará para o primeiro computador onde irá desempenhar uma tarefa de atenção e responder a uma escala, também por 20min. No final, solicitaremos algumas informações pessoais e você estará dispensado. Todas as informações estão detalhadas no monitor, mas eu estarei aqui para acompanhá-lo”.
10. “Antes de iniciarmos, preciso que você leia (e se estiver de acordo) assine esse termo de consentimento, por favor”.
11. Registrar o horário: ____ h ____ min
12. Acomodar o participante no E-Run para que ele responda à escala e informar que ele siga as instruções que estão no monitor
13. Acomodar o participante na estação em que ele assistirá ao vídeo. Teclar “Play” para iniciar
14. Acomodar o participante no E-Run para que ele execute a tarefa de atenção, seguida de uma escala, e informar que irá durar 20min. Teclar “Enter” para iniciar
15. Assim que o participante concluir, conferir os dados e abrir a planilha para cálculo do IMC
16. Pesar e medir a altura do participante:
Peso: _____ e Altura: _____
17. Agradecer a participação, entregando a cópia do TCLE e a declaração de participação
18. Registrar o horário de término: ____ h ____ min
19. Transferir o E-Data para a pasta de dados no computador
20. Fazer “backups” nos “pendrives” 1 e 2

APPENDIX G

MEDIA EXPOSURE QUESTIONNAIRE FOR STUDY 4

Adolescent Participant ID Number _____

Date: ___/___/_____

Media Exposure Questionnaire

Please answer these questions to the best of your memory.

Sports TV Programs

1. How often in the past **month** have you watched **professional football** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

2. How often in the past **month** have you watched **professional basketball** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

3. How often in the past **month** have you watched **college football** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

4. How often in the past **month** have you watched **college basketball** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

5. How often in the past **month** have you watched **NASCAR races** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

6. How many days a **week** do you watch **ESPN**, **ESPN2**, and **FOX Sports Net** on TV?

0	1	2	3	4	5	6	7
Zero	One day a week	Two days a week	Three days a week	Four days a week	Five days a week	Six days a week	Seven days a week

7. How often in the past **month** have you watched **Sports Center** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

Other TV Programs

8. How often in the past **month** have you watched **Pawn Stars** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

9. How often in the past **month** have you watched **Daily Show** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

10. How often in the past **month** have you watched **Bar Rescue** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

11. How often in the past **month** have you watched **Sons of Anarchy** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

12. How often in the past **month** have you watched **American Pickers** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

13. How often in the past **month** have you watched **Fast N Loud** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

14. How often in the past **month** have you watched **Hardcore Pawn** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

15. How often in the past **month** have you watched **E! News** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

16. How often in the past **month** have you watched **Ghost Adventures** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

17. How often in the past **month** have you watched **White Collars Brawlers** on TV?

1	2	3	4	5
Never or almost never	A few times a month	A few times a week	Once a day	More than once a day

Magazines

18. How often in the past **year** have you looked at **ESPN Magazine**?

1	2	3	4	5
Never or almost never	A few times yearly	A few times monthly	A few times weekly	Almost daily

19. How often in the past **year** have you looked at **OK!?**

1	2	3	4	5
Never or almost never	A few times yearly	A few times monthly	A few times weekly	Almost daily

20. How often in the past **year** have you looked at **Rolling Stone**?

1	2	3	4	5
Never or almost never	A few times yearly	A few times monthly	A few times weekly	Almost daily

21. How often in the past **year** have you looked at **Maxim**?

1	2	3	4	5
Never or almost never	A few times yearly	A few times monthly	A few times weekly	Almost daily

22. How often in the past **year** have you looked at **Wired**?

1	2	3	4	5
Never or almost never	A few times yearly	A few times monthly	A few times weekly	Almost daily

Attitudes and Perceptions Toward Alcohol Ads

23. How often do you enjoy seeing alcohol ads?

1	2	3	4
Never	Seldom	Sometimes	Usually

24. How often do alcohol ads show you which drinks are most popular these days?

1	2	3	4
Never	Seldom	Sometimes	Usually

25. How often do you think alcohol ads help adults to find out about new brands of liquor?

1	2	3	4
Never	Seldom	Sometimes	Usually

26. How often do you think alcohol ads help adults to find out which brands impress other people?

1	2	3	4
Never	Seldom	Sometimes	Usually

27. How often do you think alcohol ads tell adults which brands of alcohol taste best?

1	2	3	4
Never	Seldom	Sometimes	Usually

THANK YOU!

APPENDIX H

DRUG USE SCREENING INVENTORY (DUSI) FOR STUDY 4



Youth Past Month Time Frame

Name: _____

Ordinarily, how many times have you used each of the drugs listed below in the <u>past month</u> ?	
1. *	Alcohol <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
2. *	Amphetamines/stimulants/"uppers" <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
3. *	Cocaine/crack <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
4. *	Prescription diet pills <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
5. *	Over the counter medications <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
6. *	Heroin/morphine/opiates <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
7. *	Methadone <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
8. *	Prescription pain killer pills <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
9. *	Barbiturate <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
10. *	Quaaludes <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
11. *	Tranquilizer Pills <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
12. *	LSD/Hallucinogens <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
13. *	Ecstasy <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
14. *	PCP <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
15. *	Marijuana <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
16. *	Glue <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
17. *	Gasoline or other fumes <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
18. *	Smoking Tobacco <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
19. *	Chewing Tobacco <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
20. *	Anabolic Steroids <input type="radio"/> 0 times <input type="radio"/> 1-2 times <input type="radio"/> 3-9 times <input type="radio"/> 10-20 times <input type="radio"/> more than 20 times
21. *	Which drug caused you the most problems? (circle one) None, Cocaine/crack, Gasoline or other fumes, Heroin/morphine/opiates, Methadone, Over the counter diet pills, Prescription diet pills, Prescription pain killer pills, Smoking Tobacco, Anabolic Steroids, Barbiturate, Ecstasy, Glue, LSD/Hallucinogens, Marijuana, PCP, Quaaludes, Tranquilizer Pills, Alcohol, Amphetamines/stimulants/uppers, Chewing Tobacco
22. *	Which drug do you prefer the most? (circle one) None, Cocaine/crack, Gasoline or other fumes, Heroin/morphine/opiates, Methadone, Over the counter diet pills, Prescription diet pills, Prescription pain killer pills, Smoking Tobacco, Anabolic Steroids, Barbiturate, Ecstasy, Glue, LSD/Hallucinogens, Marijuana, PCP, Quaaludes, Tranquilizer Pills, Alcohol, Amphetamines/stimulants/uppers, Chewing Tobacco

Answer ALL of the following questions. Even if a question does not apply exactly, answer according to whether it is MOSTLY YES (TRUE) or MOSTLY NO (FALSE). Answer the questions as they apply to you within the past month and leading up to the present time. If a question does not apply to you, answer NO.

23. *	Have you had a craving or very strong desire for alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
24. *	Have you had to use more and more drugs or alcohol to get the effect you want?	<input type="radio"/>	Yes	<input type="radio"/>	No
25. *	Have you felt that you could not control your alcohol or drug use?	<input type="radio"/>	Yes	<input type="radio"/>	No
26. *	Have you felt that you were "hooked" on alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
27. *	Have you missed out on activities because you spend too much money on drugs or alcohol?	<input type="radio"/>	Yes	<input type="radio"/>	No
28. *	Did you break rules, miss curfew, or break the law because you were high on alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
29. *	Did you change rapidly from very happy to very sad or from very sad to very happy because of drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
30. *	Did you have a car accident after using alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
31. *	Have you accidentally hurt yourself or someone else after using alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
32. *	Have you had a serious argument or fight with a friend or a family member because of your drinking or drug use?	<input type="radio"/>	Yes	<input type="radio"/>	No
33. *	Have you had trouble getting along with any of your friends because of alcohol or drug use?	<input type="radio"/>	Yes	<input type="radio"/>	No
34. *	Have you experienced any withdrawal symptoms following use of alcohol or drugs (e.g., headaches, nausea, vomiting, shaking)?	<input type="radio"/>	Yes	<input type="radio"/>	No
35. *	Have you had a problem remembering what you had done while you were under the effects of drugs or alcohol?	<input type="radio"/>	Yes	<input type="radio"/>	No
36. *	Did you drink large quantities of alcohol when you went to parties?	<input type="radio"/>	Yes	<input type="radio"/>	No
37. *	Did you have trouble resisting using alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
38. *	Have you ever told a lie in your lifetime?	<input type="radio"/>	Yes	<input type="radio"/>	No
39. *	Did you argue a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
40. *	Did you brag a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
41. *	Did you tease or do harmful things to animals?	<input type="radio"/>	Yes	<input type="radio"/>	No
42. *	Did you yell a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
43. *	Have you been stubborn?	<input type="radio"/>	Yes	<input type="radio"/>	No
44. *	Were you suspicious of other people?	<input type="radio"/>	Yes	<input type="radio"/>	No
45. *	Did you swear or use dirty language a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
46. *	Did you tease others a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
47. *	Did you have a bad temper?	<input type="radio"/>	Yes	<input type="radio"/>	No
48. *	Have you been very shy?	<input type="radio"/>	Yes	<input type="radio"/>	No



Youth Past Month Time Frame

Name: _____

49. * Did you threaten to hurt people?	<input type="radio"/> Yes	<input type="radio"/> No
50. * Did you talk louder than most other people?	<input type="radio"/> Yes	<input type="radio"/> No
51. * Were you easily upset?	<input type="radio"/> Yes	<input type="radio"/> No
52. * Did you do things a lot without first thinking about the consequences?	<input type="radio"/> Yes	<input type="radio"/> No
53. * Did you do risky or dangerous things a lot?	<input type="radio"/> Yes	<input type="radio"/> No
54. * Did you take advantage of people?	<input type="radio"/> Yes	<input type="radio"/> No
55. * Did you generally feel angry?	<input type="radio"/> Yes	<input type="radio"/> No
56. * Did you spend most of your free time by yourself?	<input type="radio"/> Yes	<input type="radio"/> No
57. * Were you a loner?	<input type="radio"/> Yes	<input type="radio"/> No
58. * Were you very sensitive to criticism?	<input type="radio"/> Yes	<input type="radio"/> No
59. * In your lifetime, are your table manners better in a restaurant than at home?	<input type="radio"/> Yes	<input type="radio"/> No
60. * Have you had a physical exam or been under a doctor's care?	<input type="radio"/> Yes	<input type="radio"/> No
61. * Have you had any accidents or injuries that still bother you?	<input type="radio"/> Yes	<input type="radio"/> No
62. * Did you either sleep too much or too little?	<input type="radio"/> Yes	<input type="radio"/> No
63. * Have you either lost or gained more than 10 pounds?	<input type="radio"/> Yes	<input type="radio"/> No
64. * Did you have less energy than you think you should have?	<input type="radio"/> Yes	<input type="radio"/> No
65. * Did you have trouble with your breathing or with coughing?	<input type="radio"/> Yes	<input type="radio"/> No
66. * Did you have any concerns about sex or trouble with your sex organs?	<input type="radio"/> Yes	<input type="radio"/> No
67. * Have you had sex with someone who shot up drugs?	<input type="radio"/> Yes	<input type="radio"/> No
68. * Have you had trouble with abdominal pain or nausea?	<input type="radio"/> Yes	<input type="radio"/> No
69. * Have your eye whites ever turned yellow?	<input type="radio"/> Yes	<input type="radio"/> No
70. * In your lifetime, did you ever feel that you wanted to swear?	<input type="radio"/> Yes	<input type="radio"/> No
71. * Have you intentionally damaged someone else's property?	<input type="radio"/> Yes	<input type="radio"/> No
72. * Have you stolen things?	<input type="radio"/> Yes	<input type="radio"/> No
73. * Have you gotten into physical fights?	<input type="radio"/> Yes	<input type="radio"/> No
74. * Have you been a fidgety person?	<input type="radio"/> Yes	<input type="radio"/> No
75. * Have you been restless and unable to sit still?	<input type="radio"/> Yes	<input type="radio"/> No
76. * Did you get frustrated easily?	<input type="radio"/> Yes	<input type="radio"/> No



77. *	Did you have trouble concentrating?	<input type="radio"/>	Yes	<input type="radio"/>	No
78. *	Did you feel sad a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
79. *	Did you bite your fingernails?	<input type="radio"/>	Yes	<input type="radio"/>	No
80. *	Did you have trouble sleeping?	<input type="radio"/>	Yes	<input type="radio"/>	No
81. *	Have you been nervous?	<input type="radio"/>	Yes	<input type="radio"/>	No
82. *	Did you get easily frightened?	<input type="radio"/>	Yes	<input type="radio"/>	No
83. *	Did you worry a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
84. *	Did you have trouble getting your mind off things?	<input type="radio"/>	Yes	<input type="radio"/>	No
85. *	Did people stare at you?	<input type="radio"/>	Yes	<input type="radio"/>	No
86. *	Did you hear things that no one else around you heard?	<input type="radio"/>	Yes	<input type="radio"/>	No
87. *	Did you have special powers nobody else has?	<input type="radio"/>	Yes	<input type="radio"/>	No
88. *	Were you afraid to be around people?	<input type="radio"/>	Yes	<input type="radio"/>	No
89. *	Did you often feel like you wanted to cry?	<input type="radio"/>	Yes	<input type="radio"/>	No
90. *	Did you have so much energy that you did not know what to do with yourself?	<input type="radio"/>	Yes	<input type="radio"/>	No
91. *	Have you ever felt tempted to steal something in your lifetime?	<input type="radio"/>	Yes	<input type="radio"/>	No
92. *	Were you disliked by others?	<input type="radio"/>	Yes	<input type="radio"/>	No
93. *	Were you usually unhappy with how well you did in activities with your friends?	<input type="radio"/>	Yes	<input type="radio"/>	No
94. *	Was it difficult to make friends in a new group?	<input type="radio"/>	Yes	<input type="radio"/>	No
95. *	Did people take advantage of you?	<input type="radio"/>	Yes	<input type="radio"/>	No
96. *	Were you afraid to stand up for your rights?	<input type="radio"/>	Yes	<input type="radio"/>	No
97. *	Was it hard for you to ask for help from others?	<input type="radio"/>	Yes	<input type="radio"/>	No
98. *	Were you easily influenced by other people?	<input type="radio"/>	Yes	<input type="radio"/>	No
99. *	Did you prefer doing things with people much older or younger than you?	<input type="radio"/>	Yes	<input type="radio"/>	No
100. *	Did you worry about how your actions would affect others?	<input type="radio"/>	Yes	<input type="radio"/>	No
101. *	Did you have difficulty standing up for your opinions?	<input type="radio"/>	Yes	<input type="radio"/>	No
102. *	Did you have trouble saying "no" to people?	<input type="radio"/>	Yes	<input type="radio"/>	No
103. *	Did you feel uncomfortable if someone gave you a compliment?	<input type="radio"/>	Yes	<input type="radio"/>	No
104. *	Did people see you as being unfriendly?	<input type="radio"/>	Yes	<input type="radio"/>	No



Youth Past Month Time Frame

Name: _____

105. * Did you avoid eye contact when talking to people?	<input type="radio"/> Yes <input type="radio"/> No
106. * Has your mood ever changed in your lifetime?	<input type="radio"/> Yes <input type="radio"/> No
107. * Has a member of your family (mother, father, brother, or sister) ever used drugs to get high like marijuana, cocaine, or heroin?	<input type="radio"/> Yes <input type="radio"/> No
108. * Has a member of your family used alcohol to the point of causing problems at home, work, or with friends?	<input type="radio"/> Yes <input type="radio"/> No
109. * Has a member of your family ever been arrested?	<input type="radio"/> Yes <input type="radio"/> No
110. * Did you have frequent arguments with your children, parents or spouse which involved yelling and screaming?	<input type="radio"/> Yes <input type="radio"/> No
111. * Did your family hardly do things together?	<input type="radio"/> Yes <input type="radio"/> No
112. * Were your parents or spouse unaware of your likes and dislikes?	<input type="radio"/> Yes <input type="radio"/> No
113. * Were there no clear rules about what you can and cannot do?	<input type="radio"/> Yes <input type="radio"/> No
114. * Were your parents or spouse unaware of what you really think or feel about things that are important to you?	<input type="radio"/> Yes <input type="radio"/> No
115. * Did you argue with your parents or your spouse or other family members a lot?	<input type="radio"/> Yes <input type="radio"/> No
116. * Were your parents or your spouse often unaware of where you were and what you were doing?	<input type="radio"/> Yes <input type="radio"/> No
117. * Were your parents or your spouse away from home most of the time?	<input type="radio"/> Yes <input type="radio"/> No
118. * Did you feel that either your parents or your spouse don't care about you?	<input type="radio"/> Yes <input type="radio"/> No
119. * Were you unhappy about your living arrangements?	<input type="radio"/> Yes <input type="radio"/> No
120. * Did you feel in danger at home?	<input type="radio"/> Yes <input type="radio"/> No
121. * In your lifetime, did you ever get angry?	<input type="radio"/> Yes <input type="radio"/> No
122. * Did you dislike school?	<input type="radio"/> Yes <input type="radio"/> No
123. * Did you have trouble concentrating in school or when studying?	<input type="radio"/> Yes <input type="radio"/> No
124. * Were your grades below average?	<input type="radio"/> Yes <input type="radio"/> No
125. * Did you cut/skip school more than two days a month?	<input type="radio"/> Yes <input type="radio"/> No
126. * Were you absent from school a lot?	<input type="radio"/> Yes <input type="radio"/> No
127. * Have you thought seriously about quitting school?	<input type="radio"/> Yes <input type="radio"/> No
128. * Did you often not do your school assignments?	<input type="radio"/> Yes <input type="radio"/> No
129. * Did you often feel sleepy in class?	<input type="radio"/> Yes <input type="radio"/> No
130. * Were you often late for class?	<input type="radio"/> Yes <input type="radio"/> No
131. * Did you have different friends at school this year than you did last year?	<input type="radio"/> Yes <input type="radio"/> No



132. * Did you feel irritable and upset when in school?	<input type="radio"/>	Yes	<input type="radio"/>	No
133. * Were you bored in school?	<input type="radio"/>	Yes	<input type="radio"/>	No
134. * Were your grades in school worse than they used to be?	<input type="radio"/>	Yes	<input type="radio"/>	No
135. * Did you feel in danger at school?	<input type="radio"/>	Yes	<input type="radio"/>	No
136. * Have you failed a grade in school?	<input type="radio"/>	Yes	<input type="radio"/>	No
137. * Did you feel unwelcome in school clubs or extracurricular activities?	<input type="radio"/>	Yes	<input type="radio"/>	No
138. * Have you missed or been late to school because of alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
139. * Have you been in trouble at school because of alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
140. * Have alcohol or drugs interfered with your homework or school assignments?	<input type="radio"/>	Yes	<input type="radio"/>	No
141. * Have you been suspended?	<input type="radio"/>	Yes	<input type="radio"/>	No
142. * In your lifetime, did you ever put things off that you needed to do?	<input type="radio"/>	Yes	<input type="radio"/>	No
143. * Have you had a paying job that you were fired from?	<input type="radio"/>	Yes	<input type="radio"/>	No
144. * Have you stopped working at a job because you just didn't care?	<input type="radio"/>	Yes	<input type="radio"/>	No
145. * Did you need help from others to go about finding a job?	<input type="radio"/>	Yes	<input type="radio"/>	No
146. * Have you been frequently absent or late for work?	<input type="radio"/>	Yes	<input type="radio"/>	No
147. * Did you find it difficult to complete work tasks?	<input type="radio"/>	Yes	<input type="radio"/>	No
148. * Have you made money doing something that was against the law?	<input type="radio"/>	Yes	<input type="radio"/>	No
149. * Have you used alcohol or drugs while working on a job?	<input type="radio"/>	Yes	<input type="radio"/>	No
150. * Have you been fired from a job because of drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
151. * Did you have trouble getting along with bosses?	<input type="radio"/>	Yes	<input type="radio"/>	No
152. * Did you mostly work so that you can get money to buy drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
153. * In your lifetime, are you more happy if you win than lose a game?	<input type="radio"/>	Yes	<input type="radio"/>	No
154. * Did any of your friends regularly use alcohol or drugs?	<input type="radio"/>	Yes	<input type="radio"/>	No
155. * Did any of your friends sell or give drugs away?	<input type="radio"/>	Yes	<input type="radio"/>	No
156. * Did any of your friends lie a lot?	<input type="radio"/>	Yes	<input type="radio"/>	No
157. * Did your parents or spouse dislike your friends?	<input type="radio"/>	Yes	<input type="radio"/>	No
158. * Have any of your friends been in trouble with the law?	<input type="radio"/>	Yes	<input type="radio"/>	No
159. * Were most of your friends older than you?	<input type="radio"/>	Yes	<input type="radio"/>	No



Youth Past Month Time Frame

Name: _____

160. * Did your friends cut school or work a lot?	<input type="radio"/> Yes <input type="radio"/> No
161. * Did your friends get bored at parties when there was no alcohol served?	<input type="radio"/> Yes <input type="radio"/> No
162. * Have your friends brought drugs to parties?	<input type="radio"/> Yes <input type="radio"/> No
163. * Have your friends stolen anything from a store or damaged property on purpose?	<input type="radio"/> Yes <input type="radio"/> No
164. * Did you belong to a gang?	<input type="radio"/> Yes <input type="radio"/> No
165. * Were you bothered by problems you were having with a friend?	<input type="radio"/> Yes <input type="radio"/> No
166. * Was there no friend to confide in?	<input type="radio"/> Yes <input type="radio"/> No
167. * Compared to most people, did you have few friends?	<input type="radio"/> Yes <input type="radio"/> No
168. * Have you ever in your lifetime been talked into doing something you didn't want to do?	<input type="radio"/> Yes <input type="radio"/> No
169. * Compared to most people, did you do less sports?	<input type="radio"/> Yes <input type="radio"/> No
170. * Did you usually stay out late on nights when you had to go to school or work the next morning?	<input type="radio"/> Yes <input type="radio"/> No
171. * On a typical day, do you watch more than two hours of TV?	<input type="radio"/> Yes <input type="radio"/> No
172. * Did you go to bars with your friends on a regular basis - at least twice a week, or were the parents absent at most of the parties you went to?	<input type="radio"/> Yes <input type="radio"/> No
173. * Did you exercise less than most people you know?	<input type="radio"/> Yes <input type="radio"/> No
174. * Was your free time spent just hanging out with friends?	<input type="radio"/> Yes <input type="radio"/> No
175. * Were you bored most of the time?	<input type="radio"/> Yes <input type="radio"/> No
176. * Did you do most of your recreation or leisure activities alone?	<input type="radio"/> Yes <input type="radio"/> No
177. * Did you use alcohol or drugs for recreational reasons?	<input type="radio"/> Yes <input type="radio"/> No
178. * Compared to most people, were you less involved in hobbies or outside interests?	<input type="radio"/> Yes <input type="radio"/> No
179. * Were you dissatisfied with how you spend your free time?	<input type="radio"/> Yes <input type="radio"/> No
180. * Did you get tired very quickly when you exerted yourself?	<input type="radio"/> Yes <input type="radio"/> No
181. * Have you ever bought anything in your lifetime that you did not need?	<input type="radio"/> Yes <input type="radio"/> No

OFFICE USE ONLY

Date of Completion _____

NOTES:

APPENDIX I

MODIFIED ALCOHOL USE DISORDERS IDENTIFICATION TEST (M-AUDIT)

FOR STUDY 4

1) Enter the Case ID. Include the T (teen) or P (parent) in the ID (e.g., A10040T for the teen or A10040P for the parent):*

*2) Enter the Visit number (e.g., e.g., Visit3 corresponds to the 1st visit of Wave2):**

- Visit1
- Visit2
- Visit3
- Visit4
- Visit5
- Visit6

3) Enter today's date:*

*4) Are you testing the parent or the child?**

- Parent
 - Child
-

Administrative

5) Enter the Case ID. Include the T (teen) or P (parent) in the ID (e.g., A10040T for the teen or A10040P for the parent):*

*6) Enter the Visit number (e.g., Visit3 corresponds to the 1st visit of Wave2):**

- Visit1
- Visit2
- Visit3
- Visit4
- Visit5
- Visit6

7) Enter today's date:*

8) *Are you testing the parent or the child?**

- Parent
 - Child
-

Alcohol

9) *Please refer to the alcohol equivalency Show Card, which defines what is meant by 1 drink of alcohol.*

*How often do you have a drink containing alcohol?**

- Never
 - Monthly or less
 - 2 to 4 times a month
 - 2 to 3 times a week
 - 4 or more times a week
-

Alcohol (continued part 1)

10) *Still looking at the alcohol equivalency show card, how many drinks containing alcohol do you have on a typical day when you are drinking?**

- 1 or 2
- 3 or 4
- 5 or 6
- 7 or 8
- 10 or more

11) *Again referring to the alcohol equivalency show card, how often do you have six or more drinks on one occasion?**

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

12) *How often during the last year have you found that you were not able to stop drinking once you had started?**

- Never
- Less than monthly
- Monthly
- Weekly

Daily or almost daily

Alcohol (continued part 2)

*13) How often during the last year have you failed to do what was normally expected from you because of drinking?**

- Never
 Less than monthly
 Monthly
 Weekly
 Daily or almost daily

*14) How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?**

- Never
 Less than monthly
 Monthly
 Weekly
 Daily or almost daily

*15) How often during the last year have you had a feeling of guilt or remorse after drinking?**

- Never
 Less than monthly
 Monthly
 Weekly
 Daily or almost daily

Alcohol (continued part 3)

*16) How often during the last year have you been unable to remember what happened the night before because you had been drinking?**

- Never
 Less than monthly
 Monthly
 Weekly
 Daily or almost daily

*17) Have you or someone else been injured as a result of your drinking?**

- No
 Yes, but not in the last year
 Yes, during the last year

*18) Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you stop?**

- No
- Yes, but not in the last year
- Yes, during the last year

Alcohol (continued part 4)

*19) Has either of child's biological parents been diagnosed with alcoholism?**

- Yes
- No
- Don't know
- Don't want to answer

*20) Has either of child's biological parents had trouble with alcoholism or alcohol abuse even if it was not diagnosed?**

- Yes
- No
- Don't know
- Don't want to answer

Drugs

*21) How often do you use drugs?**

- Never
- Monthly or less
- 2 to 4 times a month
- 2 to 3 times a week
- 4 or more times a week

Drugs (continued part 1)

22) How much of these drugs do you take on a typical day when you use drugs?

*Use whatever unit would most commonly apply to the drugs you use. For example, a joint for marijuana or a line for cocaine.**

- 1 or 2
- 3 or 4
- 5 or 6
- 7 to 9
- 10 or more

*23) How often have you felt like you didn't have control over your actions as a result of taking drugs?**

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

*24) How often during the last year have you found that you were not able to stop taking drugs once you had started?**

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

Drug (continued part 2)

*25) How often during the last year have you failed to do what was normally expected from you because of your drug use?**

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

*26) How often during the last year have you needed take drugs in the morning to get yourself going after a night drug usage?**

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

*27) How often during the last year have you had a feeling of guilt or remorse after using drugs?**

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

Drugs (continued part 3)

*28) How often during the last year have you been unable to remember what happened the night before because you had been using drugs?**

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

*29) Have you or someone else been injured as a result of your drug usage?**

- No
- Yes, but not in the last year
- Yes, during the last year

*30) Has a relative or friend or a doctor or another health worker been concerned about your drug usage or suggested you stop?**

- No
 - Yes, but not in the last year
 - Yes, during the last year
-

Drugs (continued part 4)

*31) Has either of child's biological parents been diagnosed with a drug abuse problem?**

Yes

No

Don't know

Don't want to answer

*32) Has either of child's biological parents had trouble with drug abuse even if it was not diagnosed?**

Yes

No

Don't know

Don't want to answer

End of Survey!

Administrative - Completed Survey

APPENDIX J

ETHICS COMMITTEE SUBMISSION AND APPROVAL

INSTITUTO DE PSICOLOGIA -
UFRGS



COMPROVANTE DE ENVIO DO PROJETO

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Atenção automática para alimentos após a exposição à propaganda comercial de alimentos não saudáveis na TV

Pesquisador: Lisiane Bizarro Araujo

Versão: 1

CAAE: 25716714.6.0000.5334

Instituição Proponente: Instituto de Psicologia - UFRGS

DADOS DO COMPROVANTE

Número do Comprovante: 001646/2014

Patrocinador Principal: MINISTERIO DA EDUCACAO

The screenshot displays the 'DETALHAR PROJETO DE PESQUISA' page in the Plataforma Brasil system. It includes the following sections:

- DADOS DA VERSÃO DO PROJETO DE PESQUISA:** Title, Principal Investigator (Lisiane Bizarro Araujo), Area (Psicologia), Version (1), CAAE (25716714.6.0000.5334), Submission Date (12/15/2014), Proposing Institution (Instituto de Psicologia - UFRGS), Project Location (Instituto de Psicologia - UFRGS), and Main Sponsor (Ministério da Educação).
- DOCUMENTOS DO PROJETO DE PESQUISA:** A tree view of documents including 'Versão Atual Aprobada (PC) - Versão 1', 'Projeto Original (PC) - Versão 1', 'Formulário de Assentamento', 'Documentos do Projeto', 'Forma de Risco - Submissão 1', 'Informações Básicas do Projeto', 'Dados - Submissão 1', 'Projeto Detalhado - Plataforma Brasil', 'TSEI - Termos de Assentamento', 'Aprovação 1 - Instituto de Psicologia', and 'Projeto Completo'.
- LISTA DE APROVAÇÕES DO PROJETO:** A table with columns for 'Aprovação', 'Pesquisador Responsável', 'Versão', 'Submissão', 'Validações', 'Situação', 'Exclusão do Cadastro Coord.', and 'Ações'. It shows one approval for 'PC' by 'Lisiane Bizarro Araujo' on '14/03/2014' with status 'Aprovada'.
- HISTÓRICO DE TRÂMITES:** A table with columns for 'Aprovação', 'Data/Fora', 'Tipo Trâmite', 'Versão', 'Perfil', 'Origem', 'Destino', and 'Informações'. It shows a submission on '14/03/2014' at '14:18:32' by 'Painel Operário' to 'Instituto de Psicologia - UFRGS'.

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Atenção automática para alimentos após a exposição à propaganda comercial de alimentos não saudáveis na TV

Pesquisador: Lisiane Bizarro Araujo

Área Temática:

Versão: 1

CAAE: 25716714.6.0000.5334

Instituição Proponente: Instituto de Psicologia - UFRGS

Patrocinador Principal: MINISTERIO DA EDUCACAO

DADOS DO PARECER

Número do Parecer: 557.198

Data da Relatoria: 10/03/2014

Apresentação do Projeto:

O projeto se refere a exposição ao conteúdo das propagandas comerciais de TV, que pode servir de gatilho para o consumo automático de substâncias relacionadas ao produto divulgado, isso é evidenciado em estudos envolvendo crianças e jovens adultos. Entretanto, a maneira como a propaganda afeta a preferência de alimentos ainda é pouco conhecida. Este estudo será caracterizado por um delineamento experimental, com medidas independentes, visto que 54 participantes de ambos os sexos, com idade entre 18 e 25 anos e IMC (Índice de Massa Corporal) normais, serão aleatoriamente alocados em uma entre três condições de programação de TV, de 20 min. cada, intercaladas por intervalos comerciais de alimentos, não alimentos ou sem comercial. Como resultado, espera-se que participantes expostos a uma grande densidade de propaganda comercial de alimentos não saudáveis, na TV, apresentem viés da atenção para pistas associadas a esses alimentos, se comparados a participantes expostos a uma grande densidade de propaganda comercial de serviços (não relacionados a alimentos). Os participantes serão estudantes de graduação recrutados na UFRGS.

Objetivo da Pesquisa:

O objetivo primário é verificar se a exposição à propaganda comercial de alimentos na TV aumenta o viés da atenção para alimentos não saudáveis em uma tarefa computadorizada de tempo de

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Continuação do Parecer: 557.198

reação.

Avaliação dos Riscos e Benefícios:

Os riscos são mínimos tendo em vista a origem da programação de TV(considerada livre para divulgação, conforme a legislação brasileira), destacando-se o tempo de permanência no laboratório como principal prejuízo.

Benefícios é a oportunidade de conhecer um laboratório de pesquisa, além de contribuir para ampliar o conhecimento acerca dos efeitos de assistir Televisão sobre a cognição e o comportamento.

Comentários e Considerações sobre a Pesquisa:

O estudo quer em principio, investigar a atenção automática para alimentos após a exposição à propaganda comercial de alimentos não saudáveis na TV. Também quer verificar se a exposição à propaganda de alimentos na TV aumenta o viés de atenção para alimentos não saudáveis em uma tarefa de tempo de reação.

Por isso será realizado um estudo prévio de análise de conteúdo de comerciais de TV, para a obtenção de um conjunto de propagandas ecologicamente válido.

Considerações sobre os Termos de apresentação obrigatória:

O TCLE para os participantes esta claro e completo, presente no Anexo D.

Os instrumentos que serão utilizados estão anexados: Instruções para realização do experimento, anexo A; Escala de fome,(com 4 questões), no anexo B; Escala de afetos positivos e negativos (com 60 questões) no anexo C.

Cronograma e Orçamento(terá apoio do Ministério da Educação)estão presentes.

Também estão anexados ao projeto a Folha de Rosto e a carta de Aprovação da Banca.

Recomendações:

Não há recomendações.

Conclusões ou Pendências e Lista de Inadequações:

O tema da pesquisa é interessante e vai ao encontro da preocupação atual com relação ao tipo e qualidade da divulgação dos alimentos em geral. Muitas vezes ingeridos em demasia somente pelo efeito de marketing, o que está preocupando a sociedade em geral.

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

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Continuação do Parecer: 557.198

Considerações Finais a critério do CEP:
Projeto aprovado pelo CEP.

PORTO ALEGRE, 14 de Março de 2014

Assinador por:
Milena da Rosa Silva
(Coordenador)

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