

Is decision-making ability related to food choice and facets of eating behaviour in adolescents?



Rosemarie Macchi, PhD. ^{*}, Laura MacKew, B.Sc., Caroline Davis, PhD.

Department of Kinesiology and Health Science, York University, Toronto, ON, Canada

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ABSTRACT

Purpose: To test the prediction that poor decision-making would predict poor eating-related behaviours, which in turn would relate to elevated body mass index (BMI) percentile.

Methods: Associations among decision-making ability, eating behaviours, and BMI percentile were examined in a sample of 311 healthy male and female adolescents, aged 14–18 years. Structural equation modelling was used to test the proposed relationships.

Results: The predicted model was a good fit to the data and all paths between latent and indicator variables were significant. Impulsive responding significantly predicted poor food choice and overeating. No significant relationships emerged between eating-related variables and BMI percentile.

Conclusions: Findings from this study extend the existing research in adults and offer a more comprehensive understanding of factors that may contribute to eating behaviours and weight status in teenagers.

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1. Introduction

An alarming rise in levels of obesity is affecting millions of children and adolescents and creating a leading health concern in many countries worldwide (Nishtar, Gluckman, & Armstrong, 2016; Ogden, Carroll, Kit, & Flegal, 2014). This situation is cause for concern, as adolescent obesity is a strong predictor of adult obesity (Nishtar et al., 2016) and obese adolescents are at risk for a wide spectrum of adverse health outcomes including the development of multiple chronic diseases throughout life (Kelsey, Zaepfel, Bjornstad, & Nadeau, 2014; McCrindle, 2015).

Although inherited factors (Ehrlich & Friedenberg, 2016) and limited physical activity (Nishtar et al., 2016) play a role in weight gain, health researchers claim that diet composition and food patterns are the main determinants of energy imbalance related to childhood obesity (Birch & Anzman-Frasca, 2011; Hawkes et al., 2015; Rodriguez, Sjoberg, Lissner, & Moreno, 2011). Numerous environmental factors such as price, convenience, and availability contribute to unhealthy food options (Garza, Ding, Owensby, & Zizza, 2016), however, only relatively recently has the field of

decision science addressed the role of executive function in the foods we choose to eat, and their association with obesity (Davis, Levitan, Muglia, Bewell, & Kennedy, 2004). Research has found that individual differences in the ability to suppress impulses and delay immediate gratification are fairly stable throughout life (Eigsti, Zayas, Mischel, Shoda, & Casey, 2006), and that the inability to self-regulate behaviour and control impulses lies at the root of poor decision-making (Damasio, 1994).

Impaired decision-making was first observed in neurological patients with damage to the ventral medial prefrontal cortex [vmPFC] (Bechara, Damasio, Damasio, & Anderson, 1994; Damasio, 1994); individuals frequently make decisions that are socially inappropriate, personally disadvantageous, and mostly guided by immediate outcomes—particularly in personal and social contexts.

Real-life decision-making deficits have also been observed in adults and adolescents who gamble (Cosenza, Griffiths, Nigro, & Ciccarelli, 2016; Ochoa et al., 2013), binge drink (Xiao et al., 2013), use marijuana (Hanson, Thayer, & Tapert, 2014; Wesley, Hanlon, & Porrino, 2011), report alcohol and drug dependence (Ashenhurst, Jentsch, & Ray, 2011; Krmpotich et al., 2015; Ryan, Mackillop, & Carpenter, 2013), substance-related problems (Williams et al., 2010), and behaviour disorders (Dekkers, Popma, Rentergem, Bexkens, & Huizenga, 2016; Schutter, van Bokhoven, Vanderschuren, Lochman, & Matthys, 2011), as well as in those who self-harm (Oldershaw et al., 2009), attempt suicide (Ackerman

^{*} Corresponding author. School of Kinesiology, Lakehead University, SB 1021 Sanders Fieldhouse, 955 Oliver Road, Thunder Bay, ON P7B 5E1, Canada.

E-mail address: rmacchi@lakeheadu.ca (R. Macchi).

et al., 2015), and report high levels of risk (Rao et al., 2011) and stress (Buckert, Schwioren, Kudielka, & Fiebach, 2014).

Davis et al. (2004) were the first to extend decision-making research to the field of eating behaviours and found significant decision-making impairments in obese adult women who overeat under stress, and in those with binge eating disorder (BED; Davis, Patte, Curtis, & Reid, 2010). Other researchers have subsequently found similar impairments in obese men and women (Brogan, Hevey, & Pignatti, 2010; Horstmann et al., 2011; Pignatti et al., 2006) and in those with impulsive/disinhibited eating (Yeomans & Brace, 2015), regular binge eating (Muller et al., 2014), bulimia nervosa (BN; Brogan et al., 2010; Chan et al., 2013; Garrido & Subira, 2013), and anorexia nervosa (AN; Adoue et al., 2015; Bodell et al., 2014); all share an inability to properly regulate eating behaviour.

While the evidence suggests a clear link between decision-making deficits and disordered eating in adults, only one study in the field of decision-making has been undertaken with eating behaviour in adolescents, where researchers found that poorer decision-making was associated with higher sugar-sweetened beverage consumption in boys (Ames et al., 2014). Two previous studies evaluated decision-making competence in relation to weight status only, and found that overweight and obese children and adolescents demonstrated greater decision-making impairment than their healthy weight counterparts, suggesting an inability to inhibit increasingly disadvantageous choices (Verbeken, Braet, Bosmans, & Goossens, 2013; Verdejo-Garcia et al., 2010).

Given the high rates of adolescent obesity, there is a need to understand better why some adolescents consume large quantities of poor-quality food despite the negative health outcomes associated with this behaviour. Repeatedly choosing immediate gratification, when the long-term consequences of these actions are harmful, reflects clear deficits in the ability to self-regulate. The current study is the first to investigate simultaneous associations among decision-making, eating behaviours, and BMI percentile in a sample of male and female high school adolescents, aged 14–18 years. The primary objective of this study was to examine the relationships between decision-making ability, food choice, food choice motives, overeating, and BMI percentile in high school adolescents. In light of previous research on decision-making and eating disorders in adults, and substance and behaviour disorders in adolescents, we propose that 1) decision-making ability will positively predict eating behaviour variables; 2) eating behaviour variables will positively predict BMI percentile. Separate analyses were conducted for males and females and no differences emerged; participants were grouped for one single analysis. Using structural equation modelling (SEM), relationships among these variables will

be tested in the proposed model presented in Fig. 1.

2. Material and methods

2.1. Participants and procedures

Three hundred and eleven English speaking male and female adolescents in grades 9 to 12 were enrolled in the study via classroom recruitment, where adolescent assent and parent/guardian consent forms were distributed to interested volunteers. Eligibility was confirmed following receipt of permission forms and completion of an individual health screening by the researcher. During the initial intake and health screening, students reported medications currently prescribed. Information regarding pubertal stage, and parents' weight were not directly assessed, although, an indirect indicator of parents' weight involved a question regarding student perceptions of mother's and father's weight status (underweight to obese). Students were excluded from the study if they had food allergies, chronic diseases requiring special/restricted diets, or were presently (or in the past) diagnosed with an eating disorder. Consenting students were withdrawn from class for individual data collection sessions. Each participant completed a socio-demographic questionnaire, two computerized decision-making tasks, and an eating behaviour questionnaire package. All assessments and data collection took place in a quiet room in the school during regular school hours.

In order to minimize order effects, the arrangement of questionnaires and computer tasks was randomized. The researcher measured height and weight while students were dressed in lightweight clothing. One student was excluded for not meeting inclusion criteria, resulting in 311 participants; all students received their choice of a complimentary day-pass at a local health facility or a free-admission movie pass. The study received approval from the York University Review Ethics Board.

2.2. Measures

2.2.1. Decision-making ability

The most widely used neuropsychological test of decision-making competence is the *Iowa Gambling Task* (IGT; Bechara et al., 1994), originally developed to measure the impaired decision-making observed in patients with damage to the vmPFC. The IGT measures affective decision-making ability under conditions of ambiguity, assessing the ability to postpone immediate reward and gratification in favour of a longer-term uncertain, but more beneficial outcome (Damasio, 1995).

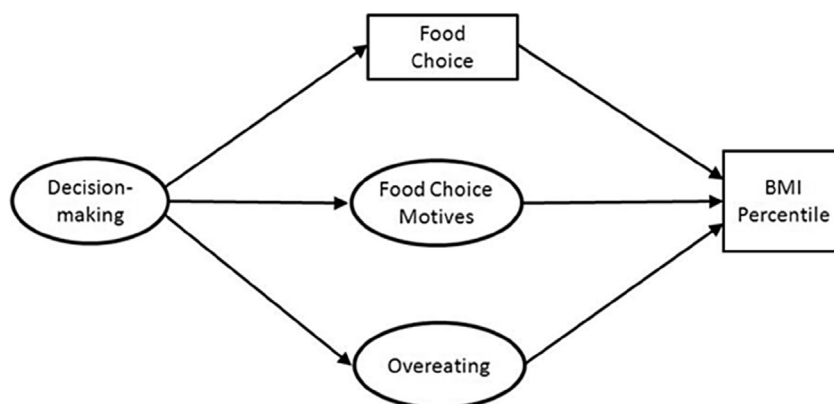


Fig. 1. Theorized model depicting the associations among decision-making, food choice, food choice motives, overeating, and BMI percentile in adolescents. Oval shapes represent latent variables; square shapes represent observed variables.

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