

# Chapter 12

## Smart Phone Video Game Simulation of Parent– Child Interaction: Learning Skills for Effective Vegetable Parenting

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### ABSTRACT

*Higher levels of vegetable intake have been associated with decreased risks of heart disease, diabetes, stroke, several cancers, and possibly obesity, but vegetable intake is generally low. Preference is an important determinant of vegetable intake, and food preferences are initiated early in life, but parents of preschoolers commonly report difficulties in getting their child to eat, or even taste, vegetables. What parents do to get their child to do something in a specific context (such as eating, homework, or chores) has been labeled “parenting practices.” Based on research on parenting practices (effective and ineffective) related to preschoolers’ vegetable consumption (hereinafter called vegetable parenting), a smart phone application (app) game prototype was developed to help parents of preschool children use effective vegetable parenting practices. This chapter presents the extensive formative research, describes the game app, and explains the behavioral science foundation.*

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## INTRODUCTION

Child vegetable consumption has been related to a variety of child and adult health outcomes (Andres, Abraham, Appel, & Lampen, 2011; Bendinelli, et al., 2011; Esposito, Kastorini, Panagiotakos, & Giugliano, 2010; Ledoux, Hingle, & Baranowski, 2011). Parents can have an important influence on young children's dietary intake (Birch & Fisher, 2000), but parents of young children commonly report difficulties in getting their child to eat, or even taste, vegetables (Cullen, Baranowski, Rittenberry, & Olvera, 2000). Since the common behavior change methods involving parents (e.g. newsletters, small group discussions) have had weak or no effects (Hingle, O'Connor, Dave, & Baranowski, 2010), innovative intervention procedures are needed both to obtain changes, and to reach larger numbers of parents who may not wish to attend face-to-face education sessions.

"Serious video games" are an emerging genre which combine behavior change intervention procedures (e.g. goal setting, tailoring, reinforcement in the form of points) with entertainment, to provide an engaging medium which can produce health behavior change (Baranowski, Buday, Thompson, & Baranowski, 2008). Serious video games changed psychosocial constructs related to diet (Peng, 2009); increased fruit and vegetable (FV) intake by one serving/day among 4th grade children (Baranowski, et al., 2003); and motivated 10-12 year old players to significantly improve their diet (Baranowski, et al., 2011). Thus, video games can change diet related behaviors. Video games on smart phones can easily reach large numbers of parents at times convenient to them. Casual video games (i.e. have simple rules and require 10 minutes or less of game play) are particularly appropriate for smart phones.

"Kiddio" is a casual video game played on a smart phone platform to help parents adopt behaviors likely to influence their 3-5 year old (yo) child's short and long term vegetable intake. The mediating-moderating variable model (MMVM)

provides a framework for elucidating the design of an intervention (Baranowski, 2011). Kiddio was designed using a multiple mediation framework (see Figure 1). MMVM assumes strong and causal effects among variables going from left to right. The effects or relationships must be strong and causal at each step, otherwise attempts to change variables earlier in the chains of effects would have no or weak effects on child behaviors and health status (Baranowski, Lin, Wetter, Resnicow, & Hearn, 1997). Moderating variables identify subgroups among those targeted for intervention for whom the relationships depicted in the left to right arrows may vary (Yildirim, et al., 2011).

MMVM logically organizes the design of an intervention. Relationships under A (in Figure 1) indicate that a variety of early child diet and health characteristics influence later childhood and adult diet and health characteristics. For example, children who began eating FV early in life were more likely to eat more FV in later childhood (Coulthard, Harris, & Emmett, 2010), and child dietary intake tracked into the adult years (Craigie, Lake, Kelly, Adamson, & Mathers, 2011; Lake, Mathers, Rugg-Gunn, & Adamson, 2006). Relationships under A also specify that aspects of a young child's dietary intake (e.g. vegetable intake, sodium intake) influence a child's health status/ chronic disease risks. For example, higher vegetable intake has been related to lower risk of diabetes (Esposito, et al., 2010), cardiovascular disease (Bendinelli, et al., 2011), several cancers (Andres, et al., 2011), and possibly obesity/adiposity (Ledoux, et al., 2011) later in life. Overweight or obese children who remained overweight or obese as adults had increased risks of adult type 2 diabetes, hypertension, dyslipidemia, and carotid-artery arteriosclerosis in adulthood (Juonala, et al., 2011). Yet, children are consuming vegetables well below recommended amounts (Baranowski, Smith, et al., 1997), especially preschool children (Fox, Condon, Briefel, Reidy, & Deming, 2010).

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