



# Development of a theory-based internet program promoting maintenance of diet and physical activity change to 8-year-old African American girls

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## Abstract

Obesity and chronic disease risk factors are rising among youth. The Internet offers promise as a channel for delivering behavior change programs in a manner that is both available and accessible. This manuscript describes how theory informed the development of an Internet-based program promoting the maintenance of healthy eating and physical activity (PA) behaviors to 8-year-old African American girls. The web site was designed using a theoretical framework comprised of Social Cognitive Theory (SCT) and the Elaboration Likelihood Model (ELM). Program content was developed to target mediating variables derived from SCT, whereas the delivery channel was designed to enhance central processing, a concept derived from ELM. This manuscript is important because interactive multimedia provides a promising medium for attracting and maintaining youth's attention, thereby enhancing the opportunity for behavior change to occur. Such interventions can incorporate state of the art theory-based procedures, effect behavior change, and provide opportunities to test theoretical constructs and procedures.

Further, it demonstrates that theory-based behavior change programs can be developed and delivered over the Internet with expectations of success.

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## 1. Introduction

Obesity (Ogden et al., 2002; Troiano et al., 1995) and chronic disease risk factors (Dietz, 1998) among youth have been increasing at alarming rates. Novel methods and dissemination channels are needed to deliver behavior change programs to youth. Internet-based multimedia programs offer promise. This manuscript describes how an Internet program promoting maintenance of healthy eating and physical activity (PA) was developed.

## 2. Background

Prevalence of obesity among children and adolescents has increased dramatically (Ogden et al., 2002; Troiano et al., 1995), especially among African American girls (Troiano et al., 1995). Obese youth, particularly those who became obese at the onset of puberty, were more likely to become obese adults (Serdula et al., 1993), with increased risk of chronic disease (Dietz, 1998). Intervening among high-risk youth before puberty may minimize their risk of becoming obese.

Although the precise causes of the rise in obesity among youth have not been pinpointed, diet and PA are likely primary contributing factors. Fruit (Lloyd et al., 1998) and vegetable (Lahti-Koski et al., 2002) intake and percent of energy from carbohydrate (Tucker et al., 1997) were negatively associated with obesity, while dietary fat (Miller et al., 1994; Tucker et al., 1997), added sugar (Miller et al., 1994), and soft drink (Ludwig et al., 2001) consumption were positively associated. PA, the major source of variability in energy expenditure (Goran & Treuth, 2001), was negatively correlated with obesity (Berkowitz et al., 1985), while physically inactive behaviors, such as television viewing (Gortmaker et al., 1990; Kronenberg et al., 2000), were positively related. Interventions to instill healthy diet and PA behaviors in youth should target “positive” behaviors (Rolls et al., 2004), such as increased fruit, vegetable, and water consumption and increased PA.

Mediating variables are key in intervention design because they specify the pathway between the intervention and the behavioral outcome, and represent the mechanism(s) through which the intervention exerts its effect (Baranowski et al., 1997). In behavioral interventions, mediators are obtained from the theory used to guide the development of the intervention (Baranowski et al., 1997).

Social Cognitive Theory (SCT) (Bandura, 1986) provides a rich source of mediating variables, including self efficacy, outcome expectancy, availability, and accessibility, and as well as self control related behavior change procedures (e.g., problem solving, goal setting, goal review). SCT has been used to explain behavior change in both adults (Bandura, 1986) and children (Saunders et al., 1997). SCT has provided the foundation for several health behavior change interventions and has been shown to be more effective than knowledge-based health education programs (Contento et al., 1995). The SCT concept of reciprocal determinism maintains that there is a constant interaction among environmental, personal and behavioral factors (Bandura, 1986). Environmental components include aspects of the physical, institutional and social environments and their mechanisms of influence (e.g., modeling, social reward) (Baranowski, Perry, & Parcel, 2002, Chap. 8). The person characteristics include preferences, outcome expectancies, behavioral capability (knowledge and skills necessary to perform a behavior), and self efficacy (the confidence one can perform a behavior and successfully overcome the problems likely to be encountered).

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