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Processes of change for increasing fruit and vegetable consumption among economically disadvantaged African American adolescents

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ABSTRACT

This study sought to identify Transtheoretical Model processes of change associated with consumption of ≥5 daily servings of FVs in a sample of economically disadvantaged African American adolescents ($N = 549$; mean (SD) age = 12.44 (.99) years; 61% female; 15% African American Hispanic). Participants completed measures of stages and processes of change, and were ranked according to intake level based on their reported stage. Spearman correlations and independent samples *t* tests were used in cross-sectional analyses of the relationship between processes of change and FV consumption. Consciousness raising, environmental reevaluation, helping relationships and stimulus control processes were significantly associated with FV consumption ($\rho \geq .12$; $p < .01$), and were practiced more often by youths who consumed ≥5 daily servings of FVs relative to those who did not ($p < .05$). Findings highlight the potential of these processes for increasing FV consumption in this population.

1. Introduction

Fruit and vegetable (FV) consumption is associated with reduced risks for cardiovascular diseases, diabetes, obesity and certain cancers (Bazzano, 2006). With few adolescents consuming recommended amounts of FVs (Guenther, Dodd, Reedy, & Krebs-Smith, 2006), there is a recognized need to increase consumption, in particular among demographic groups that are less likely to meet national dietary guidelines such as African Americans and low socioeconomic status groups (Robinson, 2008). To guide interventions, an understanding of behavior change strategies associated with adequate FV consumption is needed. Research in this area is limited (Sandeno, Wolf, Drake, & Reicks, 2000), and studies of theoretically prescribed strategies are lacking.

Transtheoretical Model (TTM) processes of change are a common set of strategies and techniques for modifying a health behavior (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997), and are considered important guides for the development of health interventions when matched to individuals' stage of readiness to change (Padula et al., 2003). In smoking cessation, experiential or cognitive, affective and evaluative processes are used more often at earlier stages when people are considering or planning to modify their behavior, whereas behavioral or overt processes are used more often at later stages among those who have changed their behavior and are working to sustain the change (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997; Prochaska et al., 1992). For dietary change, experiential and behavioral processes increase in tandem across stages (Chung, Hoerr, Levine, & Coleman, 2006; Greene et al., 2004; Henry, Reimer, Smith, & Reicks, 2006; Hildrebrand & Betts, 2009; Rosen, 2000). Stronger associations with stage of readiness are found for self-reevaluation (reappraisal of values related to the behavior), consciousness raising (seeking information), self-liberation (committing to change) and stimulus control (changing environmental cues) processes, suggesting that these processes may be particularly important for facilitating dietary change (Rosen, 2000). Because most studies to date have been conducted with adults, less is known about processes that are used at earlier life stages. The purpose of this study was to identify processes associated with consumption of ≥5 daily servings of FVs in a sample of economically disadvantaged African American adolescents.

2. Method

2.1. Participants

This cross-sectional study examined baseline data provided by African American adolescents enrolled in a dietary intervention study described elsewhere (Di Noia, Contento, & Prochaska, 2008). Youths were recruited through 27 youth services agencies serving low-income communities in the Greater New York City area, and were offered the opportunity to participate when they presented for services. Selection criteria were African American ethnic-racial

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heritage and aged 11 to 14 years. Following institutional review board approval, all youths provided informed written assent and informed written consent was obtained from a parent or guardian. Data were collected between November 2005 and April 2006.

2.2. Measures

Informed and assenting youths were administered an outcome battery under the direction of trained research staff. The battery assessed youths' demographic characteristics and included measures of TTM stages and processes of change. Stage of readiness to consume ≥5 daily servings of FVs was assessed with the 4-item staging measure and algorithm developed by research scientists at the Cancer Prevention Research Center (1995). Youths were ranked according to intake level based on their reported stage. Those in pre-action stages (an indication that intake was <5 daily servings) were labeled low consumers, and those in action and maintenance stages (an indication that intake was ≥5 daily servings) were labeled high consumers. Other TTM constructs were related to stage of change as determined by the measure in ways predicted by the model, providing evidence of its validity (Di Noia & Schinke, 2006).

A 19-item instrument assessed processes of change used by economically disadvantaged African American adolescents to consume FVs (Di Noia & Schinke, 2006). Responses were on a 5-point scale ranging from never (1) to often (5). Measurement development included examination of the relevance and exhaustiveness of an initial pool of questionnaire items ($N=48$), pilot testing to ensure the clarity and interpretability of the items ($N=9$) and psychometric evaluation ($N=262$). Principal components analysis yielded a 2-factor solution representing four experiential (7 items) and four behavioral (12 items) processes. Processes of change definitions (Mauriello et al., 2006) and measurement items are shown in Table 1. The measure was reliable and valid, with acceptable internal consistency for both scales ($\alpha=.77$ experiential, .89 behavioral) and evidence that use of the processes significantly increased from pre-action to action and maintenance stages (Di Noia & Schinke, 2006).

2.3. Analysis

Analyses were conducted using SPSS, version 17.0. Spearman correlations were calculated to provide an index of relation between processes of change and FV consumption. Differences by intake level in mean frequencies of the processes were also examined with independent samples *t* tests. The study was sufficiently powered to detect modest correlations ($\rho \geq .12$) and mean differences ($\geq .30$), $1-\beta=.80$; $\alpha=.05$, 2-tailed.

3. Results

Participants were 549 African American adolescents with a mean (SD) age of 12.44 (.99) years. The sample was 61% female and 15% African American Hispanic. A modest 12% of youths ($n=64$) reported consumption of ≥5 daily servings of FVs, with most (88%, $n=485$) reporting consumption of<5 daily servings. All but three survey items were significantly associated with FV consumption, and were practiced more often by high versus low consumers (Table 2). Stronger correlations were found for ten items measuring two experiential processes, consciousness raising (1 item) and environmental reevaluation (2 items), and two behavioral processes, helping relationships (2 items) and stimulus control (5 items), $\rho \geq =.12$; $p<.01$.

4. Discussion

Findings of this study of economically disadvantaged African American adolescents confirmed that few consumed ≥5 daily servings of FVs (Guenther et al., 2006), underscoring the need for dietary intervention programs to improve health outcomes and nutritional status in this population. Although fewer processes of change were associated with FV consumption than observed for non-dietary behavior (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997; Prochaska et al., 1992), as found in previous dietary applications of the TTM, both experiential and behavioral processes were used more often by high versus low consumers (Chung et al., 2006;

Table 1
Processes of change definitions and measurement items for fruit and vegetable consumption.

Processes[a]	Definition	Measurement items[b]
Experiential		
CR	Seeking and considering information on the healthy behavior	Remember what people tell me about the benefits of eating FVs
ER	Realizing the impact of engaging in the healthy behavior on one's social and physical environment	Would set a good example for others if I ate FVs Might influence others to be healthier by eating FVs more often
SR	Emotional and cognitive reappraisal of values related to the healthy behavior	Eating enough FVs could make me healthier and happier Think of eating FVs as something to do for myself rather than as a chore Only I can decide whether to eat enough FVs
SL	Noticing how social norms are changing to support environments and individuals engaging in the healthy behavior	Find the world changing in ways to make it easier to eat healthfully
Behavioral		
RM	Increasing intrinsic and extrinsic rewards for engaging in the healthy behavior	Reward myself when I eat FVs
HR	Seeking and using social support to encourage or to help with engaging in the healthy behavior	Have a friend who encourages me to eat FVs Surround myself with people who are trying to eat more FVs
CC	Substituting the unhealthy behavior with healthier alternative behaviors and cognitions	Purchase FVs instead of junk food Make myself eat FVs even if I do not like their smell/taste Have fruit as a dessert instead of sweets or ice cream
SC	Removing cues to the unhealthy behavior and adding cues to engage in the healthy behavior	Keep reminders at school to eat FVs When friends are over, serve only FVs Keep reminders at home to eat FVs Remove things (like junk food) that prevent me from eating enough FVs Keep FVs in sight as reminders to eat more of them Avoid spending time in places where it is difficult to eat FVs

[a] CR, consciousness raising; ER, environmental reevaluation; SR, self-reevaluation; SL, social liberation; RM, reinforcement management; HR, helping relationships; CC, counterconditioning; SC, stimulus control.
[b] Items revised to fit table. FVs, fruits and vegetables.