

# Developing an Instrument to Evaluate Psychosocial and Environmental Determinants of Parental Monitoring of Sugar-Sweetened Beverages

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**Abstract:** Sugar-sweetened beverage (SSB) consumption among children and adolescents is a public health concern, as up to 88% consume them on a daily basis. While much research has been done regarding what types of foods parents feed their children and how that is linked to various health outcomes, research determining how parents monitor their children's SSB consumption has not been well studied. Identifying important environmental and psychosocial determinants of parental-monitoring behaviors is a greatly needed area for investigation. The purpose of this study was to develop and validate a theory-based instrument related to this parenting practice. Initially, a 41-item instrument was developed and face and content validity were established using a panel of 6 experts. Next, the survey was administered to 270 parents (29 parents completed the survey twice). Psychometric properties tested of the instrument included construct validity, using the maximum likelihood extraction method of factor analysis, internal consistency reliability, using Cronbach's alpha, and test-retest reliability using Pearson-product moment correlations between instrument results taken at two separate occasions. Initial results suggested some scales required re-specification, which included removing weak and/or non-related items. Results from this study can be used to assist future health professionals and researchers for measuring theory-based determinants of parental practices related to monitoring SSB consumption. This process can also be replicated to construct instruments measuring other critical obesogenic behaviors, such as monitoring fruit and vegetable consumption, or physical activity.

**Keywords:** Sugar sweetened beverage consumption, parental monitoring, childhood obesity.

## INTRODUCTION

Sugar-sweetened beverage (SSB) consumption has recently gained much attention for its role in promoting obesity. According to four U.S. nationally representative surveys, including the Nationwide Food Consumption Survey, two versions of the Continuing Survey of Food Intake by Individuals, and the National Health and Nutrition Examination Survey, SSB consumption has increased by 135% across all age groups ( $\geq 2$  years) since 1977 [1, 2]. Recently, a study found, by using data from the National Health and Nutrition Examination Survey, that 88% of children and adolescents consume SSB's every day, resulting in an average intake of 271 calories [1]. Researchers also found that 4-5% of children frequently *over-consume* SSBs, defined as a daily consumption of  $\geq 500$  calories [1]. It has also been reported that among a convenience sample of children from the Southern region of the U.S., 94% of children (3-5 years old) consumed sweetened milk products, 88% consumed fruit drinks (non-100% juice), 63% consumed sodas, and 56% consumed sports drinks and sweet tea on a frequent basis [3]. Excess sugar consumption is not only an issue within the United States however. In

2015, the World Health Organization strongly suggested that individuals reduce their intake of free sugars throughout the lifespan, and for both adults and children, free sugar intake should be less than 10% of total energy intake [4]. The WHO also cited that while some countries are currently meeting this recommendation (such as Hungary and Norway), many countries are not, including Spain and the United Kingdom, which have been noted as having 16-17% of total energy intake from sugars [5].

SSB consumption among children and adolescents can be explained, in part, by intrapersonal level factors such as individual food and beverage preferences. However, when developing nutrition education and public health programs to prevent and reduce SSB consumption, ecological factors should also be operationalized. It is well-known that parenting practices and parental role modeling can significantly influence a child's health habits. Parents have such a strong influence on the health of children, because they have the ability to create home environments that can shape healthy behaviors and promote positive decision-making, they can enforce rules in the home pertaining to what foods can and cannot be bought or served, and they can serve as healthy role-models by eating health foods in front of their children. Many studies have examined the role parents have on influencing their children's dietary behaviors, especially

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for SSB consumption [6]. Home availability of SSB's is a key determinant of consumption among children and adolescents. In a study investigating SSB consumption among adolescents, researchers found that 76% of the adolescents' homes always had SSBs available and 47% of adolescents were allowed to drink as many SSBs as they desired [7]. Data from NHANES also shows that lower educated and lower income parents are more likely to consume SSB's than their higher educated/higher income counterparts, and in turn, adolescents with lower educated and lower income parents were more likely to consume greater amounts of SSB's than adolescents with higher educated/higher income parents [1]. The relationship between SSB consumption and the home-environment appears to weaken with age however, indicating the need for early interventions [8].

While there is no universal definition of the concept *parental monitoring*, the most commonly used concept related to parenting is based upon Baumrind's [9] and Maccoby and Martin's [10] typology of parenting styles. This typology categorizes parents into one of four parenting styles (authoritarian, authoritative, permissive and uninvolved/neglectful). Many articles in the literature have evaluated the relationship between SSB consumption and parenting style. For example, in a cross-sectional study of adolescents (n=383), the relationship between parenting style and SSB consumption patterns was evaluated and researchers found that attitudes, self-efficacy, habit strength, and parental modeling were all positively associated with SSB consumption. Additionally, a stricter, more involved parenting style was associated with lower consumption patterns [6]. Researchers also evaluated parental involvement and strictness, and found that the more restrictive parents are about SSB's, childhood consumption decreased. However, the most effective strategy for decreasing consumption was moderately strict and highly involved parents [6]. Two common behaviors parents use to control their children's eating behaviors include pressuring them to eat certain foods (i.e. healthy foods such as fruits and vegetables) by using rewards and punishments, and restricting access to other foods (i.e. unhealthy foods such as salty and sweet snacks). A recent review found that both strategies are counterproductive and, in extreme cases, can lead to maladaptive eating behaviors as children lose their ability to self-regulate their diets [11].

Determinants of parenting practices and behaviors that monitor children's behaviors are complex and have not been well studied. Research examining theory-

based determinants of parental monitoring behavior related to SSB consumption, including cognitive and environmental factors, is also greatly needed to inform future nutrition education and public health interventions. Concurrently, deciding which determinants are important for investigation is critical. Although many health behavior theories and models exist, which all provide a guiding framework for nutrition and health behaviors, the Integrative Model (IM) was recently developed as an attempt to integrate a number of the leading theories and models in the field (ex. Theory of Reasoned Action/Planned Behavior, Health Belief Model, Social Cognitive Theory) [12]. The IM was conceptualized at a theorist workshop sponsored by the National Institute of Mental Health, and attended by Albert Bandura, Marshall Becker, Martin Fishbein, Fredrick Kanfer, and Harry Triandis. During the workshop, theorists agreed upon 8 principle determinants of health behaviors, (intentions, environment, skills/abilities, attitudes, social pressure, personal standards/self-image, emotional reaction, and self-efficacy), however, the theorists did not agree upon the ordering or conceptualization of the determinants [12]. Since the inception of the IM, limited research has been conducted using the model proposed at the workshop, and research that operationalizes the model to a health behavior has mostly focused on sexual health, including research on adolescent abstinence [13], HPV vaccination [14], condom use [15], examining role of religiosity has on delaying the onset of sexual intercourse in adolescent virgins [16], exploring how young people find sexual information in various forms of media, and how that information influences their sexual behaviors [17, 18], and enhancing communication about sexual health [19]. The IM has also started to be used in other areas of health, such as evaluating the effects of anti-marijuana ads in adolescents [20], predicting alcohol dependency among freshman undergraduates [21], and exploring how cancer patients find cancer-related information [22], however, the IM has not been operationalized for use with dietary or parenting behaviors, which leaves a gap in the current literature. The IM posits that one's intentions to perform a behavior is the most predictive determinants of behavior, and in turn, intentions are influenced by attitudes toward the behavior, perceived norms, and perceived behavioral control (PBC). In addition to intentions, environment, including both the social environment (ones proximal social sphere, and relationships between individuals within a family, or small group, that can influence ones behavior) and physical environment (the presence or absence of

barriers or facilitating factors that can influence ones behavior), and skills/abilities are direct determinants of behaviors.

Instruments evaluating parental monitoring behaviors and critical theory-based determinants of these behaviors are greatly needed. Such instruments should also be tested for validity and reliability, since this is rarely done. For example, in a recent review of 7 journals in the field of health promotion and education (ex. American Journal of Health Behavior; Health Education and Behavior) authors examined nearly 1000 published studies and found that a high percentage failed to report measures of validity and reliability [23]. The purpose of this study was two-fold: first critical constructs of the IM were operationalized and a theory-based instrument was developed; and second, the instrument was evaluated for validity and reliability.

## METHODS

### Instrument Development

Critical steps of instrument development were utilized to develop an instrument based upon the IM for parental monitoring of child SSB consumption [24]. First the behavior was defined using the TACT method (Target; Action; Context; Time) described by Fishbein and Ajzen [25], and each construct of the IM was then operationally defined for the behavior. 'Monitoring my child's sugar-sweetened beverage consumption when they are at home' was used, since it represented the core practice to be promoted in nutrition education, and contained a Target (sugar-sweetened beverages), Action (monitoring my child's consumption), Context (at home) and Time (implied that parental monitoring is an ongoing process). While there is no universal definition of the concept *parental monitoring*, the behavior was defined using Albert Bandura's 6 processes related to self-regulation (self-monitoring, goal-setting, feedback, self-reward, self-instruction, and enlistment of social support), extrapolated to how parents monitor their children's behaviors [26]. *Child-monitoring* referred to a parent's systematic observation of the child's SSB consumption. *Goal-setting* included identifying and communicating the rules related to SSB consumption in the household. *Feedback* was defined as parents providing information about how well their children follow household rules related to SSB consumption. *Child-reward* referred to a parent's provision of tangible or intangible rewards to their children for following household rules related to SSB consumption. *Child-*

*instruction* referred to when parents talk to their children when they do not follow the rules related to SSB consumption. Finally, *enlistment of social support* was defined as parent encouragement related to the child's efforts towards following the rules related to SSB consumption. To measure this behavior, six items on the instrument related to each process were developed (See Appendix A or Email the corresponding author for a copy of the instrument).

Next, the constructs of the IM were applied to the behavior, and given operational definitions. Behavioral Intentions were defined as an individual's readiness to act, and was measured using three items pertaining to the parents' willingness to monitor the child's SSB consumption in the home. Attitudes toward the behavior were defined as an individuals overall feelings of like or dislike and were assessed using a semantic differential scale with bipolar descriptors, such as harmful to beneficial, and valuable to worthless (6 items). Perceived norms were defined as the social pressure one feels to act, and were evaluated using two types of norms; injunctive norms assessed what influential others think the individual should do (4-items) and descriptive norms assessed an individual's perception of what everyone else is doing (3-items). PBC was defined as how much control the participant felt over the behavior and how easy or difficult the behavior was to enact (5-items). In addition, skills and abilities, the social environment and the home environment were evaluated. Skills/abilities was defined as having the necessary tools to engage in the behavior and knowing how to use those tools in a way that will promote health (4-items). The social environment was defined as the proximal and social sphere in which the behavior was performed (5-items). For example, questions related to whether both parents enforced the same rules regarding SSB consumption. Finally, the home environment was defined as the availability of SSB's in the home (4-items).

After constructs of the IM were defined, items related to each construct were written and a first draft of the instrument was developed. The Flesch-Kincaid grade level test revealed the instrument scored at a 5<sup>th</sup> grade reading level, indicating a high level of readability. The instrument was next sent to a panel of six experts (two individuals for the IM, two individuals for instrument development, and two individuals with expertise related to the target population) in order to establish face validity (whether the instrument appeared to measure what it was supposed to measure) and content validity (whether items had been

adequately sampled within each construct to represent the entire meaning of the construct). After the panel submitted initial suggestions, the instrument was revised and sent for a second round of review. The instrument was also pilot tested with eight individuals who completed the instrument independently, in a group setting. After completing the instrument, researchers elicited comments from the group on items that were ambiguous, unclear, or difficult to understand. Comments were used to further refine the instrument before data collection.

### Psychometric Testing

Internal consistency reliability was established using Cronbach's alpha, and the following recommendations were used to interpret the results:  $\alpha > 0.8$  was deemed *good*;  $0.80 > \alpha > 0.7$  was deemed *acceptable*;  $0.70 > \alpha > 0.6$  was deemed *questionable*;  $0.60 > \alpha > 0.5$  was deemed *poor*; and an  $\alpha < 0.5$  was deemed *unacceptable* [27]. For all subscales deemed *questionable*, *poor* or *unacceptable* ( $\alpha < 0.7$ ), re-specification was attempted by eliminating weak items that were detected using inter-item correlation matrices; unrelated items to the scale ( $r \leq 0.20$ ) or redundant items ( $r \geq 0.80$ ) were removed. Test-retest reliability was established with 29 participants who agreed to take the survey twice, two weeks apart. Pearson-product moment correlations between both time periods were then determined, and a correlation of 0.70 or higher was deemed acceptable. Construct validity was established using the maximum likelihood extraction method of confirmatory factor analysis (CFA). Eigenvalues greater than 1 were used to determine if each scale yielded a one-factor solution, and items significantly loaded upon each factor if they yielded a factor loading of at least 0.298 [28]. All data were analyzed using SPSS version 19.0. Before data were collected, this study was approved by the Institutional Review Board of the University of Oklahoma (IRB#3655).

## RESULTS

A sample 270 parents (men 41.5 %;  $n=112$ ; women 58.5%;  $n=158$ ) at a community after school program in a Southwestern city were used for this study, with the following racial composition: [Caucasian (84.8%;  $n=229$ ); African American (3.3%;  $n=9$ ); Asian (2.2%;  $n=6$ ); Hispanic/Latino (3.0%;  $n=8$ ); Native American (4.0%;  $n=11$ ); and Other (1.9%;  $n=5$ ). The sample also consisted of mostly educated parents, with many having an Associates degree (12.2%;  $n=33$ ), Bachelor's degree (26.7%;  $n=72$ ) or higher (31.9%;  $n=86$ ). For recruitment, parents were approached by members of the research team as they picked up their children, and informed about the study, including the consent process and instructions for completing the instrument. On average, the instrument took 15-20 minutes to complete.

### Instrument Specification and Re-Specification

Initial Cronbach's alpha scores for all subscales were mixed. Three scales were acceptable [Intentions ( $\alpha=0.80$ ); Descriptive Norms ( $\alpha=0.80$ ); and Physical Environment ( $\alpha=0.70$ )], four scales were questionable [Skills/Abilities ( $\alpha=0.69$ ); Attitudes towards the behavior ( $\alpha=0.69$ ); Injunctive Norms ( $\alpha=0.62$ ); and PBC ( $\alpha=0.60$ )], one scale was poor [Social Environment ( $\alpha=0.58$ )], and one scale was unacceptable [Child-Monitoring ( $\alpha=0.48$ )]. For scales deemed less than acceptable, scale re-specification was attempted by deleting weak items. As a result, Social Environment ( $\alpha=0.73$ ) and Attitudes towards the behavior ( $\alpha=0.73$ ) improved to acceptable, however, Child-Monitoring ( $\alpha=0.66$ ), Skills/Abilities ( $\alpha=0.69$ ), Injunctive Norms ( $\alpha=0.68$ ), and PBC ( $\alpha=0.60$ ) were still questionable. Items removed from each scale can be found in Appendix A (or email the corresponding author for a copy of the instrument). Similar to other studies, it was decided to retain all modified scales, because scales

**Table 1: A Summary of the Reliability Statistics**

Theoretical construct	Cronbach's $\alpha$	Test-retest reliability (Pearson's r)
Child-Monitoring	0.66	0.84
Intentions	0.81	0.81
Skills/Abilities	0.69	0.67
Social Environment	0.73	0.64
Physical Environment	0.70	0.74
Attitudes	0.73	0.83
Injunctive Norms	0.68	0.87
Descriptive Norms	0.80	0.78
Perceived Behavioral Control	0.60	0.64

were not poor or unacceptable [13]. Results were better for test-retest reliability, as most scales met the a priori criteria ( $r=0.70$ ) [Child-Monitoring ( $r=0.84$ ); Intentions ( $r=0.81$ ); Physical Environment ( $r=0.74$ ); Attitudes ( $r=0.83$ ); Injunctive Norms ( $r=0.87$ ); Descriptive Norms ( $r=0.78$ )] and only three scales were slightly lower than the criteria [Perceived Behavioral

Control ( $r=0.64$ ); Skills/Abilities ( $r=0.67$ ); Social Environment ( $r=0.64$ )]. A summary of the reliability statistics can be found on Table 1.

Finally, confirmatory factor analysis (CFA) using the maximum likelihood extraction (MLE) method was employed to evaluate construct validity for each scale. As previously mentioned, two criteria were used to

**Table 2: Summary of Factor Analysis for Establishing Construct Validity**

Variable	Eigen Value	Factor Loadings
<b><u>Child Monitoring Scale</u></b>	1.798	
I have rules in my house about how much SSBs my child can have at home.		0.585
I frequently talk with my child about why I keep track of the number of SSBs he/she drinks.		0.670
If my child drinks more SSBs than I allow, we usually have a discussion about that.		0.641
<b><u>Intentions Scale</u></b>	2.174	
I intend to watch the amount of SSBs my child drinks at home.		0.698
I expect to monitor the amount of SSBs my child drinks at home.		0.915
I plan to keep track of the amount of SSBs my child drinks at home.		0.693
<b><u>Physical Environment Scale</u></b>	2.165	
When SSBs are in the refrigerator, my children have them whatever they want.		0.434
At meals, if my child wants a SSB, I give it to him/her.		0.750
At meals, SSBs are served at home.		0.758
SSBs can be found in the refrigerator at my house.		0.554
<b><u>Social Environment Scale</u></b>	1.576	
In my house, my child argues with me about wanting to have more SSBs.		*
In my house, my child complains about not having SSBs.		*
<b><u>Skills &amp; Abilities Scale</u></b>	2.292	
I know how to communicate with my child about SSBs.		0.683
I know how to create rules related to SSB consumption at home.		0.555
I can correct my child's behavior when he/she breaks the SSB rules at home.		0.561
At the grocery store, I know how to tell if a drink has sugar in it.		0.445
I can keep track of how many SSBs my child consumes at home.		0.594
<b><u>Attitudes Scale</u></b>	2.296	
Keeping track of how many SSBs my child drinks is... <Unimportant/Important>		0.697
Keeping track of how many SSBs my child drinks is... <Worthless/Valuable>		0.803
Keeping track of how many SSBs my child drinks is... <Harmful/Beneficial>		0.647
If I keep track of how many SSBs my child has, my child's health will be... <Unaffected/Greatly Affected>		0.475
<b><u>Injunctive Norms Scale</u></b>	1.862	
Most people who are important to me think I should keep track of how many SSBs my child drinks.		0.777
It is expected of me that I should keep track of how many SSBs my child drinks.		0.439
People who are important to me want me to keep track of how many SSBs my child drinks.		0.767
<b><u>Descriptive Norms Scale</u></b>	2.162	
Most people who are important to me and who have kids monitor their child's SSB consumption.		0.542
How many people that have kids that you respect monitor their child's SSB consumption?		0.789
How many people similar to you that have kids at home monitor their kids' SSB consumption?		0.974
<b><u>Perceived Behavioral Control Scale</u></b>	1.998	
I am confident that I can keep track of the SSBs my child has at home if I want to.		
For me, keeping track of my child's SSB consumption at home is:		0.537
Limiting how many SSBs my child drinks at home is something that is beyond my control.		0.485
Keeping track of how many SSB my child drinks at home is...		0.538
When my child wants to have more SSBs than allowed, I...		0.356

\*Scales with 2 items or less cannot yield factor loadings.  
Note: Maximum likelihood estimation used for all subscales.

evaluate construct validity; the presence of one factor with an Eigenvalue greater than 1, and each item loaded significantly on the corresponding factor, as indicated by a factor loading greater than 0.298. Using the re-specified scales from the previous step, it was found that all scales yielded an Eigenvalue greater than 1 [Child-Monitoring ( $\lambda=1.798$ ); Intentions ( $\lambda=2.174$ ); Skills/Abilities ( $\lambda=2.292$ ); Social Environment ( $\lambda=1.576$ ); Physical Environment ( $\lambda=2.165$ ); Attitudes ( $\lambda=2.296$ ); Injunctive Norms ( $\lambda=1.862$ ); Descriptive Norms ( $\lambda=2.162$ ); Perceived Behavioral Control ( $\lambda=1.998$ )], and all factor loadings were greater than the a priori criteria [Child-Monitoring (0.585-0.670); Intentions (0.693-0.915); Skills/Abilities (0.445-0.683); Social Environment (\*note: scales with one or two items cannot yield factor loadings); Physical Environment (0.434-0.758); Attitudes (0.475-0.803); Injunctive Norms (0.439-0.777); Descriptive Norms (0.542-0.974); Perceived Behavioral Control (0.356-0.572)]. A summary of all of the CFA results can be found on Table 2.

### DISCUSSION

There were two main objectives for this study. For the first objective, critical constructs of the IM were operationalized for parental monitoring of child SSB consumption, and a theory-based instrument was developed. In this study, child-monitoring was operationalized based on Bandura’s definition of self-monitoring, and extrapolated to how parents monitor their children’s behaviors, which is unique to this instrument, and to our knowledge, has never been done. As previously mentioned, there is no universal definition of the concept *parental monitoring*, and the most commonly used measure of *parenting* is related to parenting styles. However, for this study it was envisioned that the behavior would go beyond a style of parenting, to a behavioral category that includes a number of interrelated parenting practices. As Patrick and colleagues note “there is a critical need to develop measures that address the range of parenting practices and how parenting practices may differ across obesogenic behavioral domain” [30]. Results from this study showed that while this was a suitable place to

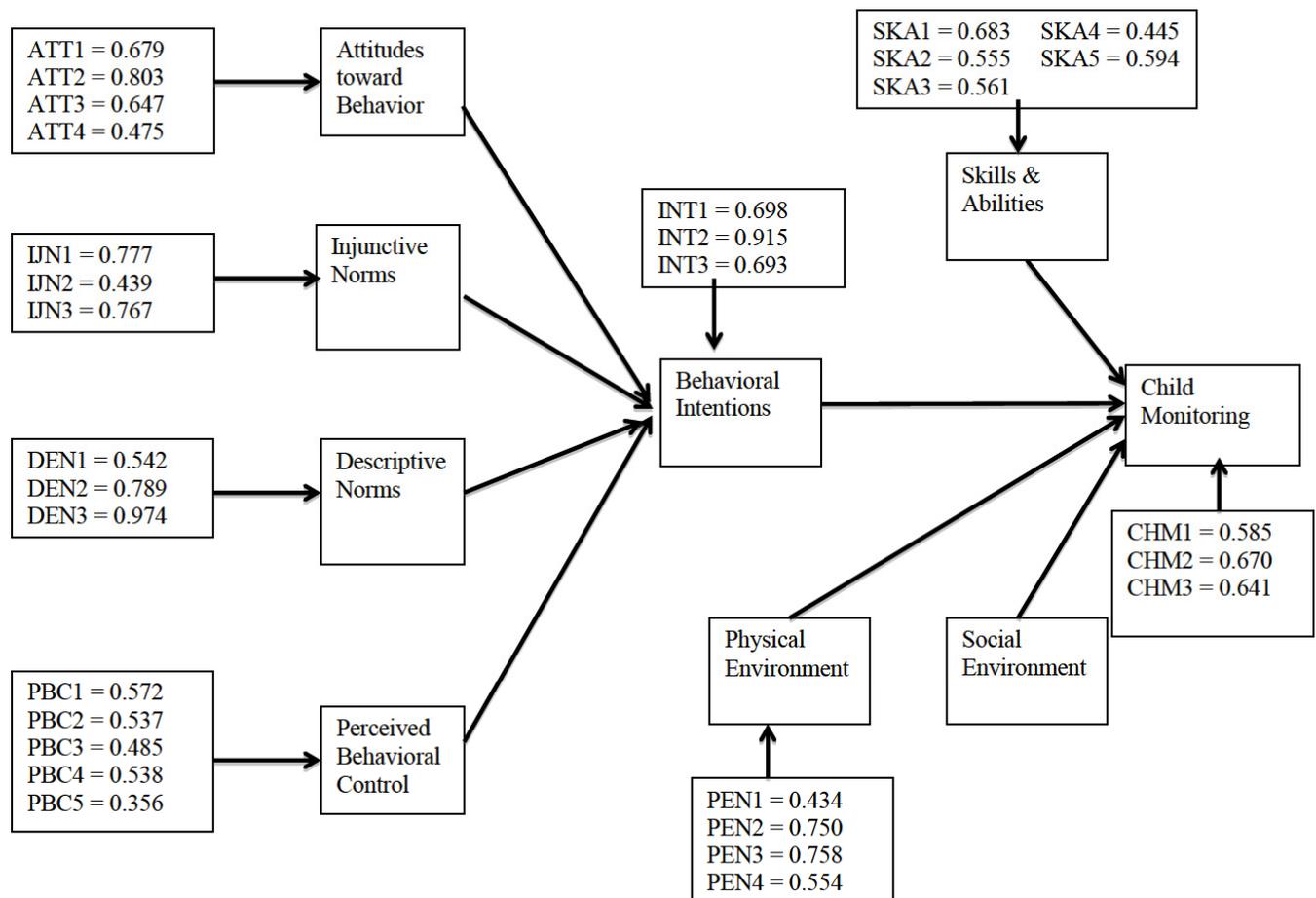


Figure 1: Path model of the Integrative Model with Theory Construct Factor Loadings.

start for the conceptualization of parental monitoring, the subscale was problematic and needed further refinement.

The second purpose of this study was to evaluate a number of forms of validity and reliability to support the use of this scale in future research and nutrition practice. This included subjective forms of validity (face and content validity), and three psychometric measures; test-retest reliability, internal consistency reliability and construct validity. An important finding from this study was that even though the instrument had a strong theoretical framework, was evaluated by a 6 member expert panel, and pilot tested with 8 individuals, the initial psychometric measures indicated that the instrument was in need of revisions. This is an important finding, in that it demonstrates that instrument development is an iterative process, and it may take two or three revisions of an instrument before a final version of the scale shows adequate reliability and validity.

Theory-based instruments such as the one presented in this article are greatly needed in the area of nutrition education and public health because they can be utilized in a number of ways. First, it should be stated that the use of theory in the field of nutrition education and public health is vital, since theories discern measurable program outcomes, specifies methods for behavior change, enhances communication between professionals, and improves replication of research and practice. Second, a number of community planning models call for evaluating determinants of health behaviors, in order to develop targeted and tailored approaches for health interventions. For example, in Step 3 of the PRECEDE-PROCEED model [31] (the Educational and ecological assessment) factors that influence behaviors are referred to as *predisposing, enabling and reinforcing factors*, and include theory-based factors housed within the IM theoretical framework. This step is also in step 2 of the MATCH model [32], and step 1 of Intervention Mapping [33]. Third, instruments are needed to enhance needs assessments, which identify critical factors a community believes are important for interventions. Fourth, instruments are needed to evaluate nutrition education and public health interventions. As Barry and colleague's note [34], while surveys are a vital tool for research and practice, few researchers and practitioners fully understand how to properly develop them. Having access to validated tools such as the one presented in this article is greatly needed. Finally, as reported by others in the field, the

lack of organized and standardized measurement and evaluation has deterred the development of a knowledge and evidence base which could be used to identify, apply, and disseminate evidence-based practices to enhance and support nutrition education and public health prevention programs [29].

## LIMITATIONS

This study was not without limitations. First, responses were based on self-report. Respondents may have been biased in their answers, as they may have misinterpreted questions, or were dishonest and marked answers that did not truly represent his/her actual perspective. Second, the sample used for this study was from a convenience sample of parents, therefore results may not be generalizable to all populations or groups. Proxy variables were also used for some subscales of the instrument (skills and abilities, social environment and physical environment), representing a limitation of the study and the instrument. Proxy variables are oftentimes used when variables of interest are difficult or impossible to evaluate directly. For instance, in this study to measure social environment, parents responded to a number of items pertaining to their *perceptions* of the social environment at home, which is a proxy of the *actual* social environment. Finally, in this study structural equation modeling (SEM) was not used given the low sample size (as it is commonly noted that 300 cases are minimal). In this case SEM would have been advantageous, as it would have allowed us to expand the model estimation, fit, and given modification indices for weaker subscales.

## CONCLUSIONS

Despite the development of the IM over 20 years ago, surprisingly it has not been widely used in research and practice. Although researchers and practitioners continue to use previous iterations of the IM (Theory of Reasoned Action and Theory of Planned Behavior), more attention should be placed on the IM, since it represents new developments in the theory, and gives additional insights into predicting and changing health behaviors. Although further refinements and testing are needed, this study presents a new instrument that can be utilized in future studies to examine the determinants of child monitoring for SSBs for a needs assessment, as well as evaluate a theory-based intervention targeting this behavior.

In conclusion, childhood obesity is not an issue that can be easily addressed, and health practitioners and

researchers should utilize frameworks such as the ecological model when planning lifestyle interventions. While it is important to encourage children to drink more water and sugar-free drinks (an intrapersonal factor), other levels of the model should be utilized such as motivating parents to closely monitor the amount of SSBs they allow their children to consume (an interpersonal factor), and encouraging schools

(organizational factor) and communities (community factor) to facilitate behavior change by making clean water, and other sugar-free drinks, available and accessible.

#### **ACKNOWLEDGEMENTS**

This study was approved by the IRB of The University of Oklahoma.

#### **APPENDIX A: INITIAL AND FINAL DRAFT OF THE 'DETERMINANTS OF PARENTAL MONITORING OF SUGAR-SWEETENED BEVERAGES SCALE'**

\*Denotes items were retained after scale re-specification

#### **Child Monitoring Scale**

1. I **control** of the number of SSBs my child drinks at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2\*. I have rules in my house about **how much SSBs** my child can have at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3\*. I **frequently talk with my child** about why I keep track of the number of SSBs he/she drinks.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4. I **reward my child** if he/she drinks the number of SSBs I allow or fewer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

5\*. If my child drinks more SSBs than I allow, we have a usually **have a discussion** about that.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

6. I **encourage my child** to drink only a certain amount of SSBs everyday.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

#### **Intentions Scale**

1\*. I **intend to watch the amount** of SSBs my child drinks at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2\*. I **expect to monitor** the amount of SSBs my child drinks at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3\*. I **plan to keep track** of the amount of SSBs my child drinks at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

#### **Physical Environment Scale**

1\*. When SSBs are in the **refrigerator**, my children have them whatever they want.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2\*. At **meals**, if my child wants a SSB, I give it to him/her.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3\*. At meals, **SSBs are served** at home.

Never 1 2 3 4 5 6 7 Always

4\*. SSBs can be found in the refrigerator at my house.

Never 1 2 3 4 5 6 7 Always

### Social Environment Scale

1. I have rules about keeping SSBs **out of my house**.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2. In my house, **when other adults are present**, they keep track of my child's SSBs like I do.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3. In my house, **my child follows the rules** about SSB consumption.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4\*. In my house, my **child argues with me** about wanting to have more SSBs.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

5\*. In my house, my child **complains about not having** SSBs.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

### Skills & Abilities Scale

1\*. I know **how to communicate** with my child about SSBs.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2\*. I know **how to create rules** related to SSB consumption at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3\*. I can **correct my child's behavior** when he/she breaks the SSB rules at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4\*. At the **grocery store**, I know how to tell if a drink has sugar in it.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

5\*. I **can keep track** of how many SSBs my child consumes at home.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

### Attitudes Scale

1\*. **Keeping track of** how many SSBs my child drinks is...

Unimportant 1 2 3 4 5 6 7 Important

2\*. **Keeping track of** how many SSBs my child drinks is...

Worthless 1 2 3 4 5 6 7 Valuable

3\*. **Keeping track of** how many SSBs my child drinks is...

Harmful 1 2 3 4 5 6 7 Beneficial

4\*. If I keep track of how many SSBs my child has, my **child's health** will be...

Unaffected 1 2 3 4 5 6 7 Greatly affected

5. **If I keep track** of how many SSBs my kids drink, my kids will be...

Upset with me 1 2 3 4 5 6 7 Happy with me

6. If I **keep track** of how many SSBs my child drinks, my child will...

Argue with me 1 2 3 4 5 6 7 Not argue with me

**Injunctive Norms Scale**

1\*. **Most people who are important to me** think I should keep track of how many SSBs my child drinks.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2\*. **It is expected of me** that I should keep track of how many SSBs my child drinks.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3. I feel **under social pressure** to keep track of how many SSBs my child drinks.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4\*. People **who are important to me** want me to keep track of how many SSBs my child drinks.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

**Descriptive Norms Scale**

1\*. **Most people** who are important to me and who have kids monitor their child's SSB consumption.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2\*. How many people that have kids **that you respect** monitor their child's SSB consumption?

Very few 1 2 3 4 5 6 7 Virtually All

3\*. How many **people similar to you** that have kids at home monitor their kids' SSB consumption?

Very few 1 2 3 4 5 6 7 Virtually All

**Perceived Behavioral Control Scale**

1\*. **I am confident** that I can keep track of the SSBs my child has at home if I want to.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2\*. For me, keeping track of my child's SSB consumption at home is:

Easy 1 2 3 4 5 6 7 Hard

3\*. Limiting how many SSBs my child drinks at home is something that is **beyond my control**.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4\*. **Keeping track of** how many SSB my child drinks at home is...

Not at all up to me 1 2 3 4 5 6 7 Completely up to me

5\*. When my child wants to have more SSBs than allowed, I...

Always give in 1 2 3 4 5 6 7 Never give in

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