

# Motivating Children and Adolescents in Obesity Treatment

Sarah Woo<sup>1</sup>, Kyung Hee Park<sup>2,\*</sup>

<sup>1</sup>Major in Biomedical Science, Department of Medical Sciences, Hallym University College of Medicine, Chuncheon; <sup>2</sup>Department of Family Medicine, Hallym University Sacred Heart Hospital, Hallym University College of Medicine, Anyang, Korea

Enhancing motivation is a crucial issue in pediatric obesity interventions, as behavioral changes related to food intake and physical exercise are difficult to carry out with an insufficient level of motivation. In the treatment setting, low motivation towards change may lead to early termination or inadequate treatment outcomes. This paper reviews widely-used models of motivation, including the transtheoretical model of change, self-determination theory, and motivational interviewing (MI). We introduce useful strategies based on each theoretical model to enhance motivation, such as an importance and confidence scale and a decisional balance technique. A review of recent MI interventions in children and adolescents is presented to discuss the efficacy of MI-based interventions and considerations for applying MI in pediatric obesity.

**Key words:** Pediatric obesity, Motivation, Motivational interviewing, Behavior therapy, Health behavior, Theoretical model

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\*Corresponding author

Kyung Hee Park



<https://orcid.org/0000-0001-9806-0076>

Department of Family Medicine,  
Hallym University Sacred Heart Hospital,  
Hallym University College of Medicine,  
22 Gwanpyeong-ro 170beon-gil,  
Dongan-gu, Anyang 14068, Korea  
Tel: +82-31-380-3805  
Fax: +82-31-380-1782  
E-mail: beloved920@gmail.com

## INTRODUCTION

Treating pediatric obesity is challenging as treatment choices are often limited due to developmental issues. For children and adolescents, lifestyle changing intervention is mainstay in the treatment of obesity.<sup>1,2</sup> There are critical issues to consider when applying lifestyle changing interventions to the pediatric population: limited effectiveness, high dropout rate, and low level of motivation to change are important considerations in pediatric obesity.<sup>3-5</sup> To ensure treatment effectiveness, it is crucial to assess a patient's motivation to change and provide adequate strategies to enhance motivation for enacting lifestyle changes.

The purpose of this review is to examine theoretical and treatment approaches to enhance motivation in pediatric obesity. We

discuss common approaches directed at changing motivation, including the transtheoretical model of change (TTM), self-determination theory (SDT), and motivational interviewing (MI).<sup>6,7</sup> We also discuss various treatment modalities to induce obesity-related behavioral changes, such as social cognitive theory,<sup>8</sup> motivational enhancement therapy,<sup>9</sup> and health action process approach.<sup>10</sup> Recent intervention studies based on MI and their effectiveness in treating pediatric obesity are also summarized.

## TRANSTHEORETICAL MODEL

Many lifestyle changing interventions focus on 'changing behavior' as a component of the treatment. However, many patients are not ready to initiate behavior change when they enter treatment,

and may not benefit sufficiently from these action-oriented programs.<sup>11</sup> TTM provides a useful theoretical tool to distinguish different stages of readiness for behavioral change related to obesity. This helps to determine which treatment strategies would be most useful to enhance motivation according to the patient's stage.<sup>12,13</sup>

According to the TTM, change is a process that progresses across time through five stages: precontemplation, contemplation, preparation, action, and maintenance.<sup>11</sup> During precontemplation, patients may be unmotivated. Patients in this stage may refuse to discuss losing weight. Contemplation is a stage in which people acknowledge that there is a problem and consider changing behaviors, such as changing their diet or increasing physical activity, but ambivalence towards change limits them from making a commitment. Preparation is a stage in which people intend to make a change in the near future and have started implementing small changes, such as taking the stairs. These people may benefit from action-oriented obesity interventions. Action is a stage with overt behavioral changes; in this stage, patients may initiate considerable efforts into making these changes. Lastly, maintenance is a stage in which people gain confidence in maintaining behavioral change. The treatment goal for this stage is to prevent relapse.<sup>11,14,15</sup>

The stages of change model demonstrates that different treatment modalities are recommended for different stages of change.<sup>16</sup> The proportion of children in each stage of change regarding physical activity and dietary behaviors varies widely across samples.

Children in the precontemplation and contemplation stages ranged from as little as 17.3% to as much as 78.7%, while participants in the preparation and action stages ranged from 25.2% to 64.6% in previous obesity intervention studies.<sup>12,17,18</sup> Clinicians should be aware that patients visiting the clinic range broadly regarding readiness to change. Patients in the early stages require strategies such as consciousness raising and discussing cost and benefits to enhance motivation to initiate change, while people in the preparation and action stages may benefit more from action-oriented strategies, such as stimulus control and reinforcement management.<sup>15,16</sup> Identification of stages and intervention strategies for each stage of change are presented in Table 1.<sup>11,13,14</sup>

Guidelines may be helpful in clinical practice. First, a patient's stage of change should be assessed to set adequate treatment goals for his or her readiness for change. Simple questions will assess a patient's actual practice of the target behavior and intention to engage in such behavior in the future (Table 1). The stages of change can be assessed separately on specific target behaviors, such as "taking the stairs," "eating fruits for snacks," and "drinking low-fat milk," so that it is easier for both the patient and the clinician to set specific treatment goals.<sup>13</sup>

Second, the treatment goal should be realistic and include a plan to advance one stage at a time. It may not be helpful to expect a patient in the precontemplation stage to achieve direct action goals at the first treatment attempt, such as cutting back on soda completely.

**Table 1.** Stages and components of transtheoretical model<sup>11,13,14</sup>

Stages of change	Description	Assessment question*	Intervention strategy
Precontemplation	Is unaware of need to change and does not have intention to change	"Do you do the (target behavior) less than half the time now, and have no plans to do it within the next 6 months?"	- Consciousness raising - Dramatic relief - Environmental reevaluation - Providing information about change
Contemplation	Has intention to change but experiences ambivalence towards change	"Do you do the (target behavior) less than half the time now, but are thinking about doing it sometime within the next 6 months?"	- Self-reevaluation - Cost and benefits
Preparation	Is preparing to take action and make plans related to change	"Do you do the (target behavior) less than half the time now, but are making definite plans to start doing it within this month?"	- Self-liberation - Goal-setting
Action	Engages in change or modifying behavior (less than 6 months)	"Do you do the (target behavior) at least half the time now, and have just started doing it within the last 6 months?"	- Counterconditioning - Helping relationships - Reinforcement - Stimulus control - Encouragement
Maintenance	Sustains changed behavior for more than 6 months	"Do you do the (target behavior) at least half the time now, and have been doing it for more than 6 months now?"	-Relapse prevention

\*Questions are implemented from Weight Loss Behavior-Stage of Change Scale.<sup>13</sup>

Rather than risking early termination by imposing action on non-motivated patients,<sup>19</sup> it may be helpful to work on enhancing motivation prior to taking action.<sup>15</sup>

Third, treatment strategies should be adequately matched to a patient’s stage of change. For example, it may not be effective to implement behavioral changing strategies in patients at the precontemplation and contemplation stages, as these changes may be temporary without intrinsic motivation. Instead, strategies to enhance motivation are required, such as giving obesity-related health risk feedback to activate emotional responses (dramatic relief), increasing awareness about the causes and consequences for obesity (consciousness raising), and helping to realize how personal behaviors affect social relationships and the environment (environmental reevaluation). Meanwhile, it is equally insufficient to apply motivational strategies when a patient is ready to change. Behavioral techniques such as stimulus control and reinforcement can help more to accomplish behavior changes at this stage.<sup>11,15,16</sup>

### SELF-DETERMINATION THEORY

While TTM focuses on the “level” or “quantity” of motivation, determining the “type” and “quality” of motivation may also be important to engage patients in lifestyle changing behaviors.<sup>20</sup> SDT, suggested by Deci and Ryan,<sup>21,22</sup> introduces a theoretical framework to understand the quality of different types of motivations and how

they affect behavior. According to the SDT, motivation can be distinguished as amotivation, extrinsic motivation, and intrinsic motivation. Whereas extrinsic motivation is a type of motivation in which the behavior is a means of achieving external outcomes, intrinsic motivation arises when the behavior is satisfactory in itself.<sup>23,24</sup> There are four different types of extrinsic motivation, which vary on a spectrum according to the degree of internalization and autonomy. Types of motivational regulation and examples related to physical activity are described in Table 2.<sup>23-26</sup>

To determine whether a change will persist, a patient’s level of autonomy and degree of internalization regarding his or her motivation should be evaluated. More self-regulatory motivation regarding exercise behavior is related to the amount of physical activity and maintenance of weight loss.<sup>24,25</sup> Even when patients seem to be equally motivated (e.g., preparation stage), sometimes it is not enough to understand the motives behind the action. For example, a child stops drinking soda after a doctor’s visit where the child learns that he or she has to lose weight to get healthy (identified regulation). This behavior may have a higher chance of lasting than a child who stops drinking soda to refrain from his or her parent’s scolding (external regulation). A behavior has an even higher chance of lasting when it is done for intrinsic reasons. A child playing basketball because it is fun may keep playing even after he or she has lost a considerable amount of weight (intrinsic regulation).<sup>20</sup>

Most of the work with SDT and obesity is focused on the moti-

**Table 2.** Motivational regulations according to self-determination theory<sup>23-26</sup>

Type of motivational regulations	Type of motivation	Description	Motivational source
Amotivation	Amotivation	Has no reason or intention to engage in the target behavior	None (e.g., does not engage in physical activity even though one is advised to do so)
External regulation	Extrinsic motivation	Motivated by external controls prescribed by others. May only temporarily control behavior and is likely to show minimal effort	- Gaining rewards - Avoiding punishment (e.g., exercises to receive allowance promised by parents)
Introjected regulation		Motivated by internal pressure from internalized constructs of external controls. Does not truly value the behavior and may experience inner conflict	- Feeling self-approval - Avoiding feeling guilty (e.g., exercises after heavy meal because one is affected by societal ideal of thinness)
Identified regulation		Motivated because behavior is perceived as important and useful. The behavior is usually a means to achieve certain outcomes	- Outcomes of behavior (e.g., exercises to get healthy or lose weight)
Integrated regulation		Motivated because the behavior is in concordance with one’s values and sense of self. Stable and persistent type of motivation	- Feeling of identification (e.g., plays soccer as a sports player, which is an important part of one’s identity)
Intrinsic regulation	Intrinsic motivation	Motivated because behavior is interesting and exciting in itself. A person engages in the behavior willingly and with self-determination	- Enjoyment - Pleasure - Fun (e.g., riding a bicycle because it is enjoyable)

vation for engaging in physical activity.<sup>20,27</sup> Although research targeting the pediatric population is scarce, studies in the adult population showed that autonomous or intrinsic motivation predicts higher rates of attendance, exercise, weight loss, and weight loss maintenance after intervention.<sup>24,28-31</sup> SDT-based obesity interventions that included setting value-relative goals and enhancing enjoyment were successful in reinforcing motivation and also increased the amount of physical exercise.<sup>27,29,32</sup> Some effective strategies included exploring the value of exercise other than weight management and presenting various exercise options to discover a physical activity that is personally enjoyable.<sup>31</sup>

Other strategies based on SDT may also be useful to promote autonomous motivation. First, refrain from the use of external incentives, such as giving rewards for exercise, as this will undermine the sense of autonomy and internal locus of causality. Also, provide a list of options to choose from, as physical activity or dietary plans corresponding to the patient's preference are more likely to be congruent with his or her internal goals and values. Lastly, rather than using coercive statements such as "you should exercise" or "you must lose weight," use neutral terms and give objective reasons for adopting a health-related behavior to help a patient to examine the rationale and make a choice on his or her own behalf.<sup>24</sup>

## MOTIVATIONAL INTERVIEWING

### Strategies of MI

Finally, MI is a powerful tool widely used to promote behavior change. Motivational changes that occur through MI can be explained through the theoretical framework of TTM and SDT. The key principles and strategies of MI are similar to concepts from TTM and SDT, especially the importance of resolving ambivalence and enhancing autonomous motivation to change.<sup>23,24,33,34</sup>

MI is a particularly useful tool with a distinctive style of interacting with patients and providing strategies to work on behavioral change.<sup>23</sup> The main elements of MI are distinguished into relational and technical components.<sup>33</sup> The relational component is the "spirit of MI," or the clinician's interpersonal qualities in being empathetic and collaborative with a patient.<sup>35</sup> The technical component is a variety of strategies used to motivate patients to pursue change, such as expressing empathy, reflective listening, rolling with resistance,

eliciting statements of motivation, and developing discrepancy.<sup>23,24,36</sup> In contrast to conventional approaches that use a confronting and directive style of interaction, MI avoids imposing action or directly persuading a patient to change and instead interacts with patients to support their autonomy.<sup>37</sup>

Although MI was first developed as a counseling method, with adequate training, many practitioners can use it for pediatric obesity treatment, including nurses, dietitians, and physicians.<sup>24</sup> The American Academy of Pediatrics has recommended MI as an approach for treating pediatric obesity.<sup>36,38</sup> MI used in combination with other forms of treatment, such as behavioral therapy, is known to be effective.<sup>24</sup> The common components and strategies of MI that can be used to treat pediatric obesity are described in Table 3.<sup>36,39-41</sup>

### Recent MI interventions

Evidence has shown that MI is effective in leading health-related behavioral change during obesity treatment in the adult population.<sup>38,42,43</sup> Meanwhile, the relatively few studies that have examined the efficacy of MI in children and adolescents with obesity have shown mixed results.<sup>44-47</sup> A recent meta-analysis on the effectiveness of MI to treat adolescents with obesity yielded a nonsignificant overall reduction in body mass index (BMI) z-score and other cardiometabolic outcomes, such as insulin and triglycerides.<sup>47</sup> However, some promising outcomes were reported related to increased health-related behaviors and quality of life.<sup>46,47</sup>

A meta-analysis on children with obesity treated with MI also presented mixed results regarding treatment outcomes.<sup>45</sup> Three trials included in the review demonstrated that MI intervention is more effective than usual care in decreasing BMI, while three other trials showed null effects regarding BMI.<sup>45</sup> In parallel with interventions in adolescents, MI interventions targeting children also showed improvements in behavioral outcomes, such as decreased calorie intake,<sup>48</sup> less consumption of snacks and soda,<sup>49</sup> and decreased screen time.<sup>50</sup>

Although there is still insufficient data to draw conclusions about the efficacy of MI as a strategy to treat pediatric obesity,<sup>51</sup> we looked at some of the most recent MI interventions since the latest meta-analysis on adolescents<sup>47</sup> and children.<sup>45</sup> A brief review of recent studies on the effectiveness of MI in pediatric obesity are presented in Table 4.<sup>5,52-55</sup>

**Table 3.** MI strategies and examples for children with obesity<sup>36,39-41</sup>

Main MI technique	Description and rationale	Example
Agenda setting	Collaboratively sets session agenda - Offers the patient control over course of action - Patient is more likely to participate actively in conversation.	"Would it be okay to talk about your weight today?" "Which of the topics, exercise or reducing screen time, would you like to talk about today?"
Reflective listening	Rephrasing what patients have said and clarifying implicit or explicit emotions and meanings of what patients intended - Expresses empathy - Facilitates patient's self-disclosure and expression of feelings	"Here is how I heard what you were saying. On one hand, you don't want to give up on drinking soda. On the other hand, you feel the need to change to become healthy."
Open-ended questions	Questions that can be answered using patient's own words and not answered with restricted forms of "yes" or a "no" - Provides more information and details about the patient - Gives patients the opportunity to explore and express their thoughts and feelings	"Tell me about your concerns related to increasing physical activity." (Instead of "Are you concerned about increasing physical activity?")
Importance and confidence scales	Scale questions ask degree of importance and confidence in achieving certain behavior on a scale of 1 to 10 to assess motivation and self-efficacy - Change talk can be elicited when patients explain why they did not choose a lower number - Helps to identify obstacles related to change and factors that can help in achieving success	"On a scale from 0 to 10, how important is it for you to lose weight?" "On the same scale, how confident are you that you can lose weight?" "Why didn't you give a lower number?" "What is needed to get to a higher number?"
Decisional balance technique	Discuss patient's ambivalence towards change by examining pros and cons of changing behavior - Helps clarify reasons for ambivalent attitude towards change	"What are the things you like about eating snacks at night?" "What are some of the bad things about eating snacks at night?" "What reasons are particularly important to you?"
Develop discrepancy between actual and desired behavior	Promote awareness of how patient's current behaviors are inconsistent with his or her important values and goals - Resolves ambivalence towards change	"How do you want to be living in 5 years from now, when you are a grown-up?" "Is there any behavior that you are doing now that may get in the way of these goals?"
Affirming autonomy	Avoids confronting or imposing behavior on patient and emphasizes freedom of personal choice and responsibility - Acknowledges that patients are experts in their own lives - Enhances intrinsic motivation.	"It is up to you to decide whether or not you want to start exercise, and to choose which way works best for you."
Supporting self-efficacy	Noticing and encouraging patient's strengths and efforts - Facilitates the ability of patients to make their own change - Exploring patient's past successes and acknowledging strengths enhances self-efficacy	"Can you tell me about a past experience when you tried to lose weight and succeeded?" "How you tried participating in the PE class is very impressive."
Eliciting change talk	Reinforcing change talk, which is patient's own motivational statements of expressing desire to change - Change talk best predicts actual behavior change	"What do you expect to happen if you don't make any changes regarding your diet?" "How do you think this behavior would affect your future if it kept going?"
Providing information or advice with permission	Asking permission to discuss subject before offering information, suggestions, or advice - Asking permission before providing information lowers patient's resistance - Helps to enhance willingness to hear information	"Can I share some information with you about the benefits of exercising?" "Would it be okay if I share some useful tips that worked for other kids who have the same worries as you?"
Summarizing	Restating what patient had said with a summary - Demonstrates that clinician has been listening - Patients are more likely to be motivated by hearing what they have said, instead of what other people have told them.	"Could I go over what we have discussed so far today? From what I understand..."

MI, motivational interviewing; PE, physical education.

Two trials each on adolescents and children were identified. Three of the four studies were relatively brief, ranging from 3 to 10 sessions,<sup>52-54</sup> while the Fit Families trial was a more intensive intervention with an average of 21 sessions applied over 7 months.<sup>5</sup> The

results imply that brief forms of MI counseling may be useful in treating pediatric obesity.<sup>52-54</sup> Brief interventions were effective, and more intensive intervention was not more beneficial.

While recent updates of the MI-based obesity intervention in



**Table 4.** Review of recent MI intervention trials in pediatric obesity

Author (year)	Study design	Subject	Duration (follow-up)	Intervention (session)	Outcome
Freira et al. (2018, 2019) <sup>54,55</sup>	Cluster RCT	- 97 Participants (14–19 years) - Overweight	- 3 Months (6 months follow-up) - 83 (85.6%) Completed	- CI: 3 sessions - MI: 3 sessions	- MI group: BMI z-score↓, WC↓, fat mass↓, muscle mass↑, SBP↓, DBP↓ - CI group: WC↑, fat mass↑, muscle mass↓, HRQoL↓
Naar et al. (2019) <sup>5</sup> (fit families)	Sequential multiple assignment randomized trial	- 181 Participants (12–17 years) - BMI ≥ 95th percentile for age and sex	- 7 Months - 156 (86%) Completed	- Home-based MI: 12 sessions+RP/CS/CM (3 mo) - Office-based MI: 12 sessions+RP/CS/CM (3 mo)	All groups: weight loss 3.20% (no group difference)
Resnicow et al. (2016) <sup>53</sup> (BMI <sup>2</sup> )	Cluster RCT	- 645 Participants (2–8 years) - BMI ≥ 85th, ≤ 97th for age and sex	- 2 Years - 457 (71%) Completed	- Usual care - PCP: 3 MI sessions, 1 booster session (PCP) - PCP+RD: 3 MI sessions, 1 booster session (PCP), 6 sessions (RD)	- BMI percentile, fruit and vegetable intake: PCP+RD < usual care - Screen time: PCP+RD < PCP, usual care
Broccoli et al. (2016) <sup>52</sup>	RCT	- 372 Participants (4–7 years) - BMI ≥ 85th, ≤ 95th for age and sex	- 12 Months (24 months follow-up) - 337 (91%) Completed	- Usual care - MI: 5 sessions	- MI short-term effect (12 mo): BMI↓, PA↑, sweet snacks/desserts↓, sweetened drinks↓ - MI long-term effect (24 mo): BMI↑ (12–24 mo rebound), breakfast↑, sweetened drink↓

MI, motivational interviewing; RCT, randomized controlled trial; CI, conventional intervention; BMI, body mass index; WC, waist circumference; SBP, systolic blood pressure; DBP, diastolic blood pressure; HRQoL, health-related quality of life; RP, relapse prevention; CS, continued skills; CM, contingency management; PCP, primary care providers; RD, registered dietitians; PA, physical activity.

children and adolescents demonstrated successful weight loss after MI treatment, the effect was modest.<sup>5,53,54</sup> Broccoli et al.<sup>52</sup> indicated that although MI was more effective than usual care after 12 months of intervention, the MI group showed a rebound effect of weight increase during the 12–24 month period of maintenance. One trial reported that cardiometabolic parameters, such as waist circumference, blood pressure, and fat mass, decreased with a larger effect size than BMI z-score change.<sup>54</sup>

As suggested by previous literature, MI may have a more direct effect on behavioral changes related to food intake and enhanced physical activity. At least short-term effects of MI on food intake were reported, including increased fruit and vegetable intake, vegetable soup intake, and decreased sweet snacks, candy, desserts, and sweetened drinks intake.<sup>52,53</sup> Behavioral changes associated with physical activity including decreased screen time and enhanced non-organized physical activity were also significant.<sup>52,53</sup> Health-related quality of life was improved with MI.<sup>55</sup> This result is reasonable, as the primary focus of MI is not to decrease weight but to enhance motivation to engage in specific behavioral changes.<sup>47</sup> The effective communication facilitated through MI is also associated with other treatment-related factors, such as patient satisfaction and adherence to treatment recommendations.<sup>33,56</sup>

Other considerations when applying MI in pediatric obesity include the phase of treatment in which MI is most effective. MI may work best in the initial stages of intervention, whereas motivational issues should be used to engage patients in treatment and behavioral change.<sup>1,57</sup> Even an MI session delivered over the phone prior to treatment initiation was shown to be effective in increasing treatment adherence.<sup>56</sup> Once the issues with motivation are thoroughly addressed, more direct modes of intervention should be added, such as behavioral therapy or cognitive behavioral therapy.<sup>57,58</sup>

It is also possible to consider different options when deciding on the treatment mode of MI. Interventions that explored the outcomes of MI delivered by telephone demonstrated its effectiveness,<sup>59,60</sup> and the effect of home-based MI was not different from that of office-based intervention.<sup>5</sup> While MI-based text-messaging may not have a direct effect on decreased BMI, it may be a useful supplementary tool because it increases adherence to treatment and behavioral changes.<sup>61,62</sup>

## CONCLUSION

To address the crucial issue of enhancing motivation in pediatric obesity, we assessed several models of motivation, including TTM,

SDT, and MI. These treatment modules were initially applied in the field of addiction treatment, but have been extended for use in a variety of behavioral interventions including obesity.<sup>47</sup> TTM is particularly useful in assessing a patient's readiness to engage in behavioral change and setting goals. SDT enhances understanding of a patient's motivational causes by examining types of motivation, which are distinguished by the level of autonomy. Lastly, MI is a practical approach frequently used in obesity treatment that encompasses the theoretical framework of TTM and SDT to present a variety of strategies for use in clinical practice. Because each patient's motivational status for behavioral change is different, it is crucial to comprehend the level and content of a patient's motivation and deliver an intervention tailored to each patient. TTM, SDT, and MI can serve as useful theoretical approaches to guide this process and enhance motivation to treat pediatric obesity.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

## AUTHOR CONTRIBUTIONS

Study concept and design: KHP and SW; drafting of the manuscript: KHP and SW; critical revision of the manuscript: KHP and SW; and study supervision: KHP.

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