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MOTIVATION AND HEALTH BEHAVIOR IN THE PREVENTION OF CHILDHOOD OBESITY

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To Isak and Aron

ABSTRACT

The objectives of the present thesis were to investigate self-efficacy and motivational interviewing as motivational frameworks for health behavior change in the prevention of childhood obesity, and to explore child health services as a setting for childhood obesity prevention. Specifically, the thesis aimed to (a) develop a measure of parental self-efficacy for promoting healthy physical activity and dietary behaviors in children and assess its psychometric properties, (b) evaluate the effects of a training program in childhood obesity prevention on self-efficacy in nurses in child health services, (c) evaluate the effects of a training program in motivational interviewing on proficiency in nurses in child health services, and (d) investigate the frequency of conversation about dietary and physical activity behaviors in children in child health services.

In **Study I**, using exploratory and confirmatory factor analyses, the evaluation showed that a new measure of parental self-efficacy had adequate psychometric properties in a sample of 2232 mothers with 3-year-old children, including construct and discriminant validity, internal consistency ($\alpha = .87$), and test-retest reliability ($r = .82$). **Study II** used multiple linear regression analysis and dependent *t*-tests with Bonferroni correction to examine the effects of training in methods of preventing childhood obesity on efficacy beliefs in nurses in child health services. The study had a randomized controlled design with an intervention group ($n = 22$) and a control group ($n = 38$). Results showed that efficacy beliefs in intervention nurses had increased at post assessment relative to control nurses ($\beta = 14.70, p < .001$). **Study III** used dependent *t*-tests and multiple linear regression analysis to evaluate the effects of training in motivational interviewing on proficiency in a sample of nurses in child health services ($n = 36$). Skillfulness had not been acquired in this sample from pre to post training ($ps \geq .05$). In **Study IV**, conversations between nurses ($n = 23$) and parents in child health services were assessed to what extent conversations focused on child health behaviors. Using descriptive statistics, it was found that attention to these behaviors was infrequent, with dietary behaviors ranking fourth and physical activity on rank 14 among topics of conversation.

In summary, self-efficacy is a useful framework, and motivational interviewing a potentially useful framework in childhood obesity prevention. Efficacy beliefs were adequately assessed in parents of small children and nurses in child health services, and increased in nurses as a result of training. However, motivational interviewing proved to be a difficult method to learn, and conversations in child health services did not focus to any greater extent on dietary and physical activity behaviors in children.

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LIST OF ABBREVIATIONS

BMI	Body mass index
CFA	Confirmatory factor analysis
CHS	Child health services
EFA	Exploratory factor analysis
LOC	Locus of control
MI	Motivational interviewing
MISC	Motivational Interviewing Skill Code
MITI	Motivational Interviewing Treatment Integrity Code
PHBS	Parental Health Belief Scales
PSE	Parental self-efficacy
PSEPAD	Parental Self-Efficacy for Promoting Healthy Physical Activity and Dietary Behaviors in Children Scale
RMSEA	Root mean square error of approximation
RSES	Rosenberg's Self-Esteem Scale
SCT	Social cognitive theory
SE	Self-efficacy

1 INTRODUCTION

In which I introduce the main topics of the present thesis, including childhood obesity, social cognitive theory, and motivational interviewing.

1.1 DEFINITION OF CHILDHOOD OBESITY

Obesity, or excessive body fat, results from an imbalance in energy intake through diet and energy expenditure through metabolism and physical activity, when energy intake is larger than expenditure (Lakshman, Elks, & Ong, 2012). The most common measure of body fat is body mass index (BMI), calculated as weight in kilograms (kg) divided by the square of height in meters (m²). Using BMI, childhood obesity is defined by comparing a specific BMI value with reference values adjusted for age and sex (Rolland-Cachera, 2011). One widely used framework for assessing childhood obesity is the International Obesity Task Force references, which correspond to adult cut-off points of a BMI of 25 kg/m² for overweight and 30 kg/m² for obesity (Cole, Bellizzi, Flegal, & Dietz, 2000).

1.2 PREVALENCE OF CHILDHOOD OBESITY

Based on the International Obesity Task Force criteria, the prevalence of overweight (including obesity) in school-aged children varies considerably around the world, in 2006 estimated to 1.6 % in Africa, 27.7 % in the Americas, 23.5 % in the Eastern Mediterranean, 25.5 % in Europe, 10.6 % in Southeast Asia, and 12.0 % in the West Pacific (Wang & Lobstein, 2006). Also on a regional basis, there are between-countries variations. For example, in eight European countries, the prevalence of overweight (including obesity) in children aged 2 to 9 years ranged from 8.3 % in Belgium to 42.3 % in Italy, with 10.2 % in Sweden (Hunsberger et al., 2012). There are indications that the prevalence of childhood obesity is leveling off or decreasing in several European countries, including Sweden, and in Australia, New Zealand, the USA, and in one of the provinces in China (Olds et al., 2011; Rokholm, Baker, & Sorensen, 2010).

1.3 THE OBESOGENIC ENVIRONMENT

The genetic influence on BMI in childhood is considerable, with heritability estimates ranging from 50% to 90% across ages (Silventoinen, Rokholm, Kaprio, & Sørensen, 2010). However, as the increase in childhood obesity during the last two decades has been so dramatic (de Onis, Blossner, & Borghi, 2010), genetic factors are not likely to be accountable, as genes have not changed. The environment is critical, as obesity-associated genes need appropriate obesogenic conditions for their expression (Lobstein, Baur, & Uauy, 2004; Tounian, 2011). This obesogenic environment is characterized by high access to inexpensive energy-dense, nutrient-poor foods and beverages, and factors facilitating a sedentary lifestyle, including labor-saving devices, motorized transport and screen-based leisure time activities. To put it bluntly: “we have evolved

from a society of hunter-gatherers to a society of drive-through picker-uppers” (Ard, 2007, p. 1058). At present, however, it is not established whether it is increases in energy intake or decreases in energy expenditure that constitutes the primary determinant of childhood obesity (Bleich, Ku, & Wang, 2011).

Studies show that food promotion, large portion sizes, and consumption of sugar-sweetened soft drinks are positively associated with energy intake or BMI in children (Osei-Assibey et al., 2012), and that sedentary behaviors (e.g., watching television or movies, playing electronic games) are positively associated with child weight status (Prentice-Dunn & Prentice-Dunn, 2012). Environmental factors in the neighborhood as walkability, low traffic volume, proximity to recreation facilities, mixed land use, and residential density are positively associated with physical activity (Ding, Sallis, Kerr, Lee, & Rosenberg, 2011), indicating that the obesogenic environment is related to socioeconomic status, which shows an inverse association with childhood obesity (Shrewsbury & Wardle, 2008). The first review of prospective studies of associations between energy balance-related behaviors and overweight in children found strong evidence for an inverse association between total physical activity and overweight, and moderate evidence for a positive association between sedentary behaviors (mainly television viewing) and overweight (te Velde et al., 2012). However, the review found insufficient evidence for an association between dietary behaviors and overweight, possibly due to heterogeneity in the assessment of these behaviors.

On a biological level, the obesogenic environment influences antenatal risk factors of childhood obesity, including maternal or paternal obesity, gestational weight gain, maternal diabetes mellitus, and postnatal risk factors, as high birth weight and rapid infancy weight gain (Dattilo et al., 2012; Lakshman, et al., 2012; Lobstein, et al., 2004). On a behavioral level, in parent-child interactions, obesogenic environmental risk factors include availability and accessibility of unhealthy foods and beverages in the home, parental modeling of disinhibited eating and sedentary behaviors, and certain parental feeding practices, including encouraging children to overeat, restricting access to desired foods, and using energy-dense foods as a reward or for comfort (Dattilo, et al., 2012; Rhee, 2008; Robinson, Yardy, & Carter, 2012).

1.4 SHORT- AND LONG-TERM HEALTH EFFECTS OF CHILDHOOD OBESITY

Obesity in childhood is associated with a range of adverse health effects in the short-term, including hypertension, atherosclerosis, type 2 diabetes mellitus, fatty liver disease, sleep apnea, and musculoskeletal disorders (Daniels, 2009; Lakshman, et al., 2012). Furthermore, childhood obesity is associated with low self-esteem and quality of life (Griffiths, Parsons, & Hill, 2010). When influenced by weight-based teasing and stigmatization, obesity in childhood is probably also associated with depression, body dissatisfaction, social rejection, binge eating disorder, and unhealthy weight control behaviors (e.g., dieting, fasting), although more research is needed to establish these associations (Harriger & Thompson, 2012; Puhl & Heuer, 2010; Puhl & Latner, 2007).

Obese children run an increased risk of becoming obese adults (Singh, Mulder, Twisk, van Mechelen, & Chinapaw, 2008), presumably in part due to the tracking of unhealthy dietary and physical activity behaviors from childhood to adulthood (Craigie, Lake, Kelly, Adamson, & Mathers, 2011). Obesity in childhood is associated with morbidity in adulthood, including type 2 diabetes mellitus, hypertension, and coronary heart disease, and premature mortality (Reilly & Kelly, 2010). However, it is not clear whether the relationship between childhood obesity and adult disease are independent of adult BMI (Park, Falconer, Viner, & Kinra, 2012), and the association between adult (> 18 years) obesity and mortality may apply only for grades 2 and 3 obesity (i.e., BMI \geq 35) (Flegal, Kit, Orpana, & Graubard, 2013).

1.5 TREATMENT OF CHILDHOOD OBESITY

Recommended treatment of childhood obesity combines dietary, physical activity, and behavior change interventions based on cognitive-behavioral therapy within a family-oriented approach (Kirschenbaum & Gierut, 2012; Oude Luttikhuis et al., 2009; Sung-Chan, Sung, Zhao, & Brownson, 2012). A meta-analysis of four trials of behavioral family programs involving 301 children under the age of 12 found small but clinically significant effect sizes compared to standard care, and that these were maintained at 6-month follow-up (Oude Luttikhuis, et al., 2009). However, the effect sizes were no longer significant at 12-month follow-up, although decreases in BMI found post intervention persisted until 12- or 24-month follow-up. No studies of interventions for preschool children were identified in the review (Oude Luttikhuis, et al., 2009). Since then, a few treatment studies in this age group have been conducted (e.g., Taveras et al., 2011). However, there are several reasons to why prevention may be preferable to treatment, including no suffering if problem is not present, limited availability of treatment, and probable cost-effectiveness (Haynos & O'Donohue, 2012).

1.6 CHILDHOOD OBESITY PREVENTION

According to recent evidence-based recommendations (Summerbell et al., 2012), successful prevention in young children aged 4 to 6 years includes parental involvement, theoretically based strategies for producing behavior change, parents or caregivers as the primary target of prevention, a combined focus on dietary and physical activity behaviors, use of reinforcement, and modeling and skill building.

The majority of studies of childhood obesity prevention are conducted in school-settings in 6- to 12-year olds, however, a few studies with promising results also exist in children aged 0 to 5 years, particularly in home or health care settings (Waters et al., 2011). According to recent meta-analyses, prevention interventions are effective in reducing excessive body fat in children, with an effect size (i.e., reduction in BMI units from pre to post intervention relative to the control group) of -0.26 in children aged 0 to 5 years (based on seven studies with a combined sample of 1815 children), -0.15 in children aged 6 to 12 years (24 studies, $n = 18\ 983$), and -0.09 in children aged 13 to 18 years (six studies, $n = 7148$) (Waters, et al., 2011). Across all age groups, the effect size was -0.15 (37 studies, $n = 27\ 946$). Only a limited number of studies reported post

intervention follow-up, precluding any conclusions about long-term effects. The effect sizes may appear modest, however, they are clinically significant at a population level if sustained over several years; if the effect sizes would have been increases in BMI in adults, they would represent a doubling in population prevalence of obesity over a 20-year period (Waters, et al., 2011).

Prevention may be primary (targeting all individuals of a population), secondary (targeting individuals with heightened risk), or tertiary (targeting already affected individuals). According to Haynos and O'Donohue (2012), primary prevention is often considered the most desirable mode of prevention, for two reasons: obesity has reached such epidemic proportions that approaches that may be of benefit to most children are encouraged, and it reduces stigma that may result from interventions targeting specific high-risk populations (e.g., overweight children, ethnic minorities). A review focusing on primary prevention interventions of childhood obesity found that interventions mainly produced small effect sizes, results were not uniform across studies, and evaluation of the durability of effects were generally lacking (Haynos & O'Donohue, 2012). According to the authors, although far from being definite, it appears from this review that knowledge transfer regarding nutrition and physical activity combined with mandated exercise, or simply promotion of increased physical activity in preschools and schools, are effective preventive means. In addition, it seems that specifically targeting reduction of television viewing may add to preventive effects. The authors concluded that no childhood obesity prevention program currently meets the standards for a well-established treatment [according to criteria set by the American Psychological Association (American Psychological Association Division of Clinical Psychology, 1995)], as no program has been replicated by independent research groups. Another limitation was that only half of the studies reviewed reported on the theories and principles of behavior change used to guide program development, and when these were reported, the assumptions of the theory were not tested, for example, using mediation analysis. According to the authors, this lack of theoretical underpinning may hamper further development of the field (Haynos & O'Donohue, 2012).

1.6.1 Childhood obesity prevention and child health services

Only two studies of childhood obesity prevention in 0- to 5-year-olds have been conducted in health care settings (Waters, et al., 2011), thus little is known about the feasibility of these settings for preventive efforts. Jouret and colleagues (2009) randomized preschools with children between 2.5 and 4 years of age to two intervention groups. Parents and teachers in the first intervention group received basic information on overweight and health, and those children who were overweight or at risk for overweight were followed-up by their family physician. The procedure was the same in the second intervention group, however, in addition, children in this group received a preschool-based educational component of ten 20-minute sessions to promote healthy dietary and physical activity behaviors. After the 2-year intervention period, prevalence of overweight and BMI was lower in the intervention groups compared to a control group in underprivileged areas only, while gains in BMI was lower in non-underprivileged areas in the reinforced intervention group compared to both the other intervention group and the control group. Keller, Klossek, Gausche,

Hoepffner, Kiess, and Keller (2009) randomized children between 4 and 7 years of age to an intervention group and a control group. The intervention group received a nutrition and exercise program provided by pediatricians. After the 1-year intervention period, BMI was stabilized in the intervention group, and had increased in the control group.

Although childhood obesity is recognized by pediatric health professionals (including nurses) as a condition that needs treatment and affects disease risk and future quality of life, they perceive a number of barriers in the management of childhood obesity, including lack of patient motivation and self-perceived low proficiency in behavioral interventions and guidance in parenting techniques, and insufficient skills in addressing family conflicts (Story et al., 2002). However, all groups of pediatric practitioners examined in this US sample (i.e., pediatricians, dietitians, nurses) expressed high interest in training in these areas. Relatedly, pediatric practitioners also report low perceived self-efficacy (SE) to treat obese children, which may stem from perceived low patient motivation (Resnicow, Davis, & Rollnick, 2006). Another reason for pediatric health professionals to perceive obstacles in preventing or treating childhood obesity may be difficulties in adapting to a shift in focus in child health services (CHS) during the last decades, from a paternalistic focus on the physical health of children to a more participatory focus on behavioral issues of the families (Hallberg, Lindbladh, Petersson, Rastam, & Hakansson, 2005).

Evidently, pediatric practitioners need training in health behavior change approaches that help them manage motivational issues in patients and their families, provide them with effective behavior change methods, and raise their SE. Two of the approaches with strongest evidence base are social cognitive theory (SCT) and motivational interviewing (MI).

1.7 SOCIAL COGNITIVE THEORY

Social cognitive theory is based on an agentic perspective on human development, adaptation, and change, meaning that individuals are intentionally influencing their functioning and life conditions (Bandura, 2005). In this perspective, people are self-organizing, proactive, self-regulating, and self-reflecting. According to SCT, human agency is dependent on the interaction between three major classes of determinants: intrapersonal (cognitive, affective, biological), behavioral, and environmental (Bandura, 1997). This interplay is referred to as triadic reciprocal causation, as the determinants are causally related in a bidirectional fashion. In SCT, there are three modes of human agency: (a) individual, by which people influence their own functioning or environmental events, (b) proxy, which is a socially-mediated agency employed by people to influence others who have the ability to act in ways that result in outcomes desired by them, and (c) collective agency, by which people as a group influence their environment through collective effort (Bandura, 2006b).

1.7.1 Self-efficacy

According to SCT, the central mechanism of human agency is perceived SE (Bandura, 1997). This core belief is the foundation of human motivation and action (Bandura, 2004a). People would not engage in behaviors if they did not believe that their actions could produce desired effects, and they would not persevere in the face of difficulties. The definition of SE (Bandura, 1997, p. 3) is as follows:

Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments.

According to Bandura (1997, 2004b, 2012), efficacy beliefs contribute to subsequent behavior in different areas of functioning (educational, health, clinical, athletic, organizational, and collective), independently of a host of other factors, including prior performance, ability, aptitude, occupational or scholastic interest, socioeconomic status, and amount of experience. In parenthesis, it can be noted, however, that the status of efficacy beliefs (and cognitions in general) as causes of behavior has been debated between proponents of SCT and behaviorism (e.g., Bandura, 1995, 1996; Hawkins, 1992; Lee, 1995).

According to SCT, in addition to SE there are three additional factors operating as regulators and motivators of action, and these are themselves influenced by efficacy beliefs (Bandura, 2004a). First, the *outcome expectations* people have of the likely results of their actions affect whether they engage in behavior change. For example, health behavior change may be expected to result in physical health gains, social approval, and increased self-worth. Second, *goals*, including plans and strategies for realizing them, provide people with further motivation to change behaviors, particularly if they are gradually introduced and short-term. Third, perceived *sociostructural facilitators and impediments*, for example, social norms about health, indirectly influence behaviors as they contribute to the formation of goals. The centrality of SE in the sociocognitive casual model is illustrated in Figure 1.

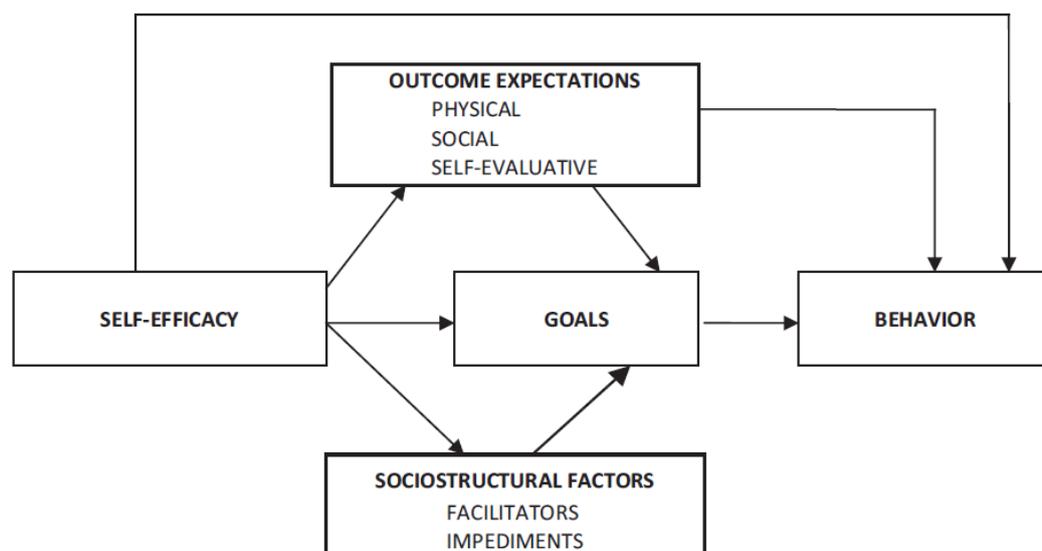


Figure 1. The sociocognitive causal model. Reproduced from Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management*, 38(1), 9-44. © 2012 Southern Management Association.

1.7.1.1 Measurement of self-efficacy

The power of efficacy beliefs to predict and explain behavior depends on its measurement. An inherent feature of the construct is domain-specificity. People do not demonstrate a general sense of personal efficacy expanding all spheres of functioning, rather, SE is specific to a certain domain, and thus varies across domains (Bandura, 1997; Bandura, 2012). Also within a single domain, efficacy beliefs may vary depending on situational circumstances, for example, impediments and time constraints. Furthermore, SE is not only predictive of performance success but also of perseverance in the face of difficulties and management of setbacks. These variations give rise to different levels of strength of efficacy beliefs, and thus must be taken into account in measurement (Bandura, 1997). Consequently, valid instruments provide differential information on SE by including a range of behaviors and situational circumstances that may hamper successful performance (Bandura, 2006a). From this it follows that valid SE instruments require a sensitive response scale. The adequate format is an 11-point scale ranging from 0, indicating no confidence in capability, to 10 (or 100 if scale consists of 10-unit intervals), indicating strong beliefs in capability, with one or several intermediate anchors (Bandura, 2006a; Pajares, Hartley, & Valiante, 2001). Unfortunately, it is not uncommon for instruments of SE to ignore the domain-specificity of the construct, or to measure efficacy beliefs on a scale with few response alternatives, thus rendering assessment of different levels of belief strength difficult (Pajares, 1997). Furthermore, in the measurement of parental self-efficacy (PSE), in addition to these methodological limitations, few instruments have been validated psychometrically using factor analysis.

1.7.1.2 Self-efficacy in childhood obesity prevention

In an SCT perspective (Bandura, 2004a), health promotion and disease prevention includes four major components: (a) health information about the benefits and risks of different life style behaviors, (b) development of self-management skills, (c) development of a resilient sense of personal efficacy to maintain control in the face of difficulties or setbacks, and (d) mobilization of social support for personal health changes. In a review of behavior change theories in obesity prevention interventions in children aged 4 to 6 years, the most commonly used theoretical framework was SCT (Nixon et al., 2012). Moreover, successful interventions were more likely to use strategies consistent with SCT, including knowledge transfer, parental involvement, modeling, reinforcement, and strategies to increase SE, including skill development within a mastery approach. As examples, two of the most effective interventions identified by the review were similar in intervention content. Fitzgibbon, Stolley, Schiffer, van Horn, KauferChristoffel, and Dyer (2006) included health information about diet and physical activity and physical exercise classes to children and parents, parental monitoring of health habits, modeling and skill building through interactive home assignments for children and parents, use of incentives for homework completion, and social support (Fitzgibbon, Stolley, Dyer, VanHorn, & KauferChristoffel, 2002). Manios, Moschandreas, Hatzis, and Kafatos (2002) employed health information about diet and physical activity to children and parents, physical exercise classes to children, joint homework for children and parents, parental modeling, and reinforcement (Manios, Moschandreas, Hatzis, & Kafatos, 1999). Apart from SCT, another motivational approach to childhood obesity prevention that shows promise is MI.

1.8 MOTIVATIONAL INTERVIEWING

Motivational interviewing is a brief psychological treatment characterized by client-centeredness and evocation of intrinsic motivation for change. The treatment is appropriate for people demonstrating little motivation for behavior change, and has proven effective in improving outcomes in a range of problem areas, including addictive disorders (alcohol, illicit drugs), and health behaviors, including diet, physical activity, and adherence to medical recommendations (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010; Martins & McNeil, 2009). If motivation is strong, however, other treatments may be more suitable, for example, cognitive-behavioral therapy. The most recent conceptualization of MI (Miller & Rollnick, 2013) describes four consecutive overlapping processes which may recur during treatment: (a) engaging in a collaborative working alliance between two equal and active partners, (b) focusing on a particular strategic direction for change; what to talk about, (c) evoking client's own motivations for change by differentially reinforcing client "change talk" in favor of improvement, and responding in a non-reinforcing way to client "sustain talk" in favor of status quo, and (d) planning and implementing a specific course of action to reach change goals. The definition of MI (Miller & Rollnick, 2013, p. 29) is as follows:

Motivational interviewing is a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion.

Interestingly, to strengthen motivation for behavior change, MI includes an emphasis on enhancing confidence in clients that change is possible. As noted by Miller and Rollnick (2013), a client may recognize and acknowledge the importance of change but lack the confidence to realize it. Indeed, they argue that SE may be one mechanism by which MI produces change. An MI approach to enhance “confidence talk” involves responding to it in a similar way as to change talk, and using strategies to increase SE consistent with SCT.

Correlational research shows that practitioner behaviors inconsistent with MI (e.g., confronting or directing the client, giving advise without permission, raising concern without permission) are positively associated with undesired client in-sessions behaviors (e.g., sustain talk), and negatively associated with desired client in-session behaviors (e.g., engagement), and with client outcome (Apodaca & Longabaugh, 2009). Some initial support for the hypothesized causal model of MI (Miller & Rose, 2009, see Figure 2) has begun to emerge. In the first study demonstrating causality, Moyers, Martin, Houck, Christopher, and Tonigan (2009) found that client change talk mediated the relationship between practitioner behaviors consistent with MI (e.g., giving advise with permission, emphasizing client control, affirming the validity of client experiences) and client outcome (drinks per week). Recently, evidence of a mediational role of change talk in health promotion was provided by Pirlott, Kisbu-Sakarya, DeFrancesco, Elliot, and MacKinnon (2012). In this study, change talk mediated the relationship between practitioner skills (MI-consistent behaviors and MI spirit; i.e., an approach to clients characterized by compassion, collaboration, acceptance, and evocation) and increased fruit and vegetable consumption. The hypothesized causal model in MI is illustrated in Figure 2.

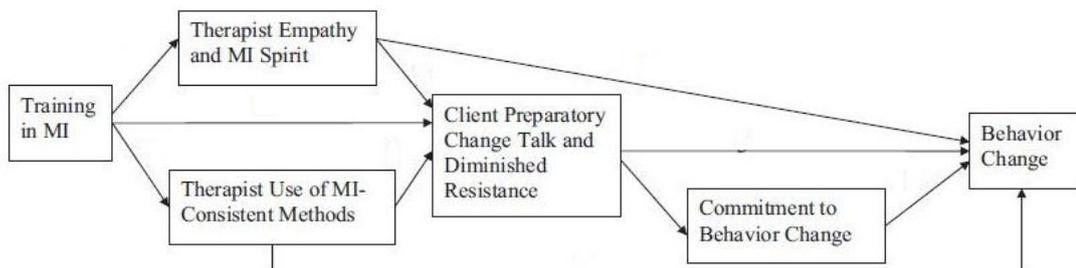


Figure 2. The hypothesized causal model in motivational interviewing. Reproduced from Miller, W. R. and Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64(6), 527-537. © 2009 American Psychological Association.

1.8.1 Training and assessment of proficiency in motivational interviewing

Long-term acquisition and retention of proficiency in MI requires extensive training, including workshop, structured feedback on MI practice based on objective behavioral coding systems, and supervision over time (Madson, Loignon, & Lane, 2009; Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Moyers et al., 2008). Efficacious workshop training educates MI principles and strategies by combining didactic presentations with experiential exercises (e.g., role-play). Structured feedback on MI performance is based on ratings of audio-recorded practice sessions according to validated coding systems, for example, the Motivational Interviewing Skill Code (MISC) (Miller, Moyers, Ernst, & Amrhein, 2008) or the Motivational Interviewing Treatment Integrity (MITI) Code (Moyers, Martin, Manuel, Miller, & Ernst, 2010). Self-reported proficiency is not reliable and may even mislead trainees to believe that they have acquired skillfulness, and thus do not need further training, when in fact they have not (Miller & Mount, 2001). Workshop training may produce proficiency in the short term; however, these gains are not maintained unless skillfulness is enhanced and consolidated by supervision over time (Miller & Rollnick, 2013; Miller, et al., 2004; Moyers, et al., 2008). Even when workshop training is enriched by systematic feedback and supervision, proficiency is not guaranteed (Forsberg, Ernst, & Farbring, 2010; Forsberg, Forsberg, Lindqvist, & Helgason, 2010; Schoener, Madeja, Henderson, Ondersma, & Janisse, 2006).

1.8.2 Motivational interviewing for childhood obesity in child health services

Few studies to date have investigated the efficacy or effectiveness of MI in the treatment or prevention of childhood obesity. Interventions typically add MI as a component to dietary, physical activity, or other behavior change methods (e.g., cognitive-behavioral therapy) (Resnicow, et al., 2006). For example, Schwartz and colleagues (2007) implemented a brief family-based intervention to prevent childhood obesity in 3- to 7-year-olds in a randomized controlled trial in CHS involving three arms: a minimal intervention of one MI session, an intensive intervention of four MI sessions, and a standard care control. At 6-month post intervention, BMI had decreased in all groups, however, the differences between groups were non-significant. Taveras and colleagues (2011) conducted a family-based randomized controlled trial of childhood obesity treatment in 2- to 6-year olds in CHS. Treatment was based on MI and compared to standard care. At 1-year post intervention, BMI had decreased non-significantly, and television viewing significantly, in the intervention group relative to the control group. However, in both these studies, practitioners were insufficiently trained (e.g., workshop only) or their proficiency was not assessed using validated objective behavioral measures, thus calling into question the fidelity of the MI component, a circumstance that may have increased the risk for “type III error” (i.e., poor results are attributed to intervention failure, when in fact results are due to poor implementation of intervention). Currently, Resnicow and colleagues (2012) are conducting a promising randomized controlled trial of childhood obesity treatment in

CHS which integrates dietary and physical activity interventions with behavior therapy delivered in a mode consistent with MI to three groups of varying treatment intensity.

Conceptual and pragmatic particularities of applying MI in the treatment or prevention of childhood obesity pertain to developmental issues in children related to comprehension and attention. For example, in conversations with children, more closed questions and less reflections probably have to be used than what is desirable, potentially decreasing the efficacy of MI (Resnicow, et al., 2006). In addition, in family consultations, there is the potential risk of parents arguing for change, and the child arguing against, thus making MI more difficult to apply (Miller & Rollnick, 2013).

2 OBJECTIVES

The overall objectives of the present thesis were to investigate self-efficacy and motivational interviewing as motivational frameworks for health behavior change in the prevention of childhood obesity, and to explore Swedish child health services as a setting for childhood obesity prevention.

The specific objectives were to

1. Develop a measure of parental self-efficacy for promoting healthy physical activity and dietary behaviors in children and assess its psychometric properties
2. Evaluate the effects of a training program in childhood obesity prevention on self-efficacy in nurses in child health services
3. Evaluate the effects of a training program in motivational interviewing on proficiency in nurses in child health services
4. Investigate the frequency of conversation about dietary and physical activity behaviors in children in child health services

3 METHODS

In which I present the methods used for conducting the studies, including participant selection, procedures for data collection, assessment of constructs and other variables, and statistical analyses. In addition, the section includes a discussion of ethical issues.

3.1 PARTICIPANTS AND PROCEDURES

In Study I, an instrument of PSE was developed and its psychometric properties assessed using exploratory and confirmatory factor analysis. Participants were 2232 primiparous mothers between the ages of 25 and 39 with 3-year-old children living in Stockholm County, Sweden. To ensure sufficient skills in the Swedish language, Swedish citizenship of mothers and children, and Sweden as country of birth of children were used as inclusion criteria. No exclusion criteria were used. Of the participants, 451 mothers constituted a subsample for assessment of test-retest reliability of the PSE measure. Mothers were sent information about the study by mail, and those who consented to participate responded to a set of questionnaires, either in web-based or paper formats.

In Study II, the effects of training in methods of preventing childhood obesity on SE in nurses in Swedish CHS were investigated using multiple linear regression analysis and dependent *t*-tests with Bonferroni correction. Participants were nurses in CHS taking part in a primary prevention trial of childhood obesity called PRIMROSE, in which child health centers were randomized to an intervention group or a control group. Nurses at child health centers in the intervention group were trained in methods of childhood obesity prevention as part of the trial, whereas nurses at child health centers in the control group received no training as part of the trial. Twenty-two intervention nurses and 38 control nurses responded to a measure of SE at pre and post assessments.

In Study III, the effects of training in MI on proficiency in nurses in Swedish CHS were evaluated using dependent *t*-tests and multiple linear regression analysis. Participants were 36 nurses in the intervention group of the PRIMROSE trial who were trained in MI as part of the trial. They audio-recorded sessions for assessment of MI proficiency immediately post workshop training and again after four supervision sessions on MI practice. Twenty-two of the nurses also participated in Study II.

In Study IV, the frequency of conversation in Swedish CHS about dietary and physical activity behaviors in children was investigated using descriptive statistics. Participants were 23 nurses in the control group of the PRIMROSE trial. They audio-recorded the sessions that provided the best opportunity for attention to diet and physical activity, according to the child health surveillance program. Topics of conversation, including dietary habits and physical activity in children, were assessed. Nineteen of the nurses also participated in Study II.

3.2 ASSESSMENT

3.2.1 Study I

A new measure of PSE called Parental Self-Efficacy for Promoting Healthy Physical Activity and Dietary Behaviors in Children Scale (PSEPAD) was developed and its psychometric properties assessed. The PSEPAD is composed of 14 items, covering three domains of interest in childhood obesity prevention: PSE for promoting healthy dietary behaviors in children, PSE for limit-setting of unhealthy dietary and physical activity behaviors in children, and PSE for promoting healthy physical activity behaviors in children. Participants rated the strength of their efficacy beliefs in influencing their 3-year-old children on an 11-point Likert-type scale ranging from 0 to 10, with the following anchors: 0 = *not at all*, 2 = *to a very low degree*, 4 = *to some degree*, 6 = *to quite a degree*, 8 = *to a high degree*, 10 = *to a very high degree*.

To assess discriminant validity, the PSEPAD was associated with instruments measuring locus of control (LOC) and self-esteem. Parental health LOC was measured using the Parental Health Belief Scales (PHBS) (Tinsley & Holtgrave, 1989), which is a modified version of the Children Health Locus of Control Scales (Parcel & Meyer, 1978). The PHBS measure parents' perceived control of their children's health, with high internal LOC indicating strong perception of personal control, and high external LOC indicating that external factors (i.e., chance or powerful others, e.g., health professionals) control health outcomes in children. The factor structure of the PHBS has varied across studies. The original psychometric evaluation yielded a three-factor solution composed of internality, chance, and powerful others (Tinsley & Holtgrave, 1989). This factor structure has been replicated (Amen & Clarke, 2001; Erci & Tufekci, 2007), while other studies have obtained different five-factor solutions (Bates, Fitzgerald, & Wolinsky, 1994; Pachter, Sheehan, & Cloutier, 2000). Internal consistency has varied from $\alpha = .50$ to $\alpha = .75$ across studies (Amen & Clarke, 2001; Erci & Tufekci, 2007). Evidence of criterion validity of the PHBS has been obtained for parental utilization of childhood preventive health services and for child health outcome (Tinsley & Holtgrave, 1989), and for breastfeeding behavior (Bates, et al., 1994). The PHBS were translated to Swedish as part of the study.

Self-esteem was measured using the Rosenberg's Self-Esteem Scale (RSES) (Rosenberg, 1965). The RSES is one of the most recognized and widely used measures of self-esteem, which refers to a global and stable attitude of self-respect and self-worth. Although the RSES is conceptualized as measuring self-esteem as a global and thus unidimensional construct, some factor analytic studies have yielded a two-factor solution (Davis, Kellett, & Beail, 2009). According to Corwyn (2000), the RSES do measure a global-unitary construct, but may be contaminated by a method effect, primarily associated with negatively worded items. The Swedish version of the RSES used in the study has been validated (Ghaderi, 2005).

3.2.2 Study II

Efficacy beliefs in nurses were measured by an instrument developed as part of the study, simultaneously with, and similarly to, the PSEPAD. The instrument measures nurses' SE for influencing parents to promote healthy dietary and physical activity behaviors in their children. It is composed of four subscales covering domains of interest in preventing childhood obesity: to elicit and strengthen motivation in parents, initiate and maintain healthy dietary behaviors in children, initiate and maintain healthy physical activity behaviors in children, and set limits on unhealthy dietary and physical activity behaviors in children. Participants rated their strength in beliefs of capability on 18 items with responses on the same scale as in the PSEPAD.

3.2.3 Study III

Proficiency in MI was assessed using the MITI 3.0 (Moyers, Martin, Manuel, Hendrickson, & Miller, 2005; Moyers, Martin, Manuel, Miller, & Ernst, 2007). The MITI is a behavioral coding system designed to assess to what extent practitioners employ MI principles and strategies skillfully. Trained coders rate practitioner proficiency in actual conversations with clients by listening to audio-recorded sessions. The instrument assesses proficiency on five dimensions; evocation, collaboration, autonomy/support, direction, and empathy, and in five categories of specific practitioner utterances; information giving, closed and open questions, simple and complex reflections, MI adherent (i.e., consistent) behaviors and MI non-adherent behaviors. The MITI is a standard instrument in MI research, and has been used extensively to investigate theoretical assumptions and associations between practitioner behavior and treatment outcome (Miller & Rollnick, 2013). It is also a common measure to evaluate training in MI, particularly as research has showed that systematic feedback on MI practice based on coding of session recordings is critical in the acquisition of proficiency in MI (Miller, et al., 2004; Moyers, et al., 2008). The Swedish version of the MITI used in the study has been validated (Forsberg, Berman, Kallmen, Hermansson, & Helgason, 2008; Forsberg, Forsberg, & van Loo, 2008).

3.2.4 Study IV

Topics of conversation in CHS were assessed based on 27 pre-determined categories and retrieved from 23 randomly selected audio-recordings of the session that provided the best opportunity for attention to dietary and physical activity behaviors in children. The coding system was developed as part of the study. Categories covered physical and behavioral topics in children and parents, as well as administrative (e.g., purpose of next appointment) and situational issues (e.g., child attention during session). The classification of health behaviors, including healthy dietary and physical activity behaviors in children, was guided by the MITI coding system framework, in which only behaviors that may be subjected to change are appropriate for coding (Moyers, et al., 2010).

3.3 STATISTICAL ANALYSES

3.3.1 Factor analyses

In Study I, two types of factor analysis were conducted: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). According to Tabachnick and Fidell (2007), it is standard procedure in EFA to test different extraction and rotation methods, and settle on the combination of extraction and rotation that is easy to interpret and yields the most meaningful factor solution. Thus, different extraction methods were tested in Study I. However, as correlation between factors was hypothesized, only oblique rotation methods were tested, since in orthogonal rotation factors are uncorrelated. Of the oblique rotation methods, direct oblimin and promax were tested, as these procedures allow for varying degrees of correlation between factors, and appeared as the most useful of the oblique methods for EFA (Tabachnick & Fidell, 2007). Similarly, it is common procedure in EFA to select a threshold for factor loadings to be considered in the factor solution that generates the most meaningful factor structure (Tabachnick & Fidell, 2007).

To cross-validate the findings of the EFA, CFA was performed on the factor structure of the PSEPAD. The weighted least squares method was used for the estimation of the model. The weighted least squares was judged as an appropriate estimation method, as data was ordinal, the method is based on polychoric correlations (i.e., estimates of the correlation between two theorized normally distributed continuous latent variables [i.e., factors] from two observed ordinal variables [i.e., items]), and the sample size was large (Jöreskog & Sörbom, 1988). The root mean square error of approximation (RMSEA), the goodness of fit index, the normed fit index, and the comparative fit index were used to assess the fit of the model (i.e., to estimate the fit between the observed sample covariance matrix and the estimated population covariance matrix). RMSEA values of .06 or less indicate a good-fitting model, values larger than .10 are indicative of poor-fitting models, and values greater than .95 on the other indices indicate a good-fitting model (Tabachnick & Fidell, 2007). These fit statistics are frequently reported in studies using CFA and were selected to cover a variety of approaches for assessing fit. According to Tabachnick and Fidell (2007), good-fitting models produce consistent results on many different fit indices.

3.3.2 Parallel analysis

To decide on the number of factors for retention in the factor solution, the Kaiser-Guttman criterion (i.e., eigenvalues above 1) and parallel analysis were used. The reason for using an additional measure of factor retention was that the Kaiser-Guttman criterion has been criticized for overestimating the number of factors and its decision rule is somewhat arbitrary (Hayton, Allen, & Scarpello, 2004). Parallel analysis may be one of the most accurate factor retention methods (Hayton, et al., 2004), and involves the generation of many (> 50) random data sets, with the same number of variables, sample size, and response scale as in the observed data set. Principal component analysis (or some other extraction method) is performed on all random data sets, and

eigenvalues for each component are averaged (or the 95th percentile is taken) across the random data sets, and then compared to eigenvalues from the observed data set. Only components from the observed data set whose eigenvalues are greater than the averaged (or 95th percentile) eigenvalue from the random data sets are retained in the factor solution (Hayton, et al., 2004; Tabachnick & Fidell, 2007). In the study, principal factors extraction was performed on 1000 random data sets, and the 95th percentile was taken.

3.3.3 Regression analysis

To compare differences between groups and simultaneously take into account variables that may influence the differences, multiple linear regression analysis was used in Study II and Study III. In Study II, adjustment was made for efficacy beliefs in nurses at pre assessment which otherwise may have confounded differences. In Study III, to investigate potential moderating and confounding effects on differences in proficiency among nurses, several regression models were tested with and without adjustments for years of work experience in CHS, variables related to the timing of session recordings, and multivariate outliers.

3.4 ETHICAL CONSIDERATIONS

The study protocols included in the present thesis were approved by the regional ethical review board in Stockholm, Sweden (2008/707-31, 2008/1256-32, 2010/0044-32). It seems unlikely that taking part in the studies has had an adverse influence on the participants. In Study I, mothers assessed their beliefs in capability to promote health behaviors in their children. Although it cannot be excluded that recognizing that one's efficacy is low may negatively impact on parents' self-esteem and the parent-child relationship, research shows that mere measurement of SE does not change behaviors (Bandura, 1997; Bandura, 2006a). Furthermore, SE is conceptually distinct from self-esteem; the former is specific to a certain domain of functioning (e.g., professional life), whereas the latter is a global attitude of worth or respect towards the self (Bandura, 1997; Maibach & Murphy, 1995; Rosenberg, 1965). Thus, efficacy beliefs may or may not impact on self-esteem, depending on how much of self-esteem is invested in a particular domain of functioning. In Study II, the authors have not been able to identify any substantial ethical issues. In Study III, nurses received training in MI and their proficiency was assessed twice by coding of session recordings. It cannot be excluded that the recording of sessions caused distress in some nurses, and may have inhibited participating parents and children, thus making the nurses' performance of MI, and the consultation suboptimal. However, before enlisting for the study, nurses were informed about the assessment of proficiency, and families always have the opportunity to contact CHS if the need arises. Besides, it seems unlikely that recording of sessions would prevent families to bring up any pressing issues. In Study IV, the ethical considerations are of a similar kind as in Study III, as nurses were invited to record sessions and the content of the conversations were assessed. In summary, the benefits of the studies included in this thesis were judged to outweigh potential negative effects on parents and nurses.

4 RESULTS

4.1 STUDY I

Originally, 16 items were generated for inclusion in the PSEPAD. Item means ranged from 5.1 to 9.4, with 81.3% above 8 on the 0 to 10 response scale. Yet, maximum endorsement frequency was within acceptable limits (< 80%). Across all 16 items, corrected item-total correlations ranged from $r = .34$ to $r = .68$. EFA was performed on the PSEPAD items. In the factor solution, with loadings of .32 as the threshold for consideration, no observed variable (i.e., item) loaded on more than one factor, and two items (6 and 12) were discarded. A meaningful three-factor structure was obtained of the final 14-item version of the PSEPAD, with factors relating to critical health behaviors in childhood obesity prevention: PSE for promoting healthy dietary behaviors in children (Factor 1), PSE for limit-setting of unhealthy dietary or physical activity behaviors in children (Factor 2), and PSE for promoting healthy physical activity behaviors in children (Factor 3). Some variables loaded highly on a factor, whereas others loaded moderately on more than one factor, suggesting a complex structure. Communalities were moderate, meaning that the three factors selected for retention explained a moderate amount of variance in the variables. Correlations between factors ranged from $r = .59$ to $r = .72$.

For cross-validation purposes, the factor structure was modeled using CFA, which results fitted the data well: the RMSEA was .07, 90% confidence interval [.07, .08], with $p < .01$ for test of close fit (RMSEA < .05), the goodness of fit index was .98, the normed fit index .97 and the comparative fit index .98, and residuals (expressed as covariance) of the indicators (i.e., items) in the model were all in the small to medium range (.13-.62). All factor estimates were significant, with t s ranging from $t = 30.73$ to $t = 100.63$, suggesting that the indicators were representative of the factors to which they were linked. The three factors were significantly associated, with covariance ranging from .86 to .88.

Associations between the PSEPAD and measures of parental health LOC and self-esteem provided support of discriminative validity, as evident by moderate correlations in the expected directions; $r = -.29$, $p < .001$ and $r = .28$, $p < .001$, respectively. Using Cronbach's α , the PSEPAD had high internal consistency, both of the total scale ($\alpha = .87$) and of Factor 1 ($\alpha = .75$), Factor 2 ($\alpha = .76$), and Factor 3 ($\alpha = .80$). Two-week test-retest reliability across administration formats of the PSEPAD was high ($r = .82$).

4.2 STUDY II

At pre assessment, means ranged from 4.5 to 6.6 on the 0 to 10 response scale, and maximum endorsement frequency was 46.7%. Corrected item-total correlations ranged from $r = .53$ to $r = .80$, with 72.2% of items above $r = .65$. Internal consistency of the instrument was $\alpha = .95$, and $\alpha = .86$ of the first subscale, $\alpha = .89$ of the second subscale, $\alpha = .87$ of the third subscale, and $\alpha = .89$ of the fourth subscale.

In the intervention group of nurses who received training in methods of preventing childhood obesity as part of the study, SE increased from $M = 95.0$ to $M = 110.6$ from pre to post training assessment. In the control group who did not receive any training as part of the study, SE decreased from $M = 103.1$ to $M = 99.2$ between assessment points. Multiple linear regression analysis with adjustment for SE at pre assessment showed a difference in SE between groups at post assessment of $\beta = 14.70$, $p < .001$, with higher SE in the intervention group compared to the control group.

To investigate differential effects of the training on efficacy beliefs in nurses, comparisons of differences in change on the subscales of the SE instrument were made using dependent t -tests with Bonferroni correction. Comparisons revealed that the greatest increase in SE occurred in the subscale concerning dietary behaviors in children compared to the subscale regarding physical activity behaviors in children. When these subscales were collapsed into a joint subscale, the increase in efficacy beliefs was greatest in this subscale compared to the subscale concerning motivation in parents.

4.3 STUDY III

Training in MI did not provide nurses with skillfulness, neither post workshop nor after four sessions of supervision on MI practice. Using dependent t -tests, differences in proficiency between post workshop training and post supervision were small and non-significant, and the largest effect sizes were in the small range (i.e., Cohen's d s $< .50$) (Howell, 2010). Using multiple linear regression analysis, number of years of work experience in CHS did not moderate differences in proficiency among nurses, and variations in the timing of training and supervision sessions did not confound the differences, with regression coefficients expressed as difference in indicators of proficiency in units of SD (i.e., z -scores) ranging from $\beta_z = .01$ to $\beta_z = .06$.

4.4 STUDY IV

Attention to dietary and physical activity behaviors, as well as other health behaviors, was infrequent in conversations between nurses and parents in Swedish CHS, despite half of the nurses having received additional training in diet interventions, a third in physical activity interventions, and all of them except one in MI, beyond their basic or specialist training. Dietary habits ranked four in frequency, and physical activity ranked 14. The three most talked about topics concerned physical examinations of the child, speaking to the child to establish or maintain contact and interest, and development of language skills. Assessment of MI consistent skills in nurses was not possible, due to the low frequency and short segments of conversation about health behaviors.

5 DISCUSSION

5.1 FINDINGS IN STUDY I

The evaluation of the PSEPAD demonstrated adequate psychometric properties. EFA yielded a meaningful structure of factors related to critical health behaviors in childhood obesity prevention. The factor structure was complex, with several factors correlating moderately with the same variables. Furthermore, correlations between factors were high. These results were expected, as efficacy beliefs in proximate domains (e.g., dietary and physical activity behaviors) are expected to correlate, both on theoretical (i.e., between-domain generality; Bandura, 1997) and empirical grounds (Cameron et al., 2011; Caprara, Regalia, Scabini, Barbaranelli, & Bandura, 2004; Gubbels et al., 2012). Thus, a simple structure, that is, several variables (i.e., items) correlating highly with each factor and only one factor correlating highly with each variable, may not be expected in SE measurement when domains are proximate.

Only one previous study has evaluated the factor structure of an instrument of PSE covering both dietary and physical activity behaviors in children. Decker (2012) evaluated a measure composed of 35 items (27 diet items, eight physical activity items) in 146 parents (88% females) with 6- to 11-year-old children, with most diet items phrased in terms of amount or frequency of consumption, according to US guidelines for healthy dietary behaviors. However, due to several methodological limitations, a comparison between the PSEPAD and this measure is not possible. In Decker (2012), the sample size was small, which may render estimates of correlation coefficients less reliable (Tabachnick & Fidell, 2007). In addition, analyses were not performed separately for mothers and fathers, which may have impacted on the results, as PSE tends to be stronger in females (e.g., Caprara, et al., 2004). Furthermore, there were indications of multicollinearity, as four of the physical activity items correlated $> .80$, and as factor retention method only the Scree test was used. In addition, orthogonal rotation was performed on the items, when probably oblique rotation would have been more adequate. Finally, as items were constructed in this instrument [e.g., “How confident are you that the meats or poultry (chicken or turkey) your child eats are low-fat or lean?”], the question is whether it is appropriate to assess PSE for the extent to which children follow national guidelines for healthy dietary and physical activity behaviors, when these behaviors to a large degree are beyond parental control. In this age group, children’s own efficacy beliefs gain in importance, and particularly dietary habits are partly controlled by what is being served at school. Indeed, Campbell, Hesketh, Silverii, and Abbott (2010) found that PSE was higher in parents of 1-year-old children compared to parents of 5-year-olds, and one of the two items that was discarded following factor analysis of the PSEPAD concerned PSE for influencing dietary and physical activity routines at preschool. This item had the lowest average PSE score and the lowest corrected item-total correlation.

5.2 ISSUES IN THE MEASUREMENT OF SELF-EFFICACY IN CHILDHOOD OBESITY PREVENTION

According to SE theory, efficacy beliefs are specific to a particular domain of functioning (although there may be domain-generalities), with consequences for the assessment of the construct, and its validity and reliability; the more specified the domain, the better the predictive and explanatory power of SE (Bandura, 1997; Bandura, 2006a). However, in the SE literature, there is some ambiguity to what defines a “domain of functioning”. For example, in criticizing the misconstrual of domain-linked assessment as task-specificity, Bandura (2012) argues that activity domains vary widely in breadth and complexity, and that the measurement of SE varies accordingly. As an example of a limited scope of assessment, he suggests the creative capability of generating varied functional uses of a given object, and of a broad scope, the collective efficacy to achieve organizational venture growth (Bandura, 2012). Another example of a domain of functioning is driving capability in patients with agoraphobia (Bandura, 1997). Indeed, even such large areas of human activity as academic, health, organizational, athletic, and sociopolitical spheres have been described as domains of functioning (Caprara, et al., 2004). Thus, where one domain ends and another begins appears somewhat arbitrary. As another example, consider childhood obesity prevention. Should PSE for promoting healthy dietary and physical activity behaviors in children be regarded as separate domains or as separate sets of behaviors within the same domain of PSE for promoting healthy weight in children? No indication is provided by Bandura (1997, p. 62), who in discussing the power of efficacy beliefs in explaining and predicting weight reduction simply states that “performances having multifaceted determinants require multifaceted self-efficacy predictors”, without going into domain-specifics. In measurement, a related issue is the relation between factors and domains: does factor solution give some indication about the number and structure of domains or is it irrelevant in specifying domains? Although the issue of what defines a domain of functioning has consequences for the validity and reliability of the construct, the literature on SE theory and assessment gives little guidance.

Another issue in the measurement of SE in childhood obesity prevention not discussed at any greater length in the literature pertains to the distance between the efficacy beliefs of the provider and the behavior of the recipient. In childhood obesity prevention, developmental issues preclude small children from forming efficacy beliefs (Bandura, 1997), and the control of providing means for engaging in healthy dietary habits and physical activity rests with parents, or clinicians or teachers, if prevention interventions are conducted in health care or preschool settings. Thus, the efficacy beliefs of adults exercise the most influence on child health behaviors, which is one of the reasons for recommending that prevention interventions be targeted at parents or caregivers (Summerbell, et al., 2012). There is a proximity-distance continuum of the relation between efficacy beliefs and behavior across studies in the SE literature, from an SE-behavior relation within the same person (e.g., an adult who feels confident in being able to lose weight and therefore engages in healthy dietary practices), to an SE-behavior relation between two persons (e.g., efficacy beliefs in parents for promoting healthy behaviors in children, as in home-based childhood obesity prevention), to an SE-behavior relation with several people involved (e.g., clinician, parent, child, as in

childhood obesity prevention in a health care setting). This issue of distance is present in Study I, in which PSE for promoting healthy physical activity and dietary behaviors in children was assessed, and in Study II, in which efficacy beliefs in nurses for influencing parents to promote these behaviors in children were examined. Presumably, these varying distances between efficacy beliefs and behavior have consequences for the measurement of SE, and the explanatory and predictive power of the construct. For example, it is possible that the distance between efficacy beliefs and influenced behavior constitutes a variable which affect belief strength. Indeed, varying distances may explain the difference in means across items of Study I (*M*s ranged from 5.1 to 9.4) and Study II (*M*s ranged from 4.5 to 6.6), despite structural similarities between the instruments (e.g., item wording, response scale). Of course, nurses' efficacy beliefs and parental behavior constitutes the SE-behavior relation in Study II, however, the relation is dependent on child behavior (e.g., nurses' efficacy beliefs for influencing parents to promote healthy behaviors in their child may be weaker if the child is obese). Thus, three parties are involved in the relation. Any consequences of varying distances between "provider cognition" and "recipient behavior" for the explanatory and predictive power of SE have not been discussed in the literature.

Future research should provide an operational definition of the concept of "domain of functioning" and investigate the consequences of the definition for other constructs (and the paths between constructs) in the causal model of SCT, and for the assessment of efficacy beliefs. Furthermore, future studies may investigate the proposed proximity-distance continuum in the SE-behavior relation and its potential differential effects on the predictive and explanatory power of the construct.

5.3 FINDINGS IN STUDY II, STUDY III, AND STUDY IV

Study II showed that nurses in the intervention group of the PRIMROSE trial increased their SE following training in methods of preventing childhood obesity, including MI, compared to nurses in the control group. However, the increase in efficacy beliefs was not due to any gains in MI skillfulness, as Study III demonstrated that the training failed to provide intervention nurses with proficiency post workshop training and after four of a total of nine supervision sessions, despite that more than half of them had prior training in the method. Instead, comparisons of differences in change in efficacy beliefs in Study II showed that the largest increase occurred in a combined subscale concerning dietary and physical activity behaviors in children, suggesting that the training in dietary and physical activity interventions produced the effects on SE in nurses, particularly the training in dietary interventions. Lack of proficiency in MI may partly explain the results of Study IV, in which all participating control nurses except one had prior training in MI. Nevertheless, nurses did not engage much in conversations focusing on behaviors in children that may be subjected to change, for example, dietary habits and physical activity, and their session recordings were not possible to assess for MI consistent behaviors.

Of these three studies, only Study II showed positive results. Increases in SE in various groups of clinicians following training in different areas have been reported previously (e.g., Rudolf, Hunt, George, Hajibagheri, & Blair, 2010; Turner, Nicholson, & Sanders,

2011), however, despite the great potential of nurses in childhood obesity interventions, studies examining SE in this group following training in methods of preventing childhood obesity are lacking. As efficacy beliefs are predictive of professional behavior (Bandura, 1997; Bandura, 2012), future studies should include the construct in implementation evaluations of childhood obesity prevention interventions in various child health care settings, including CHS, together with other factors at the provider level (e.g., perceived benefits of innovation), as well as at the structural level (e.g., politics, policy), organizational level (e.g., agency stability, shared decision-making), innovation level (e.g., compatibility with an organization's priorities, adaptability to fit with organizational practices), and patient level (e.g., health literacy, beliefs about innovation success) (Chaudoir, Dugan, & Barr, 2013; Durlak & DuPre, 2008; Korda, 2013).

As in Study III, negative training outcomes in MI have been found in other studies, even when workshop training has been enhanced by supervision (Schoener, et al., 2006) or systematic feedback and supervision (Forsberg, Ernst, et al., 2010; Forsberg, Forsberg, et al., 2010). Obviously, it would be wrong to assume that proficiency automatically has been acquired by trainees following training in MI. Rather, skillfulness should be assessed using objective behavioral coding systems, such as the MITI or the MISC, and only practitioners demonstrating an acceptable level of competence may be allowed to practice MI (Miller, Moyers, Arciniega, Ernst, & Forcehimes, 2005). Future research should investigate different learning methods (e.g., didactic presentations, reading, experiential exercises) and training formats (e.g. workshop, supervision), preferably using randomized controlled designs, and evaluate what combination is ultimate in producing training outcome (Bennett-Levy, McManus, Westling, & Fennell, 2009; Madson, et al., 2009). Central to evaluating the effects of training, and to assessing treatment fidelity in trials, is objective behavioral measures.

Despite the health promotion and disease prevention aims of Swedish CHS, and despite that half of the nurses participating in Study IV had received additional training in dietary interventions, a third in physical activity interventions, and all except one in MI beyond their basic or specialist training, little attention was paid to health behaviors in conversations between nurses and parents. A lack of attention in CHS to behaviors that potentially are under the control of parents or children, including psychosocial issues and health behaviors, may partly explain repeated findings of dissatisfaction with services provided (e.g., Fägerskiöld, Timpka, & Ek, 2003; Örténstrand & Waldenström, 2005). However, consistent with their aims, Swedish CHS provide great opportunities for prevention interventions of childhood obesity, because of their accessibility, consumer acceptability, and contact continuity over extended periods (Kornfält, 2000). Future research should examine means to enhance proficiency in nurses in behavioral domains, and thus increase SE for promoting health behaviors, and investigate which changes are necessary at the organizational and structural levels to facilitate preventive efforts in CHS.

5.4 CONCLUSIONS

- An evaluation of the new Parental Self-Efficacy for Promoting Healthy Physical Activity and Dietary Behaviors in Children Scale demonstrated adequate psychometric properties, in terms of construct and discriminant validity, internal consistency, and test-retest reliability. The instrument shows promise as a valuable tool in evaluating the effects of childhood obesity prevention and treatment.
- Training in methods of preventing childhood obesity produced increases in self-efficacy in nurses in child health services. These increases were not due to any gains in skills in motivational interviewing, but probably to the training in dietary and physical activity interventions. Together with other provider-, structural-, organizational-, innovation-, and patient-related factors, self-efficacy may be a useful construct in implementation evaluations of childhood obesity prevention interventions, and may thus contribute to the question of the feasibility of child health services for preventive efforts.
- Even extensive training in motivational interviewing, including workshop, systematic feedback on practice performance based on an objective behavioral coding system, and supervision over time was insufficient in providing nurses in child health services with proficiency in the method, indicating that acquiring skillfulness may be more difficult than generally believed.
- An assessment of conversations between nurses and parents in Swedish child health services revealed that attention was infrequent to dietary habits and physical activity in children, which cast some doubt over the effectiveness of childhood obesity prevention in this setting.

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As may be inferred from above, I am not the same person as I was when I started as a PhD student five years ago. In 2009, I got my first son **Isak** and in 2010 my second son **Aron**. In 2012, I and **Kajsa** got married. Oh right, and in 2013 I got this degree. These have been amazing years with a lot of joy and hard work, and (obvious in some parts) I could not have done it without you Kajsa. This winter, you had to take a lot of “vabb” and I worked late many nights; I would be happy to take all vabb for the remainder of the year (public commitment). I love you and I look forward to more joy and hard work for the rest of our lives (and to our trip to Cinque Terre in May!). This thesis is dedicated to my children. Ni är det finaste som finns och jag älskar er.

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