

Profiles of Cultural Adaptation and Parenting Approach for Childhood Obesity in Lifestyle Interventions for Families With Young Children

A Systematic Review

Ruben G. Fukkink, PhD; Yvonne S. Booij, MSc; Loes H. M. Leistra, MSc; Marloes D. A. van Verseveld, PhD

Background and Objectives: Various interventions aim to reduce obesity and promote healthy lifestyles among different cultural groups. **Methods:** We have conducted a systematic literature review, following PRISMA guidelines (registered at <https://doi.org/10.17605/OSF.IO/HB9AX>), to explore profiles of cultural adaptation and parenting approach of lifestyle interventions for families with young children (1-4 years). **Results:** Our search (in CINAHL, ERIC, PsycINFO, PubMed, Scopus, and SSCI) yielded 41 studies reporting 31 interventions. Drawing on Intervention Mapping, we applied a newly developed framework with various indicators of cultural adaptation and a parenting approach to analyze interventions. Our review shows clear differences in the level of cultural adaptation. A categorical principal component analysis revealed 6 different empirical profiles of cultural adaptation. **Conclusions:** Based on our profiles, we discuss how cultural adaptation can be strengthened in the design of future early interventions aimed at promoting a healthy lifestyle.

Key words: cultural adaptation, early childhood, healthy lifestyle, obesity, parenting, systematic review

CHILDHOOD OBESITY in the preschool period is a growing problem worldwide.¹ The prevalence of overweight and obesity in preschool children increased from 4.2% in 1990 to 6.7% in 2010. According to the World Health Organization, there were 38 million overweight children

younger than 5 years worldwide in 2019.² Being overweight at an early age is a predictor for obesity in adulthood and is also associated with type 2 diabetes, hypertension, and cardiovascular disease later in life.³ Various interventions have been developed and evaluated for the prevention of childhood obesity. Reviews have shown that a combined approach with a center-based component and a home-based component contributes significantly to the effectiveness of these interventions.⁴⁻⁶ This implies that the culture of families and parenting styles in the domestic situation are important contexts for preventive healthy lifestyle interventions for children in their early years.

Author Affiliations: Research Institute of Child Development and Education, University of Amsterdam, Amsterdam, the Netherlands (Dr Fukkink and Ms Leistra); Centre of Expertise Urban Education, Amsterdam University of Applied Sciences, Amsterdam, the Netherlands (Dr Fukkink); Centre of Expertise Urban Vitality, Amsterdam University of Applied Sciences, Amsterdam, the Netherlands (Ms Booij); and Norwegian University of Science and Technology, Trondheim, Norway (Dr van Verseveld).

The authors declare no conflict of interest.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website (www.familyandcommunityhealth.com).

This is an open access article distributed under the Creative Commons Attribution License 4.0 (CCBY), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Correspondence: Ruben G. Fukkink, PhD, Universiteit van Amsterdam Faculteit der Maatschappij- en Gedragwetenschappen, Nieuwe Prinsengracht 127, 1018 WS, Amsterdam, the Netherlands (r.g.fukkink@uva.nl).

Copyright © 2024 The Authors. Published by Wolters Kluwer Health, Inc.

DOI: 10.1097/FCH.0000000000000397

CULTURALLY SENSITIVE LIFESTYLE INTERVENTIONS

Reviews in the field of healthy lifestyles and the prevention of overweight have emphasized the importance of culturally adapted interventions since parents' cultural background plays a role in their children's upbringing and feeding patterns,^{6,7} as well as obesity interventions for preschool children.^{8,9} Therefore, a "one-size-fits-all" approach to interventions is not sufficient.¹⁰⁻¹² Cultural adaptation of interventions should increase their cultural fit¹² to ensure that parents are more easily reached, identify more with the activities and are less likely to drop out, which

in turn increases effectiveness.^{13–16} Cultural adaptation of interventions is defined as “systematic modification of an evidence-based treatment (EBT) or intervention protocol to consider language, culture and context in such a way that it is compatible with the client’s cultural patterns, meanings and values.”¹⁷ Cultural adaptation may include adaptation to the focus community’s language, culture and attitudes, and being attentive to specific needs. It can also include obtaining input from key figures within these communities to avoid mismatches with parents’ prior knowledge and beliefs and stimulating acceptance, participation, and completion of the intervention. Surface structure adaptations¹⁸ involve changes in the materials or activities of the intervention that address observable and superficial aspects of a population’s culture (eg, language, clothing, locations, and other observable aspects), whereas deep structure adaptations pertain to changes based on core value orientations, belief systems, and worldviews that influence the healthy lifestyle of a group.¹⁹ Cultural adaptation does not only involve modification of the program content but may also involve modifying the form of program delivery¹⁸ to reduce barriers to recruitment, improve program delivery by staff, and may strengthen the implementation in the local community environment.¹² Finally, the adaptations may be related to cognitive-information-processing characteristics, such as language and age/developmental level, and to affective-motivational characteristics as related to gender, ethnic background, or socioeconomic status.²⁰

An early review of 10 studies by Bender and Clark⁸ reported generally modest levels in the cultural adaptation of lifestyle interventions for families with preschool children, which fits in with other studies.^{19,21,22} Also, a recent review of 12 culturally adapted interventions for children 0 to 5 years of age by Marshall and colleagues⁹ concluded that cultural adaptation of childhood obesity interventions is modest. These 2 previous review studies, which have included only a relatively small number of studies, also emphasized the paucity of current studies and the need for further analysis.

CULTURAL ADAPTATION FROM AN INTERVENTION MAPPING PERSPECTIVE

Several stage models have been proposed to guide the cultural adaptation of interventions,^{21,23,24} including Intervention Mapping (IM).²⁵ IM was conceived originally as a method for developing interventions, but it also allows an analysis of the cultural adaptation of lifestyle interventions.²⁶ The IM framework, which outlines explicit procedures and detailed conceptualization of program development, has been applied in various health contexts,

including the cultural adaptation of community-based childhood obesity programs for multiethnic populations. The use of IM can provide health care planners thus with concrete guidelines for the cultural adaptation of programs.

IM distinguishes 6 steps in the planning of health promotion programs, starting with defining a logic model of the problem (1) and a model of change (2), followed by the design (3), production (4) and implementation of the program (5), and, finally, the evaluation (6). Distinguishing various concrete indicators of cultural adaptation for each IM step allows an in-depth analysis of cultural adaptation.

PARENTING IN LIFESTYLE INTERVENTIONS

Parental sensitivity, structure, and control in everyday eating situations leave their mark on young children’s feeding patterns and are a strong predictor of eating behavior later in life.²⁷ General parenting styles and specific feeding styles and food-related parenting practices are associated with the cultural background of families.⁷ The theoretical model proposed by Sleddens and colleagues,²⁸ which focuses on upbringing to achieve lifestyle-related behavioral change in families, puts, therefore, parenting at the heart of interventions. Some lifestyle interventions for families with children in their early years take into account general parenting styles of families (eg, authoritarian, authoritative, permissive, or uninvolved parenting)²⁹ and/or specific feeding styles and food-related parenting practices (eg, parents’ self-efficacy to provide healthy foods, providing rules/structure in meal setting and timing, explaining to child why healthy foods are important, promoting fun in healthy eating habits, and being a role model for child).³⁰ However, we do not know yet whether parenting is an explicit part of different lifestyle interventions for families with young children.

PRESENT STUDY

Research on cultural adaptation of healthy lifestyle interventions is still a relatively new field. Frameworks for cultural adaptation are still developing and guidelines are needed for (future) interventions for groups with diverse cultural backgrounds.^{8,9} Furthermore, previous review studies into cultural adaptation have not taken into account both the culture and parenting styles of families with young children,²⁷ although the culture of families and their parenting are related. In a systematic review, we inventoried how healthy lifestyle interventions for families with young children (1–4 years) use a culturally sensitive approach and focus on strengthening parental skills and feeding practices. Building on previous reviews, which have generally shown relatively low levels of cultural adaptation in various

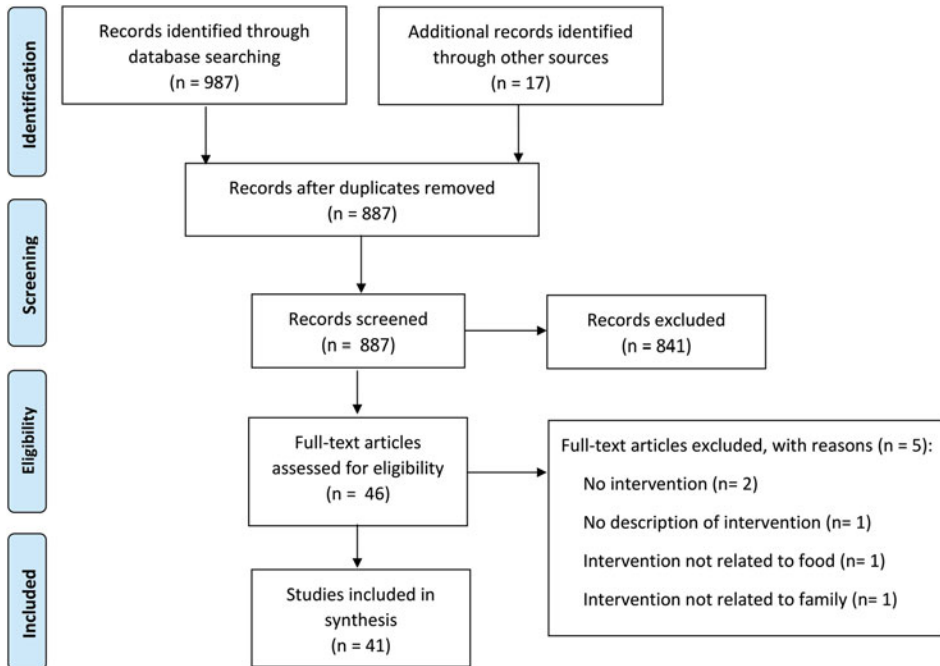


Figure 1. Flowchart of selection of studies.

fields,^{8,9,14,15,19,20,22,23} we focused in our study specifically on the identification of empirical profiles of cultural adaptation of healthy lifestyle interventions for families with children in the preschool period. In the context of our review study, Intervention Mapping²⁵ offered a broad approach which makes it possible to categorize various elements of cultural adaptation in a systematic way from needs assessment, program development, and evaluation. With this analysis, we aim to explore in an empirical fashion current strategies of cultural adaptation, which may explain why the level of cultural adaptation is generally low for current interventions. We focused in our review on healthy lifestyle interventions for families with children in the preschool period from a prevention perspective; the first year of life was not included because this is a distinct developmental period for infants with the transitioning from milk feeds to family foods. Following the included studies from our review, we focused on ethnicity as the key marker for culture and cultural adaptation; in some cases, the focus on an ethnic group also implied that the families were part of a nondominant language community.

METHODS

Literature search

The literature databases CINAHL (65 hits), ERIC (1), PsycINFO (1), PubMed (780), Scopus (24), and

Social Sciences Citation Index (116) were searched for full-text, peer-reviewed, English language articles; the first search was conducted in May 2020 with an update in December 2021. This field has recently witnessed a rise of publications in the last decade and we searched for studies published since 2005. A broad search profile included key words in 7 domains: the parents, the child, parenting, interventions, lifestyle and weight status, nutrition and diet, and cultural sensitivity (see the Figure 1; Supplemental Digital Content Appendix 1, available at: <http://links.lww.com/FCH/A68>).

The abstracts from the search yielded 987 hits; we found another 17 studies by searching through the references from the publications.³¹ These abstracts were screened using 4 inclusion criteria. First, the study had to describe the development, implementation, and/or evaluation of an intervention. Second, it had to focus on the parents and/or extended family of children aged 1 to 4 years, with at least half of its age range coinciding with this group (so a study of children aged 2-6 years, eg, did fall within this criterion). Third, the intervention had to be aimed at preventing or reducing overweight or obesity, with a focus on nutrition (optionally supplemented with attention for sleep and/or exercise). The final criterion was that only primary studies were included. The most frequent reason for exclusion was that the age range of the children did not match with our population criterion.³² Other studies were

excluded because the intervention did not match our criteria³³ or the intervention was directed only at health outcomes for parents and not children.³⁴ In case of any doubt after reading the abstract, the full article was read and discussed by the research team.³⁵ This procedure resulted in a hybrid sample of 41 studies (ie, experimental evaluations of interventions, studies with a focus on implementation, qualitative studies, design papers) reporting on 31 interventions with a shared focus on healthy lifestyle interventions.

We followed the PRISMA 2020 guidelines and the review protocol was registered with Open Science Framework (<https://doi.org/10.17605/OSF.IO/HB9AX>). Only coding the quality of the included studies was not part of our study, because our sample of studies was highly diverse and the quality of studies was not related to our research questions.

Coding

The selected studies were coded using a newly developed scheme (see Supplemental Digital Content Appendix 2, available at: <http://links.lww.com/FCH/A69>), which was tested in 3 calibration sessions with independent assessment by all the authors. The rationale of the scheme that we developed was the need for a broad overview of concrete ways to culturally adapt an intervention, taking into account both the culture and the parenting style of diverse families with young children. We wanted to integrate the different features in a stage model and theoretically structured our coding scheme with the use of Intervention Mapping,²⁵ including various concrete features of cultural adaptation from the literature. These variables were coded as present or absent and this dichotomous scoring method allows the calculation of an overall score to analyze and compare both the cultural adaptation and the parenting approach of healthy lifestyle programs.

The coding scheme was divided into 4 parts: description of the study (eg, type of report; study design; age of children; and weight status of the children); general characteristics of the program; cultural adaptation of the program; and parenting approach of the program.

The programs were classified according to the following features: primary focus—parenting skills in general; parenting practices related to nutrition, healthy eating habits, exercise, and other physical activity and sleep³⁶; mode of delivery³⁷—individual or group, face-to-face, or other (eg, email, telephone); focus group—child, mother, father, both parents, extended family, community, and early childhood professionals³⁶; delivery agent (eg, child health clinic staff, nurses, community health work-

ers, pediatrician, and staff from early childhood education and care)³⁸; and the setting (eg, community, clinic). Programs were further classified according overall duration, number of sessions, and their length.

The cultural sensitivity of the intervention was coded using a coding scheme with 53 categories, classified on the basis of the 6 IM steps. The indicators for step 1 from the IM model (ie, “logic model of the intervention”) included the adaptation of intervention goals (often referred to as “tailoring” or “framing” in the included studies). The indicators related to IM step 2 (“logic model of change”) pertained to the selection of culturally appropriate determinants for a healthy lifestyle and the inclusion of culture-specific behavioral outcomes. For example, we coded whether an intervention explicitly considered “folk health beliefs” or cultural-specific “funds of knowledge,” defined as intellectual and cultural resources from families to strengthen the connection between families’ homes and the intervention.³⁹ The indicators related to step 3 (“program design”) related to adding new, culturally appropriate modules to the original intervention, any cooperation with the community during the program design, and the choice of culturally appropriate methods concerning the logic model of change,³⁷ such as the translation of materials, the use of simplified language, and the adoption of alternative formats (eg, pictures or pictograms). Under step 4 (“program production”), we coded whether the focus community was explicitly taken into account when creating or adjusting program materials. For step 5 (“program implementation”), we coded the following features: identification of the program’s first users within a particular group; referral of families via community and peer-to-peer networks; staff screening and training in respect of so-called “inclusion competencies”³⁸; and the matching of staff with families based on language or ethnicity. Barriers identified in the literature^{26,38} were also included here (eg, low literacy skills of parents), because they may complicate the implementation of the program. Finally, for step 6 (“evaluation”), we coded whether cultural diversity of the target group was taken into account in the final evaluation phase (eg, by employing a diversity audit, coevaluation with stakeholders, or analyzing cultural background as moderator). We calculated a Cultural Adaptation score (CA), expressed as a percentage of a total of the 53 dichotomously scored CA variables (Cronbach $\alpha = .90$). We coded each variable as “present” or “absent.” The percentage score was computed from the number of present variables, divided by the total of possible indicators ($N = 53$).

With regard to the parenting approach of the interventions, we coded whether the publication referred explicitly to the classic parenting styles (authoritarian, authoritative, permissive/indulgent, and uninvolved)²⁹ or specific feeding styles and food-related parenting practices,^{28,29} distinguishing between nurturance, structure, behavioral control, overprotection, and coercive control. Each intervention was classified according to the continuum proposed by Dunst et al,⁴⁰ which ranks interventions from “professional-centered” to “family-allied,” “family-focused,” and “family-centered.” In professional-centered interventions, for example, professionals lead as experts who determine what the family needs. Conversely, family-centered interventions are characterized by a flexible approach adapted to the specific needs of the family concerned. The parenting variables were summarized in a Parenting Approach score (PA), expressed as a percentage of a total of 28 dichotomous variables ($\alpha = .82$). We coded each parenting variable as “present” or “absent.” The percentage score was calculated as the total of present variables, divided by the total of possible variables ($n = 28$).

We obtained all our information about the characteristics of Cultural Adaptation and Parenting Approach from the published articles. In a random sample of the interventions (20%), studies were coded by all possible pairs of 4 coders (ie, first author with second author; first with third; first with fourth; second with third; second with fourth; and third with fourth) to assess coder agreement for CA and PA scores. For all pairs, reliability was acceptable for CA and excellent for PA (average intraclass correlation coefficient [ICC], 2-way mixed, absolute agreement = .688 and .909, respectively). Discrepancies were resolved in sessions between the pairs of independent coders.

Analysis

Interventions described in multiple studies were aggregated into a single intervention description; interventions were the unit of analysis in our study. Using categorical principal components analysis (CATPCA),^{41,42} we subsequently explored whether there were distinct profiles in the cultural adaptation of interventions. CATPCA is a flexible statistical technique for dimension reduction with minimal loss of information. In our study, we applied this technique to identify dimensions of cultural adaptation, based on a statistical analysis of the coded studies. This technique is suitable for handling discrete data and takes into account the dichotomous (ie, categorical) nature of all coded variables from our multifaceted coding scheme. Based on the 6 IM steps, we explored a 6-dimensional model with vari-

max rotation and Kaiser normalization. Four IM items and the other indicators were not included in this analysis because there was little or no variance due to very low scores.

RESULTS

Table 1 presents an overview of the included studies and Table 2 gives information about the interventions. The 41 studies included were either evaluation ($N = 28$) or design studies ($N = 13$), mostly conducted in the United States, United Kingdom, and other countries. A slight majority (54%) involved parents from different ethnic backgrounds, while in a fifth, studies focused on a specific ethnic group (20%). Parenting styles were not explicitly addressed in most studies.

We analyzed the coded interventions with a categorical principal component analysis, which resulted in a solution with 6 internally consistent factors. Each factor reveals a different approach of cultural adaptation. The factors together “explained” 66% of the total variance (see also Supplemental Digital Content Appendix 3, available at: <http://links.lww.com/FCH/A70>).

Profile 1 is characterized by an integrated perspective on cultural diversity (Cronbach $\alpha = .88$, eigenvalue $\lambda = 6.03$, “explained” variance: 14.0%). Considering the cultural background of the focus community plays a role in various phases of program development. The cultural adaptation often pertains to the surface structure in the development, implementation, and evaluation of interventions. Associated variables for this profile were translation of materials, adapting the language for the focus community during program development, taking into account parents’ educational level, and racial and language matching in the implementation phase. Therefore, profile 1 mostly pertains to surface structure changes¹⁸ and cognitive-information processing.²⁰

Profile 2 is characterized by an inclusive, collaborative model with a focus on deep structure ($\alpha = .88$, $\lambda = 5.99$, variance: 13.9%). This profile describes interventions that focus on close cooperation with members of the focus community in the formulation of goals derived from the logic model during the design of the intervention, its production, and the evaluation of program effects. An associated variable for this profile was a selection of culturally appropriate program themes and components (ie, cultural values, traditions, customs), which is an example of cultural adaptation of the deep structure level of programs, related to the affective-motivational dimension.²⁰

Profile 3 describes interventions in which attention is paid to cultural diversity during

TABLE 1. Characteristics of the Included Studies^a

Study	Country	Program	Setting(s)	Professional(s)	Type of Study
Alkon et al ⁴³ (2014)	United States	NAP SACC Intervention & Raising Healthy Kids	ECEC	Health nurse	Evaluation
Barkin et al ⁴⁴ (2018)	United States	GROW	Community	...	Evaluation
Beckerman et al ⁴⁵ (2019)	United States	CHL program	Online Clinic	Health nurse	Design
Bender et al ⁴⁶ (2013)	United States	Vida Saludable (Healthy Living)	Clinic	Health nurse	Evaluation
de Bourdeaudhuij et al ⁴⁷ (2015)	8 EU countries	IDEFICS	ECEC Home Community	...	Evaluation
Bridge et al ⁴⁸ (2019)	United Kingdom	HENRY	Clinic	Health nurse	Evaluation
Burton et al ⁴⁹ (2019)	United Kingdom	HENRY	Clinic	...	Evaluation
Buscemi et al ⁵⁰ (2016)	United States	Hip-Hop to Health	ECEC	ECEC staff	Evaluation
Cloutier et al ⁵¹ (2015)	United States	Steps up to growing healthy	Telephone Clinic	Health nurse	Evaluation
Davison et al ⁵² (2013)	United States	CHL program	ECEC	...	Evaluation
Dickerson et al ⁵³ (2016)	United Kingdom	Born in Bradford's Better start (BBB)	Clinic Community	...	Design
Ek et al ⁵⁴ (2020)	United Kingdom + Sweden	More and Less ML study	Evaluation
Greenmills et al ⁵⁵ (2013)	United States	Communities For Healthy Living: Communication Campaign	ECEC	Researcher	Design
Hacioglu and Simsek ⁵⁶ (2019)	Turkey	Evaluation
Haines et al ⁵⁷ (2013)	United States	Healthy Habits, Happy Homes	Telephone Home	Health nurse	Evaluation
Heerman et al ⁵⁸ (2018)	United States	COACH	Community	...	Design
Ingalls et al ⁵⁹ (2019)	United States	FSN	Home	...	Evaluation
Keita et al ⁶⁰ (2014)	United States	Healthy Habits, Healthy Families (HHHF)	Telephone Home	...	Evaluation
Knierim et al ⁶¹ (2018)	United States	The COOT program	Home	...	Evaluation
Lebron et al ⁶² (2020)	United Kingdom	CCC	ECEC	ECEC staff	Evaluation
McGarvey et al ⁶³ (2006)	United States	...	Clinic	...	Design

(continues)

TABLE 1. Characteristics of the Included Studies^a (Continued)

Study	Country	Intervention	Setting(s)	Professional(s)	Type of Study
McKee et al ⁶⁴ (2010)	United States	FLAIR (pilot)	Clinic	Pediatrician Lifestyle coach	Evaluation
Messiah et al ⁶⁵ (2017)	United States	Healthy Caregivers—Healthy Children (HC2)	ECEC	ECEC staff	Design
Montana et al ⁶⁶ (2015)	United States	Family Check-Up	Home	...	Evaluation
Natale et al ⁶⁷ (2013)	United States	Healthy Caregivers—Healthy Children (HC2)	ECEC	Dietician	Design
Po'e et al ⁶⁸ (2013)	United States	GROW	Community	...	Design
Salvy et al ⁶⁹ (2018)	United States	HABITS	Home	Family coach	Design
Sherwood et al ⁷⁰ (2013)	United States	NET-works	Home Clinic	Health nurse Pediatrician Family coach	Design
de Silva-Sanigorski et al ⁷¹ (2010)	Australia	Kids Go For Your Life	ECEC Community	Family coach	Design
Smith et al ⁷² (2015)	United States	Family Check-Up	Home	...	Evaluation
Sosa et al ⁷³ (2016)	United States	Miranos!	ECEC Home	ECEC staff	Evaluation
Sun et al ⁷⁴ (2017)	United States	5-4-3-2-1-0 Program	Home	Researcher	Evaluation
Taverno Ross et al ⁷⁵ (2018)	United States	ANDALE Pittsburgh	Home	...	Design
Taverno Ross et al ⁷⁶ (2017)	United States	ANDALE Pittsburgh	Home Community	...	Evaluation
Thomson et al ⁷⁷ (2014)	United States	PaT control arm & PaTE intervention arm	Home	...	Evaluation
Wickel et al ⁷⁸ (2019)	United Kingdom	The ELI clinic	Clinic	Health nurse Psychologist Dietician	Evaluation
Williams et al ⁷⁹ (2014)	United States	Supplemental Nutrition Assistance Program	ECEC	ECEC staff	Evaluation
Willis et al ⁸⁰ (2013)	United Kingdom	HENRY	ECEC	Health nurse	Evaluation
Willis et al ⁸¹ (2016)	United Kingdom	HENRY	ECEC	Health nurse	Evaluation
Yin et al ⁸² (2012)	United States	Miranos!	ECEC	ECEC staff	Design
Yin et al ⁸³ (2019)	United States and China	Miranos!	ECEC	ECEC staff	Evaluation
Study	Country	Intervention	Setting(s)	Professional(s)	Type of Study
Summary score (frequency)	United States: 30 United Kingdom: 8 Other: 5		Clinic: 9 Community: 7 ECEC: 16 Home: 13 Online: 1 Telephone: 3 Unknown: 2	Coach: 4 Dietician: 2 ECEC staff: 6 Health nurse: 10 Pediatrician: 2 Psychologist: 1 Unknown: 18	Design: 13 Evaluation: 28

^aEllipses indicate not reported, could not be coded; setting(s) and professional(s): ECEC, early childhood education and care; summary scores may not add up to total of 41 (100%) due to multiple options per study.

TABLE 2. Overview of Interventions: Cultural Adaptation and Food-Related Parenting Components

Intervention	Cultural Adaptation	Parenting Components
5-4-3-2-1-0 Program	Profile: 1: 30%, 2: 33%, 3: 83%, 4: 40%, 5: 17%, 6: 0%	Self-efficacy, structure, enjoying healthy lifestyle
ANDALE Pittsburgh	Profile: 1: 50%, 2: 78%, 3: 0%, 4: 0%, 5: 14%, 6: 35%	Self-efficacy, being role model
Born in Brandfords Better start	Profile: 1: 0%, 2: 22%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
CCC	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
CHL Program	Profile: 1: 50%, 2: 67%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
COACH	Profile: 1: 50%, 2: 22%, 3: 0%, 4: 0%, 5: 17%, 6: 75%	...
Communities for Healthy Living	Profile: 1: 50%, 2: 89%, 3: 0%, 4: 20%, 5: 17%, 6: 0%	...
COOT Program	Profile: 1: 20%, 2: 0%, 3: 33%, 4: 0%, 5: 17%, 6: 0%	...
ELI Clinic	Profile: 1: 0%, 2: 11%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
Family Check-Up	Profile: 1: 10%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	Structure, rewarding
FLAIR	Profile: 1: 10%, 2: 11%, 3: 50%, 4: 0%, 5: 17%, 6: 0%	Self-efficacy, structure
FSN	Profile: 1: 20%, 2: 56%, 3: 0%, 4: 20%, 5: 0%, 6: 0%	Self-efficacy, structure, being role model
GROW	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 20%, 5: 17%, 6: 100%	Self-efficacy, structure, being role model, explaining to child, enjoying healthy lifestyle
HABITS	Profile: 1: 50%, 2: 11%, 3: 0%, 4: 60%, 5: 0%, 6: 25%	Self-efficacy, structure
HC2	Profile: 1: 90%, 2: 11%, 3: 0%, 4: 0%, 5: 50%, 6: 0%	Self-efficacy, being role model, enjoying healthy lifestyle
Healthy Habits, Happy Homes	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	Rewarding, being a role model
HHHF	Profile: 1: 10%, 2: 11%, 3: 0%, 4: 60%, 5: 100%, 6: 0%	Being role model
HENRY	Profile: 1: 10%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 25%	Self-efficacy, structure, being role model
Hip-Hop to Health	Profile: 1: 0%, 2: 11%, 3: 0%, 4: 0%, 5: 0%, 6: 25%	Self-efficacy, enjoying healthy lifestyle
IDEFICS	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
Kids Go For Your Life	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
Miranos!	Profile: 1: 80%, 2: 89%, 3: 0%, 4: 20%, 5: 50%, 6: 25%	Self-efficacy, enjoying healthy lifestyle
More and Less ML	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	Self-efficacy, structure
NAP SACC intervention + Raising Healthy Kids	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
NET-works	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	Structure, rewarding, being role model
PaT(E)	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...

(continues)

Downloaded from http://journals.lww.com/familyandcommunityhealth by BHDMSAPHKav12Eoun1IQN4akLLHEZgshH04XMI0HCjwCX1AVWYqjIICHD33D00DFYVTVSFAHQ3VC1Y0abgqZKXkwrFKZBVTws on 03/28/2024

TABLE 2. Overview of Interventions: Cultural Adaptation and Food-Related Parenting Components (Continued)

Intervention	Cultural Adaptation	Parenting Components
Program study Hacioglu and Simsek ⁵⁶ (2019)	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
Program study McGarvey et al ⁶³ (2006)	Profile: 1: 10%, 2: 67%, 3: 33%, 4: 0%, 5: 0%, 6: 0%	Self-efficacy, structure, rewarding
Steps up to Growing Healthy	Profile: 1: 0%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
Supplemental Nutrition Assistance Program	Profile: 1: 20%, 2: 0%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	...
Vida Saludable	Profile: 1: 25%, 2: 88%, 3: 0%, 4: 0%, 5: 0%, 6: 0%	Being role model
Summary scores	Profile: 1: 17.3% (SD = 25.5, range: 0-91), 2: 21.5% (30.8, 0-89), 3: 6.5% (18.6, 0-83), 4: 10.8% (21.3, 0-83), 5: 11.3% (22.5, 0-100), 6: 10.5% (23.1, 0-100) Overall (average profile: 1-6): 13.0% (SD = 13.7, range: 0-44)	

implementation and process evaluation ($\alpha = .82$, $\lambda = 4.84$, variance: 11.2%). Associated variables for this profile were screening of staff related to inclusion competencies, complemented with a focus in the process evaluation on cultural subgroups and the selection of culturally appropriate measures. This profile is thus characterized by a focus on gathering experiences from the focus group during implementation and evaluation.

Profile 4 is characterized by a broad approach to cultural adaptation, based on a culture-specific logic model with a choice of culture-specific determinants in the logic model and the method of change ($\alpha = .84$, $\lambda = 4.52$, variance: 10.5%). This culture-specific approach in the design is supplemented by collaboration with participants within the focus community during implementation and joint process evaluation.

Profile 5 characterizes studies with a focus on a logic model of change ($\alpha = .82$, $\lambda = 3.71$, variance: 9.2%). For this profile, cultural adaptation involves multiple elements from a culturally appropriate logic model of change and involves culture-specific resources and a selection of culture-specific behavioral outcomes. These elements are complemented with the training of staff related to inclusion and a focus on acculturation in implementation.

Finally, the sixth profile describes interventions with a key focus on the use of networks in the local community as an implementation strategy ($\alpha = .73$, $\lambda = 3.27$, variance: 7.6%). In this profile, a focus on geographical barriers (ie, distance to the family center, lack of transport) is complemented with close collaboration with the community, local centers or self-organizations (eg, church), and parent-to-parent recruitment. This focus aims to

increase awareness in the community of the availability of the program and to stimulate families' entry in the program as first and vital steps of implementation in the community.²⁰

We explored whether a different analysis with a smaller number of factors would result into different outcomes. Because our original analysis resulted in more homogeneous factors, we preferred this solution for analytical purposes.

Intervention links with cultural diversity

Across the 6 profiles, the average CA score is 13% but with clear differences between the interventions (SD = 13.7, range = 0-44). Based on the factor structure identified, a total CA score has been determined on the basis of the different variables corresponding with each profile. These percentages show, at profile level, that the interventions vary greatly in the extent to which CA is explicitly addressed in the studies (see Table 2).

Intervention links with parenting approach

The average PA score for the interventions is 14.5% (SD = 12.7, range = 0-39%); reports provided information related to the parenting approach for 21 interventions. These interventions link with the parenting context in the home situation by focusing on strengthening specific parenting skills. For example, some interventions aimed to increase parental self-efficacy in diet-related activities (40%) by having them "practice" certain skills as homework, or they may support parents in establishing rules and structures (33%, eg, eating at set times and/or at the table), or make them aware that they serve as role models for their child (30%). A family-centered approach was most common in our sample.

Relationship between cultural adaptation and study characteristics

The CA and PA scores were positively correlated ($r_s = 0.497, P = .004$). As expected, we found higher scores for interventions with a family-centered perspective in which the parents' point of view plays a major role ($M = 25.2, SD = 10.5, N = 8$) than for programs without this focus ($M = 8.7, SD = 12.2, N = 23$), as the median test showed, $\chi^2 = 11.5, df = 1, P = .003$. CA scores were also higher for interventions in which empowerment explicitly plays a role than for other interventions ($M = 24.0, SD = 13.7, N = 10$ vs $M = 7.7, SD = 10.4, N = 21$, respectively), $\chi^2 = 5.91, df = 1, P = .041$.

DISCUSSION

In our review study, we explored how studies describing different lifestyle interventions take into account the cultural diversity of families with young children. The included studies generally provided relatively little information related to the cultural adaptation or parenting style in the objectives, design, production, implementation, or evaluation of the interventions, acknowledging variation among studies. Our review suggests that cultural adaptation and parenting are not prominent themes in the literature,^{8,9} acknowledging that interventions do not need to include all elements that are distinguished in our conceptual framework.

Our analysis revealed 6 empirical profiles of cultural adaptation: an integrated perspective of cultural diversity with a focus on surface structure; an inclusive, collaborative model with a focus on deep structure characteristics; a focus on cultural diversity during implementation and process evaluation; cultural adaptation, based on a culture-specific logic model; logic model-driven implementation; and, finally, the use of networks in the local community for implementation. The identified empirical profiles were related to theoretical distinctions from the literature, including IM,²³ family interventions,⁴⁰ cultural adaptation, and prevention science.^{10,17}

Our framework distinguishes various concrete actions to shape cultural adaptation across all phases of program development. Future program developers may use an integrated approach to the development of future programs (perhaps similar to the first profile), but it is also possible to complement a more restricted focus on cultural adaptation from a specific profile with other profiles to incorporate adaptation into the development of interventions in a structured fashion, because the identified profiles are independent and complementary.

Our analysis shows that the scope of cultural adaptation varies significantly among the included programs. This variation in scope explained much

of the observed differences and suggests that cultural adaptation may be stimulated by integrating this in the full process of program development. Our empirical profiles suggest more specific strategies. Close collaboration with 1 or more cultural groups was related to changes at deep level, and it seems, therefore, valuable to include stakeholders in the design of the program to avoid a restricted focus on cultural adaptation with mostly changes at surface level.

Our findings showed that a focus on parenting styles and the empowerment of families in interventions are positively related to the cultural adaptation of interventions. Cultural adaptation was also positively associated with a family-centered approach, whereby the intervention is tailored to the needs of a family.⁴⁰ These findings suggest that a culturally sensitive approach is also compatible with an empowering family approach.

Limitations

Although cultural adaptation is an explicit theme in the studies we reviewed, it is possible that such adaptation of interventions occurs more frequently than is apparent from the scientific report.⁹ Not only may adaptations during the design phase not have been captured adequately in our study but also implementation practice could be more sensitive to the multicultural diversity and the parenting context of different families than is apparent from the scientific reports. Our results may therefore be conservative estimates. It should also be noted that the original studies were the input for our review and we coded explicit statements related to cultural adaptation from the authors in their reports.

The current review involves the first application of a new framework to analyze lifestyle interventions. Additional evaluation of intercoder agreement is needed for further validation.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The cultural adaptation and parenting approach may be strengthened in healthy lifestyle interventions to promote inclusive programs in practice. Our conceptual framework and the empirical profiles offer a tool for charting and strengthening the cultural adaptation and parenting approach of (future) interventions. Cultural fit may be improved by including individual elements for each step of program development without ticking all the boxes from our conceptual model. Combining the empirical profiles may also result into a hybrid, more comprehensive strategy to improve the cultural fit

of lifestyle interventions for various families with children in their early years.

The first results of our psychometric analysis are promising, but further validation of our new measure is needed. In a next step of development and validation, it is important to investigate whether cultural adaptation and PA scores from our procedure are related to the successful implementation and positive effects of healthy lifestyle interventions from the literature. It is yet an open question whether the identified profiles may, for example, predict families' acceptance of the program, their adherence to the intervention, and/or a changes at child or parent level related to health knowledge, attitude, and behavior. In a next phase of development, we therefore aim to link the profiles of cultural adaptation with implementation and outcome measures from published studies, acknowledging the often modest level of cultural adaptation.^{8,9} This line of research may ultimately point out concrete, evidence-based strategies for successful cultural adaptation of healthy lifestyle programs and positive outcomes at child, parent, and family levels.

REFERENCES

- GBD 2013 Obesity Collaboration, Ng M, Fleming T, et al. Global, regional and national prevalence of overweight and obesity in children and adults 1980-2013: a systematic analysis. *Lancet*. 2014;384(9945):766-781. doi:10.1016/S0140-6736(14)60460-8
- World Health Organization (2020). Obesity and overweight. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>. Accessed December 1, 2021.
- Park MH, Falconer C, Viner RM, Kinra S. The impact of childhood obesity on morbidity and mortality in adulthood: a systematic review. *Etiol Pathophysiol*. 2012;13(11):985-1000. doi:10.1111/j.1467-789X.2012.01015.x
- Ash T, Agaronov A, Young T, et al. Family-based childhood obesity prevention interventions: a systematic review and quantitative content analysis. *Int J of Behaviour Nutr Phys Act*. 2017;14(1):113. doi:10.1186/s12966-017-0571-2
- Bleich SN, Vercammen KA, Zatz LY, Frelter JM, Ebbeling CB, Peeters A. Interventions to prevent global childhood overweight and obesity: a systematic review. *Lancet Diabetes Endocrinol*. 2018;6(4):332-346. doi:10.1016/S2213-8587(17)30358-3
- Wang X, Ammerman A, Orr CJ. Family-based interventions for preventing overweight or obesity among preschoolers from racial/ethnic minority groups: a scoping review. *Obesity Scie Pract*. 2021;8(3):371-386. doi:10.1002/osp4.578
- Bruss MB, Applegate B, Quitugua J, Palacios RT, Morris JR. Ethnicity and diet of children: development of culturally sensitive measures. *Health Educ Behav*. 2007;34(5):735-747. doi:10.1177/1090198106294648
- Bender MS, Clark MJ. Cultural adaptation for ethnic diversity: a review of obesity interventions for preschool children. *Californian J Health Promot*. 2011;9(2):40-60. doi:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3805036/pdf/nihms487583.pdf
- Marshall S, Taki S, Laird Y, Love P, Wen LM, Rissel C. Cultural adaptations of obesity-related behavioral prevention interventions in early childhood: a systematic review. *Obes Rev*. 2022;23(4):e13402. doi:10.1111/obr.13402
- Abe J, Grills C, Ghavami N, Xiong G, Davis C, Johnson C. Making the invisible visible: identifying and articulating culture in practice-based evidence. *Am J Community Psychol*. 2018;62(1-2):121-134. doi:10.1002/ajcp.12266
- Bernal G, Jiménez-Chafey MI, Domenech Rodríguez MM. Cultural adaptation of treatments: a resource for considering culture in evidence-based practice. *Professional Psychol Res Pract*. 2009;40(4):361-368. doi:10.1037/a0016401
- Castro FG, Yasui M. Advances in EBI development for diverse populations: towards a science of intervention adaptation. *Prevention Sci*. 2017;18(6):623-629. doi:10.1007/s11121-017-0809-x
- Loveman E, Al-Khudairy L, Johnson R, et al. Parent-only interventions for childhood overweight or obesity in children aged 5 to 11 years. *Cochrane Database Syst Rev*. 2015;12(12):CD012008. doi:10.1002/14651858.CD012008
- van Mourik K, Crone MR, de Wolff MS, Reis R. Parent training programs for ethnic minorities: a meta-analysis of adaptations and effect. *Prev Sci*. 2016;18(1):95-105. doi:10.1007/s11121-016-0733-5
- Nierkens V, Hartman MA, Nicolaou M, et al. Effectiveness of cultural adaptations of interventions aimed at smoking cessation, diet, and/or physical activity in ethnic minorities: a systematic review. *PLoS One*. 2013;8(10):e73373. doi:10.1371/journal.pone.0073373
- Pels T, Distelbrink M, Tan S. *Meetladder Diversiteit Interventies [The Intervention Diversity Scale]*. Verwey-Jonker Instituut; 2009.
- Bernal G, Domenech-Rodríguez MM. *Cultural Adaptations: Tools for Evidence-Based Practices With Diverse Populations*. APA Press; 2012.
- Resnicow K, Soler R, Braithwait RL, Ahluwalia JS, Butler J. Cultural sensitivity in substance abuse prevention. *J Community Psychol*. 2000;28:271-290. doi:10.1002/(SICI)1520-6629(200005)28:3<271::AID-JCOP4>3.0.CO;2-I
- Barrera M, Castro FG, Strycker LA, Toobert DJ. Cultural adaptations of behavioral health interventions: a progress report. *J Consult Clin Psychol*. 2013;81(2):196-205. doi:10.1037/a0027085
- Castro FG, Barrera M, Martinez CR. The cultural adaptation of prevention interventions: resolving tensions between fidelity and fit. *Prev Sci*. 2004;5(1):41-45. doi:10.1023/B:PREV.0000013980.12412.cd
- Bernal G, Adames C. Cultural adaptations: conceptual, ethical, contextual, and methodological issues for working with ethnocultural and majority-world populations. *Prev Sci*. 2017;18(6):681-688. doi:10.1007/s11121-017-0806-0
- Castro FG, Barrera M, Holleran Steiker LK. Issues and challenges in the design of culturally adapted evidence-based interventions. *Ann Rev Clin Psychol*. 2010;6:213-239. doi:10.1146/annurev-clinpsy-033109-132032
- Thier M, Martinez CR Jr, Alresheed F, et al. Cultural adaptation of promising, evidence-based, and best practices: a scoping literature review. *Prev Sci*. 2020;21(1):53-64. doi:10.1007/s11121-019-01042-0
- Wang-Schweig M, Kviz FJ, Altfeld SJ, Miller AM, Miller BA. Building a conceptual framework to culturally adapt health promotion and prevention programs at the deep structural level. *Health Promot Pract*. 2014;15(4):575-584. doi:10.1177/1524839913518176
- Bartholomew Eldridge LK, Markham CM, Ruitter RAC, Fernández ME, Kok G, Parcel GS. *Planning Health Promotion Programs: An Intervention Mapping approach*. 4th ed. Wiley; 2016.

26. Kok G, Gottlieb NH, Peters GY, et al. A taxonomy of behaviour change methods: an Intervention Mapping approach. *Health Psychol Rev.* 2016;10(3):297-312. doi:0.1080/17437199.2015.1077155
27. Sladdens EFC, Kroeze W, Kohl LFM, et al. Correlates of dietary behavior in adults: an umbrella review. *Nutr Rev.* 2015;73(8):477-499. doi:10.1093/nutrit/nuv007
28. Sladdens EFC, Gerards SM, Thijs C, de Vries NK, Kremers SPJ. General parenting, childhood overweight and obesity-inducing behaviors: a review. *Int J Pediatr Obes.* 2011;6(2-2):e12-e27. doi:10.3109/17477166.2011.566339
29. Maccoby EE, Martin JA. Socialization in the context of the family: parent-child interaction. In: Mussen PH, Hetherington EM, eds. *Handbook of Child Psychology.* Vol 4. Wiley; 1983:1-101.
30. Sladdens EFC, Kremers SPJ, Staffleu A, et al. Food parenting practices and child dietary behavior: prospective relations and the moderating role of general parenting. *Appetite.* 2014;79:42-50. doi:0.1016/j.appet.2014.04.004
31. White HD. Scientific communication and literature retrieval. In: Cooper H, Hedges LV, Valentine JC. *The Handbook of Research Synthesis and Meta-Analysis.* 2nd ed. Russell Sage Foundation; 2009.
32. Hare ME, Coday M, Williams NA, Richey PA, Tylavsky FA, Bush AJ. Methods and baseline characteristics of a randomized trial treating early childhood obesity: the Positive Lifestyles for Active Youngsters (Team PLAY) trial. *Contemp Clin Trials.* 2012;33(3):534-549. doi:10.1016/j.cct.2012.02.003.
33. Odoms-Young AM, Kong A, Schiffer LA, et al. Evaluating the initial impact of the revised Special Supplemental Nutrition Program for Women, Infants and Children (WIC) food packages on dietary intake and home food availability in African-American and Hispanic families. *Public Health Nutr.* 2014;17(1):83-93. doi:10.1017/S1368980013000761
34. Jordan KC, Freeland-Graves JH, Klohe-Lehman DM, et al. A nutrition and physical activity intervention promotes weight loss and enhances diet attitudes in low-income mothers of young children. *Nutr Res.* 2008;28(1):13-20. doi:10.1016/j.nutres.2007.11.005
35. Pigott TD, Polanin JR. Methodological guidance paper: high-quality meta-analysis in a systematic review. *Rev Educ Res.* 2020;90(1):24-46. doi:10.3102/0034654319877153
36. Yavuz HM, van Ijzendoorn MH, Mesman J, van der Veek S. Interventions aimed at reducing obesity in early childhood: a meta-analysis of programs that involve parents. *J Child Psychol Psychiatry.* 2014;56(6):677-692. doi:10.1111/jcpp.12330
37. Hennessey M, Heary C, Laws R, et al. The effectiveness of health professional-delivered interventions during the first 1000 days to prevent overweight/obesity in children: a systematic review. *Obesity Rev.* 2019;20(12):1691-1707. doi:10.1111/obr.12924
38. Barton H, Grant M, Guise R. *Shaping Neighbourhoods: For Local Health and Global Sustainability.* Bookcraft Ltd; 2003.
39. Marshall E, Toohey K. Representing family: community funds of knowledge, bilingualism, and multimodality. *Harvard Educ Rev.* 2010;80(2):221-241. doi:10.17763/haer.80.2.h3446j54n608q442
40. Dunst CJ, Boyd K, Trivette CM, Hamby DW. Family-oriented program models and professional helping practices. *Fam Relat.* 2002;51(3):221-229. doi:10.1111/j.1741-3729.2002.00221.x
41. Linting M, van der Kooij A. Nonlinear principal component analysis with CATPCA: a tutorial. *J Pers Assess.* 2012;94(1):12-25. doi:10.1080/00223891.2011.627965
42. Linting M, Meulman JJ, Groenen PJF, Van der Kooij AJ. Nonlinear principal components analysis: introduction and application. *Psychol Methods.* 2007;12(3):336-358. doi:10.1037/1082-989x.12.3.336
43. *Alkon A, Crowley AA, Benjamin Neelon SE, et al. Nutrition and physical activity randomized control trial in child care centers improves knowledge, policies and children's body mass index. *BMC Public Health.* 2014;14:215. doi:10.1186/1471-2458-14-215
44. *Barkin SL, Heerman WJ, Sommer EC, et al. Effect of a behavioral intervention for underserved preschool-age children on change in body mass index. *J Am Assoc.* 2018; 320(5):450-460. doi:10.1001/jama.2018.9128
45. *Beckerman JP, Aftosmes-Tobio A, Kilos N, et al. Communities for healthy living (CHL)—a family-centered childhood obesity prevention program integrated into Head Start services: study protocol for a pragmatic cluster randomized trial. *Contemp Clin Trials.* 2019;78:34-45. doi:10.1016/j.cct.2019.01.002
46. *Bender MS, Nader PR, Kennedy C, Gahagan S. A culturally appropriate intervention to improve health behaviors in Hispanic mother-child dyads. *Child Obes.* 2013;9(2):157-163. doi:10.1089/chi.2012.0118
47. *de Bourdeaudhuij I, Verbeel V, De Henauw S, et al. IDEFICS Consortium. Behavioural effects of a community-oriented setting-based intervention for prevention of childhood obesity in eight European countries: main results from the IDEFICS study. *Obes Rev.* 2015;16(2):30-40. doi:10.1111/obr.12347
48. *Bridge GL, Willis TA, Evans CEL, Roberts KPJ, Rudolf M. The impact of HENRY on parenting and family lifestyle: exploratory analysis of the mechanisms for change. *Child Care Health Dev.* 2019;45(6):850-860. doi:10.1111/cch.12694
49. *Burton W, Twiddy M, Sahota P, Brown J, Bryant M. Participant engagement with a UK community-based preschool childhood obesity prevention programme: a focused ethnography study. *BMC Public Health.* 2019;19(1): 1074. doi:10.1186/s12889-019-7410-0
50. *Buscemi J, Berlin KS, Rybak TM, et al. Health behavior and weight changes among ethnic and racial minority preschoolers and their parents: associations across 1 year. *J Pediatr Psychol.* 2016;41(7):777-785. doi:10.1093/jpepsy/jsv165
51. *Cloutier MM, Wiley J, Huedo-Medina T, et al. Outcomes from a pediatric primary care weight management program: steps to growing up healthy. *J Pediatr.* 2015;167(2): 372-377. doi:10.1016/j.jpeds.2015.05.028
52. *Davison KK, Jurkowski JM, Li K, Kranz S, Lawson HA. A childhood obesity intervention developed by families for families: results from a pilot study. *Int J Behav Nutr Phys Act.* 2013;10:3. doi:10.1186/1479-5868-10-3
53. *Dickerson J, Bird PK, McEachan RRC, et al. Born in Bradford's Better Start: an experimental birth cohort study to evaluate the impact of early life interventions. *BMC Public Health.* 2016;15(1):711. doi:10.1186/s12889-016-3318-0
54. *Ek A, Nordin K, Nyström CD, Sandvik P, Eli K, Nowicka P. Responding positively to "children who like to eat": parents' experiences of skills-based treatment for childhood obesity. *Appetite.* 2020;145:104488. doi:10.1016/j.appet.2019.104488
55. *GreenMills LL, Davison KK, Gordon KE, Li K, Jurkowski JM. Evaluation of a childhood obesity awareness campaign targeting Head Start families: designed by parents for parents. *J Health Care Poor Underserved.* 2013;24(2): 25-33. doi:10.1353/hpu.2013.0096

56. *Hacioglu DO, Simsek H. The effect of healthy life approaches applied to families of children in preschool on obesity and healthy life behaviour. *Progress Nutr.* 2019; 21(1):34-45. doi:10.23751/pn.v21i1.6141
57. *Haines J, McDonald J, O'Brien A, et al. Healthy Habits, Happy Homes: Randomized trial to improve household routines for obesity prevention among preschool-aged children. *JAMA Pediatr.* 2013;167(11):1072-1079. doi:10.1001/jamapediatrics.2013.2356
58. *Heerman WJ, Burgess LE, Escarfuller J, et al. Competency based approach to community health (COACH): the methods of a family-centered, community-based, individually adaptive obesity randomized trial for preschool child-parent pairs. *Contemp Clin Trials.* 2018;73:1-7. doi:10.1016/j.cct.2018.08.006
59. *Ingalls A, Rosenstock S, Cuddy FS, et al. Family Spirit Nurture (FSN)—a randomized controlled trial to prevent early childhood obesity in American Indian populations: trial rationale and study protocol. *BMC Obes.* 2019;6:18. doi:10.1186/s40608-019-0233-9
60. *Keita AD, Risica PM, Drenner KL, Adams I, Gorham G, Gans KM. Feasibility and acceptability of an early childhood obesity prevention intervention: results from the healthy homes, healthy families pilot study. *J Obes.* 2014; 378501. doi:10.1155/2014/378501
61. *Knierim SD, Moore SL, Raghunath SG, Yun L, Boles RE, Davidson AJ. Home visitations for delivering an early childhood obesity intervention in Denver: parent and patient navigator perspectives. *Matern Child Health J.* 2018; 22(11):1589-1597. doi:10.1007/s10995-018-2553-7
62. *Lebron CN, Ofori A, Sardinias K, Luaces M, Natale R, Messiah SE. Barriers and facilitators to obesity prevention dissemination and implementation efforts in the childcare centre setting from the provider perspective. *Child.* 2020; 46(3):352-359. doi:10.1111/cch.12752
63. *McGarvey EL, Collie KR, Fraser G, Shufflebarger C, Lloyd B, Oliver MN. Using focus group results to inform preschool childhood obesity prevention programming. *Ethn Health.* 2006;11(3):265-285. doi:10.1080/13557850600565707
64. *McKee MD, Maher S, Deen D, Blank AE. Counseling to prevent obesity among preschool children: acceptability of a pilot urban primary care intervention. *Ann Fam Med.* 2010;8(3):249-255. doi:10.1370/afm.1057
65. *Messiah SE, Lebron C, Moise R, et al. Healthy caregivers-healthy children (HC2) phase 2: integrating culturally sensitive childhood obesity prevention strategies into childcare center policies. *Contemp Clin Trials.* 2017;53:60-67. doi:10.1016/j.cct.2016.12.011
66. *Montaño Z, Smith JD, Dishion TJ, Shaw DS, Wilson MN. Longitudinal relations between observed parenting behaviors and dietary quality of meals from ages 2 to 5. *Appetite.* 2015;87:324-329. doi:10.1016/j.appet.2014.12.219
67. *Natale R, Scott SH, Messiah SE, Schrack MM, Uhlhorn SB, Delamater A. Design and methods for evaluating an early childhood obesity prevention program in the childcare center setting. *BMC Public Health.* 2013;13:78. doi:10.1186/1471-2458-13-78
68. *Po'e EK, Heerman WJ, Mistry RS, Barkin SL. Growing right onto wellness (GROW): a family-centered, community-based obesity prevention randomized controlled trial for preschool child-parent pairs. *Contemp Clin Trials.* 2013;36(2):436-449. doi:10.1016/j.cct.2013.08.013
69. *Salvy S-J, Dutton GR, Borgatti A, Kim Y-I. Habit formation intervention to prevent obesity in low-income preschoolers and their mothers: a randomized controlled trial protocol. *Contemp Clin Trials.* 2018;70:88-98. doi:10.1016/j.cct.2018.05.015
70. *Sherwood NE, French SA, Veblen-Mortenson S, et al. NET-works: linking families, communities and primary care to prevent obesity in preschool-age children. *Contemp Clin Trials.* 2013;36(2):544-554. doi:10.1016/j.cct.2013.09.015
71. *de Silva-Sanigorski A, Prosser L, Carpenter L, et al. Evaluation of the childhood obesity prevention program Kids—'Go for your life.' *BMC Public Health.* 2010;10:288. doi:10.1186/1471-2458-10-288
72. *Smith JD, Montaño Z, Dishion TJ, Shaw DS, Wilson MN. Preventing weight gain and obesity: indirect effects of the family check-up in early childhood. *Prev Sci.* 2015;16(3): 408-419. doi:10.1007/s11121-014-0505-z
73. *Sosa ET, Parra-Medina D, He M, et al. ¡Miranos! (look at us! we are healthy!): Home-based and parent peer-led childhood obesity prevention. *Health Promot Pract.* 2016; 17(5):675-681. doi:10.1177/1524839915623762
74. *Sun A, Cheng J, Bui Q, Liang Y, Ng T, Chen J-L. Home-based and technology-centered childhood obesity prevention for Chinese mothers with preschool-aged children. *J Transcult Nurs.* 2017;28(6):616-624. doi:10.1177/1043659617719139
75. *Taverno Ross SE, Barone Gibbs B, Documet PI, et al. ANDALE Pittsburgh: results of a promotora-led, home-based intervention to promote a healthy weight in Latino preschool children. *BMC Public Health.* 2018;18(1):360. doi:10.1186/s12889-018-5266-3
76. *Taverno Ross SE, Gibbs BB, Documet PI, Pate RR. Study protocol for a home-based obesity prevention program in Latino preschool children. *Transl J of Am Coll Sports.* 2017;2(14):85-91. doi:10.1249/TJX.0000000000000038
77. *Thomson JL, Tussing-Humphreys LM, Goodman MH. Delta healthy sprouts: a randomized comparative effectiveness trial to promote maternal weight control and reduce childhood obesity in the Mississippi delta. *Contemp Clin Trials.* 2014;38(1):82-91. doi:10.1016/j.cct.2014.03.004
78. *Wickel EE, Ali L, Hawkins H, Hemming E. Results of a referral-based weight management program targeted toward children aged 2 to 6 years with obesity or severe obesity. *BMC Pediatrics.* 2019;19:504. doi:10.1186/s12887-019-1886-8
79. *Williams PA, Cates SC, Blitstein JL, et al. Nutrition-Education Program improves preschoolers' at-home diet: a group randomized trial. *J Acad Nutr Diet.* 2014;114(7): 1001-1008. doi:10.1016/j.jand.2014.01.015
80. *Willis TA, George J, Hunt C, et al. Combating child obesity: Impact of HENRY on parenting and family lifestyle. *Pediatr Obes.* 2013;9(5):339-350. doi:10.1111/j.2047-6310.2013.00183.x
81. *Willis TA, Roberts KPJ, Berry TM, Bryant M, Rudolf MCJ, et al. The impact of HENRY on parenting and family lifestyle: a national service evaluation of a preschool obesity prevention programme. *Public Health.* 2016;136:101-108. doi:10.1016/j.puhe.2016.04.006
82. *Yin Z, Parra-Medina D, Cordova A, et al. Miranos! Look at Us, We Are Healthy! An environmental approach to early childhood obesity prevention. *Child Obe.* 2012;8(5):429-439. doi:10.1089/chi.201.0125
83. *Yin Z, Ullevig SL, Sosa E, et al. Study protocol for a cluster randomized controlled trial to test "¡Miranos! Look at Us, We Are Healthy!"—an early childhood obesity prevention program. *BMC Pediatrics.* 2019;19(1):190. doi:10.1186/s12887-019-1541-4