

Behavior Change Interventions to Improve the Health of Racial and Ethnic Minority Populations: A Tool Kit of Adaptation Approaches

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Context: Adapting behavior change interventions to meet the needs of racial and ethnic minority populations has the potential to enhance their effectiveness in the target populations. But because there is little guidance on how best to undertake these adaptations, work in this field has proceeded without any firm foundations. In this article, we present our Tool Kit of Adaptation Approaches as a framework for policymakers, practitioners, and researchers interested in delivering behavior change interventions to ethnically diverse, underserved populations in the United Kingdom.

Methods: We undertook a mixed-method program of research on interventions for smoking cessation, increasing physical activity, and promoting healthy eating that had been adapted to improve salience and acceptability for African-, Chinese-, and South Asian-origin minority populations. This program included a systematic review (reported using PRISMA criteria), qualitative interviews, and a realist synthesis of data.

Findings: We compiled a richly informative data set of 161 publications and twenty-six interviews detailing the adaptation of behavior change interventions

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and the contexts in which they were undertaken. On the basis of these data, we developed our Tool Kit of Adaptation Approaches, which contains (1) a forty-six-item Typology of Adaptation Approaches; (2) a Pathway to Adaptation, which shows how to use the Typology to create a generic behavior change intervention; and (3) RESET, a decision tool that provides practical guidance on which adaptations to use in different contexts.

Conclusions: Our Tool Kit of Adaptation Approaches provides the first evidence-derived suite of materials to support the development, design, implementation, and reporting of health behavior change interventions for minority groups. The Tool Kit now needs prospective, empirical evaluation in a range of intervention and population settings.

Keywords: ethnicity, race, smoking cessation, diet, exercise.

THE MOST WIDELY ADVOCATED STRATEGY TO COMBAT THE global pandemic of chronic disease is a preventive approach (CDC 2009; Reinhard et al. 2010; WHO 2005, 2008). Although much evidence supports behavior change interventions to address the lifestyle factors driving this pandemic—primarily smoking, physical inactivity, and unhealthy diet (UK Department of Health 2004)—this evidence is mostly derived from, and applicable to, European-origin populations in economically developed countries. There is a recognized gap in the evidence regarding whether these interventions are effective also with these countries' ethnic minority populations, by whom they are relatively underutilized (White, Carlin, and Rankin 1998). Indeed, if such interventions are not suitable for, and hence not “reaching,” ethnic minority populations, they may well be widening the existing ethnic inequalities in health (White, Adams, and Heywood 2009).

The adaptation of existing interventions might increase the salience and consequent effectiveness of behavior change interventions for ethnic minority populations, thereby helping reduce inequities in the provision of services (Barrera, Castro, and Holleran Steiker 2011; Barrera et al. 2012; Bhopal 1991). Card, Solomon, and Cunningham (2011, 25–26) defined the adaptation of an intervention as “the process of altering a program to reduce mismatches between its characteristics and those of the new context in which it is to be implemented or used.” The potential benefit of this process has been illustrated in randomized controlled trials (RCTs) such as the Healthy Body / Healthy Spirit trial (Resnicow et al. 2005), which demonstrated statistically significantly greater improvements in healthy eating and physical activity for African

American populations involved in an appropriately adapted, versus a nonadapted, lifestyle intervention.

Despite the growing support for such adaptations, there is little evidence worldwide comparable to the Healthy Body/ Healthy Spirit trial that clearly demonstrates the effectiveness of these approaches. Consequently, we were commissioned by the United Kingdom's National Institute for Health Research Health Technology Assessment Programme (NIHR HTA) to examine the adaptation of behavior change interventions for the country's largest ethnic minority groups, those of African, Chinese, and South Asian origin (Liu et al. 2012). As one component of our work, we conducted a systematic review of the effectiveness of both existing and novel approaches to the adaptation of behavior change interventions to better meet the needs of these ethnic minority populations. We discovered that one of the central barriers to accruing evidence of effectiveness is the heterogeneity and the language used in reporting and describing the interventions and adaptation mechanisms. This lexical diversity prevents the comparison of studies and the ability to attribute evidence to particular components of interventions (Abraham and Michie 2008).

To address this evidence gap and construct a more standardized approach to adapting behavior change interventions for ethnic minority populations, we further analyzed the literature identified in our systematic review, supplemented this with qualitative interviews, and combined our research findings through a process of realist review (Pawson et al. 2005). Our aim was to develop a comprehensive Tool Kit of Adaptation Approaches, which is the focus of this article. This Tool Kit is intended to support the development, design, implementation, and reporting of future behavior change interventions for diverse populations, thus improving both their reach and efficacy, which is fundamental to interventions specifically intended to reduce or eliminate disparities in health (King et al. 2008; Thorlby et al. 2011). The Tool Kit is therefore aimed at people working in policy, practice, and research with a particular interest in underserved populations.

Methods

Systematic Review

Search Strategy. We conducted a comprehensive search of eleven databases to identify research that reported studies of behavior change

interventions for smoking cessation, increasing physical activity, and promoting healthy eating for African-, Chinese- and South Asian-origin populations. We also conducted a gray literature search using Google, Google Scholar, and the first five pages of NHS Evidence, along with ClinicalTrials.gov (<http://clinicaltrials.gov/>) and Current Controlled Trials (<http://www.controlled-trials.com/>) for ongoing trials. The experts whom we contacted for our qualitative interviews referred to additional gray literature. Our searches covered the period from 1950 to 2009, with no restrictions on the language of the publication. Our search strategy, terms, and databases are reported in appendix 1.

Study Selection. Two reviewers independently assessed the studies for selection according to explicit inclusion and exclusion criteria, which we summarize here (Liu et al. 2012). Studies of any behavior change interventions for smoking cessation, increasing physical activity, and/or promoting healthy eating were eligible for inclusion. The populations targeted by the interventions were children and (not pregnant) adults who self-identified as having African, Chinese, and/or South Asian origins and who were now living in countries where they were minority populations. These people had vastly different histories, characteristics, and contexts. For example, an African origin encompassed people with African ancestral origins who self-identified, or were identified, as African, living in any country where they were part of a minority population and from any generation of migration (e.g., African Americans, African British, and recent migrants born in Africa). But we excluded African people of other ancestry, for example, European Africans and South Asian Africans (Agyemang, Bhopal, and Bruijnzeels 2005; Bhopal 2004). Whenever the study report permitted, we included a thorough documentation of the description of ethnicity, how this was assessed, and any within-group heterogeneity or acculturation. Specific identifiers, for example, “Bangladeshi” or “Indian,” were preferable to broad ethnic classifications such as “South Asian.” We excluded any study that was described as “multiethnic” but did not report the percentage of the specific ethnic groups or whose ethnic group(s) of interest comprised less than 90 percent of the total study population and whose outcomes were not disaggregated by ethnicity. Appendix 2 is a glossary of the ethnicity-related terms that we used in this work.

We did not place any restrictions on the study design. We thus included systematic reviews, experimental studies (e.g., randomized

controlled trials (RCTs), controlled clinical trials (CCTs), controlled before-and-after (CBA) studies, interrupted time series (ITS), and before-and- after, and pilot intervention studies) as well as qualitative studies. Given our focus, we used only those studies that clearly described the adaptations that were undertaken, as opposed to stating only that an adaptation had been undertaken. The literature on adapted interventions variously describes interventions as being “culturally appropriate” “culturally sensitive,” “culturally tailored,” “culturally targeted,” or “modified” (Barrera et al. 2012). In our study, we opted for the term “adapted,” as it encompasses all these descriptions and also acknowledges a broader influence of ethnicity on health than one mediated purely by culture (Liu et al. 2012). Therefore, studies of all such descriptions were eligible for inclusion in our work. When the description of the “adaptation” was unclear, we discussed (and reached agreement on) whether the study warranted inclusion. Our decision was based on whether the study had been altered in any way to meet the characteristics of the ethnic population that it was serving, as opposed to being a generic intervention. This definition covered studies of entire interventions already operating for mainstream populations that were subsequently adapted, as well as studies of interventions that were designed from scratch specifically for ethnic minority populations (e.g., from an approach based on community participation) that contained intervention elements used in the mainstream, like counseling or nicotine replacement therapy (NRT).

Data Extraction, Assessment, and Analysis. Either Liu and Davidson or Liu and Wabnitz independently extracted data using a tailored data extraction form and assessed the data’s quality. As recommended by the Cochrane Public Health Group (Armstrong et al. 2007), we used the Critical Appraisal Skills Programme (CASP) checklist to assess the quality of adapted systematic reviews (CASP 2013; <http://www.casp-uk.net/>) and the quality assessment tool developed by the Effective Public Health Practice Project (EPHPP) for the intervention studies (EPHPP 2013; <http://www.ephpp.ca/tools.html>). We extracted a wide range of quantitative and qualitative data, which we descriptively summarized and then thematically synthesized to examine the effectiveness, cost-effectiveness, feasibility, acceptability, and equity of the adapted approaches (Liu et al. 2012).

Qualitative Interviews

Sampling. We used purposive, maximum diversity sampling to recruit twenty to thirty researchers and health promoters adapting behavior change interventions for smoking cessation, increasing physical activity, and promoting healthy eating aimed at African-, Chinese-, and South Asian–origin ethnic minority groups around the world.

Data Generation and Analysis. Two researchers conducted semistructured, in-depth interviews by telephone or face to face. The interviews were recorded, transcribed, and independently coded using NVivo 8 (QSR International, Doncaster, Australia). The thematic analysis (Attride-Stirling 2001) used a coding frame informed by the systematic review while remaining open to more emergent issues, to answer the central question, How can interventions be adapted to be more effective for ethnic minority groups? (Liu et al. 2012). We interviewed until we reached data saturation, which became apparent when no new themes were generated from the last few interviews.

Data Synthesis

The data were synthesized from the various components of our work to develop our Tool Kit of Adaptation Approaches.

We first undertook an iterative process to create and refine a Typology of Adaptation Approaches (Michie et al. 2011), using data from the systematic review and the qualitative interviews. We independently extracted all approaches to adapt interventions for our populations of interest reported in the systematic review literature. Through discussion, the three lead researchers synthesized and categorized these data to produce a generic Typology of Adaptation in which all items were conceptually clear and unambiguous. The Typology was then applied to the data extracted on adaptation approaches from the qualitative interviews to examine whether any more items could be identified. The resulting Typology was refined after discussion with the multidisciplinary research team and, later, after critical discussions at a national stakeholder event held in the United Kingdom (University of Edinburgh, Ethnicity and Health Conference 2011).

Subsequently, we examined the Typology to find those adaptations relevant to the various stages of a generic behavior change intervention and created a Pathway to Adaptation.

A realist approach to synthesizing our research components enabled us to decide which adaptation approaches were most likely to be effective in which populations, in what circumstances, and why (Greenhalgh et al. 2009). The research components included, in addition to the systematic review and the qualitative interviews, our program user engagement and a review of guidelines and systematic reviews of behavior change interventions recommended for mainstream populations. We modified the key steps from existing realist review logic (Pawson et al. 2005), as the original steps were developed for synthesizing primary studies and we needed to synthesize data generated from mixed-method sources (Liu et al. 2012). Liu and Davidson were able to synthesize these data through repeated discussion after searching, reviewing, interviewing, coding, extracting, and analyzing the data sets from the preceding project components. Through this process we were able to find multiple context-mechanism-outcome configurations demonstrating contexts that either enhanced or diminished the effectiveness of adaptations at each stage in our Pathway to Adaptation. We then used these contextual considerations to develop a decision-making tool to guide the use of the Typology when choosing which adaptations to employ and when.

Results

Typology of Adaptation Approaches

In total, seven systematic reviews and 107 studies (reported in 154 papers) met our inclusion/exclusion criteria. They were fully extracted and their quality appraised (see the PRISMA diagram in figure 1). Table 1 summarizes both the distribution of the studies across ethnic minority populations and the health topics. Most of these studies were conducted in the United States and focused on African American populations ($n = 90$) for physical activity and healthy eating ($n = 50$) and smoking cessation ($n = 19$). From this literature, we found only seven systematic reviews (Banks-Wallace and Conn 2002; Chen and Tang 2007; Hawthorne et al. 2008; Hudson 2008; Shaya, Gu, and Saunders 2006; Webb 2008b; Whitt-Glover and Kumanyika 2009) and eight additional empirical investigations (Ard et al. 2008; Campbell et al. 1999a; Djuric et al. 2009; Kreuter et al. 2005; Ma et al. 2004; Nollen et al. 2007; Resnicow et al. 2009; Webb 2008a) that evaluated the

TABLE 1
 Spread of Literature Identified across Ethnic Groups and Health Topics of Interest

| Origin | Health Topics | | | | | | | Total |
|------------------|---------------|-----------------------------------|----------------------|--|-------------------|---------------------------------------|--------------------------------|-------|
| | Smoking | Smoking + Physical Activity | Physical Activity | Physical Activity + Healthy Eating | Healthy Eating | Physical Activity + Healthy Eating | Smoking + Physical Activity | |
| African American | 19 | 0 | 6 | 50 | 14 | 1 | 90 | |
| African | 0 | 0 | 1 | 0 | 0 | 0 | 1 | |
| Chinese | 4 | 0 | 1 | 2 | 0 | 0 | 7 | |
| South Asian | 0 | 0 | 1 | 5 | 2 | 0 | 8 | |
| Multiethnic | 0 | 0 | 1 | 0 | 0 | 0 | 1 | |
| Total | 23 | 0 | 10 | 57 | 16 | 1 | 107 | |

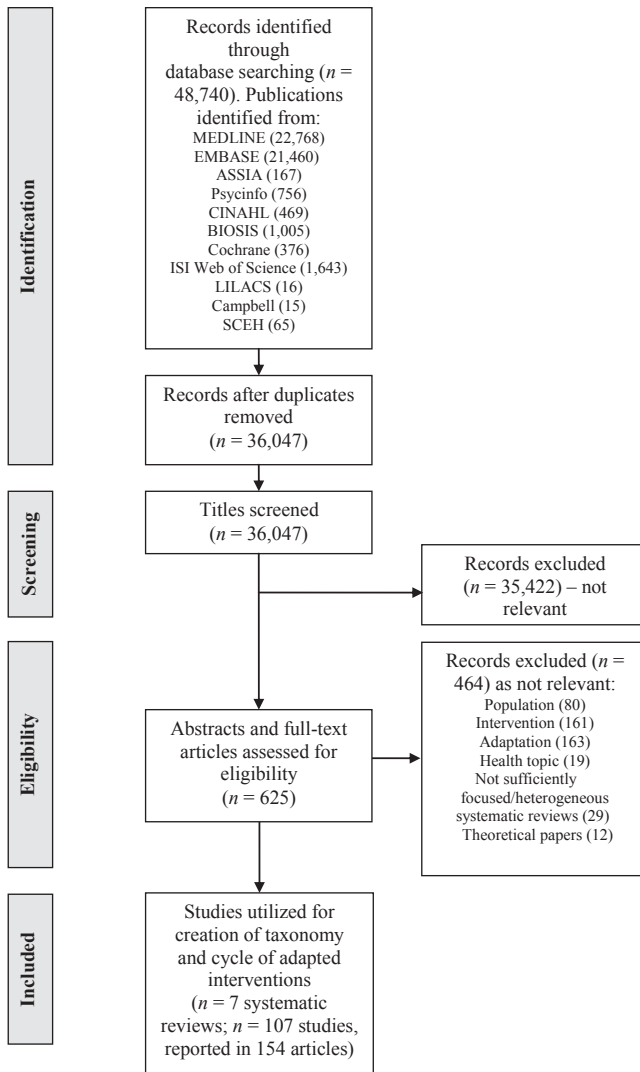


FIGURE 1. PRISMA diagram ([http://www.prisma-statement.org/statement .htm](http://www.prisma-statement.org/statement.htm)).

effectiveness of adaptations. This evidence showed an advantage of adaptation in acceptability to intervention recipients but revealed mixed and inconclusive evidence for the effectiveness of adaptations for improving behavior change outcomes (Liu et al. 2012).

We used all seven systematic reviews and 107 studies to consider, in detail, the approaches to adapt these interventions. We synthesized and categorized the data extracted by the reviewers to come up with forty-six mutually exclusive adaptations, which together represented the breadth and depth of adaptation in these studies, which spanned all three health behavior topics and populations of interest.

For our qualitative research, we conducted twenty-six in-depth interviews with experts in adapting behavior change interventions. Analysis of the interviews generated three overarching themes: (1) the need to broaden thinking on ethnicity when adapting health promotion interventions from the more fixed dimensions (e.g., country of birth, language, religion, ethnic group) to encompass more contextual dimensions (e.g., participants' health care/research exposure, their social environment, and heterogeneity within the participant groups); (2) considerations of the practicalities of adapting interventions; and (3) the approaches adopted to adapt interventions (Liu et al. 2012). Data from the third theme validated the forty-six items in the Typology generated from the systematic review data.

The forty-six items covered a wide range of considerations for those conceptualizing, designing, implementing, and reporting on behavior change interventions. These items also could, however, be placed under the six broad structure and process headings shown in table 2 (i.e., Collaborative Working, Team, Endorsement, Materials, Messages, and Delivery).

"Collaborative Working" refers to exploratory work with the target population (Kreuter et al. 2005; Stewart et al. 2006) or community leaders (Whitt-Glover et al. 2008) to assess what may be appropriate and effective with key groups, as this varies according to heterogeneity within ethnic groups based on, for example, acculturation, geography, socioeconomic status, age, and gender. Collaborative Working also ensured that the intervention addressed health behavior patterns found in the population (Webb 2008a) and that the goals (Robinson et al. 2003) and evaluation instruments were appropriate (Story et al. 2003).

"Team" considerations were the matching of ethnicities and sometimes other characteristics (e.g., age, gender) of the program facilitators (Gaston, Porter, and Thomas 2007) and the individuals in the high-level planning and leadership of the intervention with the prospective target population (Banks-Wallace, Enyart, and Johnson 2004). "Team" also

TABLE 2
Typology of Adaptation

| Adaptation | | Example |
|------------|--|---|
| 1 | Collaborative Working Exploratory phase with target population (same group as intervention group) | Adaptations based on prior relevant (qualitative) research |
| 2 | Exploratory phase with target population (different group than intervention group or cannot tell) | Adaptations based on focus groups from a previous study |
| 3 | Exploratory phase with community leaders | Needs assessment |
| 4 | Determine whether intervention goals and outcomes are relevant to the target population | Focus on reducing fat and not on losing weight when weight loss is not a priority for the population; emphasis on personal health improvement as means of assisting the family or community |
| 5 | Determine whether intervention addresses health behavior patterns found in target population | Model smoking patterns of African American smokers (low daily smoking rate, menthol, high tar/nicotine cigarettes) |
| 6 | Determine whether evaluation instruments are developed for and validated in the target population | Regionally and culturally specific foods added to Food Frequency Questionnaire (FFQ) |
| 7 | Ethnically matched intervention staff or facilitator (with qualifications) | Dietician, exercise instructor, program staff with knowledge of culture, religion, and specific community characteristics |
| 8 | Ethnically matched peer role models or peer education | Lay health advisers with the same background, age, gender, ethnicity |
| 9 | Ethnically matched high-level/respected individuals and community members throughout planning, directing, reviewing, and implementing stages | Steering group ethnically matched to the target population, e.g., all Chinese |
| 10 | Ethnically matched leadership within the study | Principal investigator is ethnically matched to the target population, e.g., is South Asian |

Continued

TABLE 2—Continued

| Adaptation | | Example |
|------------|--|---|
| 11 | Endorsement | Cultural competency training provided for study personnel |
| 12 | Ethnically matched facilitators and peer role models who have successfully changed their behavior (both ethnically and behaviorally matched) | Lay health advisers employed who themselves are ex-smokers |
| 13 | Ethnically matched high-level/respected individuals to increase salience of program goals | Former surgeon general (African American) asked to deliver a message, spokesperson |
| 14 | Utilizes local/respected religious/spiritual leaders | Church pastors, church pastors' wives involved in the intervention |
| 15 | Collaboration with ethnic specific institutions and professional organizations (formal) | Collaboration with, e.g., National Black Leadership Initiative on Cancer; holding intervention at local tutoring program |
| 16 | Utilizes ethnically appropriate informal networks | Community groups, lay health educator networks |
| 17 | Materials | |
| 18 | Material depicts individuals from target population | Posters with appropriate models, e.g., of same ethnicity and age as the target population |
| 19 | Material (video, booklet, skits, handouts, games) in target population's language | Translation, bilingual, interpretation |
| 20 | Material reflects target population's language use (usage, concepts, vocabulary) | Figurative language, e.g., "Dear Sister" |
| 21 | Material matched to reading level and literacy | Consider matching text with graphics, or fifth- to sixth-grade reading level for populations with low literacy; assistance with questions |
| 22 | Material depicts appropriate graphics and scenarios (this can be heterogeneous) | Foods, clothing, logos, artwork |
| 23 | Ethnically appropriate media sources used to develop materials | Chinese-language newspaper |

Continued

TABLE 2—Continued

| Adaptation | Example |
|------------|---|
| 23 | <p>Material developed specifically for target population (by project investigators, expert opinion, tools)</p> <p>KIS II Quit Smoking Guide: 36-page booklet developed for African American light smokers developed by investigators, expert feedback, and cultural relevance analysis using the suitability of assessment materials (SAMS)</p> <p>African American–owned advertising company produced campaign media spots; recipe books with recipes provided by participants</p> |
| 24 | <p>Materials created by members of the target population</p> |
| 25 | <p>Messages</p> <p>Presents ethnic specific data</p> |
| 26 | <p>Guidance/messages based on preferences of target population</p> |
| 27 | <p>Intervention content targets population's social and cultural values</p> <p>Presented statistics for heart disease among African Americans</p> <p>Preferences including foods, recipes, flavorings, activities</p> <p>Includes spiritual themes, prayers, inclusion of kinship, collectivism; cultural traditions; family commitments; connection to history</p> |
| 28 | <p>Intervention considers issues unique to target population's context</p> |
| 29 | <p>Utilizes resources from target population</p> |
| 30 | <p>Utilizes and addresses target population's norms</p> |
| 31 | <p>Addresses concerns with medical programs, procedures, and medication</p> <p>Church meals; food at social gatherings</p> <p>Recipes provided by participants used in direct instruction</p> <p>BMI cutoffs, normative frameworks, body image</p> <p>Medicine may be perceived as too strong; giving saliva was a concern to some populations</p> |
| 32 | <p>Presents a pro-ethnic/race approach</p> |
| 33 | <p>Teaches appropriate communication skills</p> <p>Asian youth learned to communicate their smoking cessation needs to parents and elders while maintaining harmony and respect</p> |

Continued

TABLE 2—Continued

| Adaptation | | Example |
|------------|--|--|
| 34 | Maintains cultural significance of food | Encourage different preparation of foods rather than avoidance of certain foods altogether |
| 35 | Addresses discrimination and mistrust Delivery | Address oppressions such as racism and stigma |
| 36 | Reflects target population's preferred method of communication | Storytelling, poetry, and literature; hands-on/interactive learning; testimonials; face-to-face |
| 37 | Intervention delivered in a format preferred by target population | Joint counseling sessions for Chinese smoker's physician and family |
| 38 | Considers target population's employment situations | Caretaker, night-shift worker, taxi driver |
| 39 | Utilizes incentives relevant to the target population | Held in evenings rather than daytime; use of small gifts given at intervals during the study found to enhance retention of participants with rural African Americans |
| 40 | Located in an ethnically appropriate/familiar location | Black-owned commercial gym; community-based clinic that serves predominantly low-income African American patients |
| 41 | Provide ethnically appropriate food/activities/music | Serve culturally appropriate foods and dishes; African dance |
| 42 | Addresses emotional barriers | Stress (of inner city life) |
| 43 | Addresses physical/financial (structural) barriers to participation | Access to transport, time restrictions, safe locations, financial constraints addressed (providing compensations/suggesting alternatives); child care |
| 44 | Encourages/involves social support | Joint or family counseling; invited families and friends to sessions |
| 45 | Purposefully maintains an exclusive or open intervention environment as preferred by target population | African American only (non-African American research members asked to leave); targeted to African American churchgoers, but open to all churchgoers |
| 46 | Gender taken into consideration | Women-only sessions |

encompassed the use of peer role models and peer education (Auslander et al. 2002; Lacey et al. 1991) and cross-cultural training for all study personnel (Ard et al. 2008).

“Endorsement” meant that ownership was fostered through linkages with individuals in the community, such as peer role models, respected individuals, and religious or spiritual leaders (Thrasher, Campbell, and Oates 2004), as well as with ethnic-specific organizations (Resnicow et al. 2002), institutions (Royce et al. 1995), and formal and informal networks (Campbell et al. 1999b), in order to enhance community support for interventions.

The “Materials” used in the intervention were adapted for appearance—depicting individuals from the relevant population groups and using appropriate graphics and scenarios (Two Feathers et al. 2005)—and for the language used, including translation (Chen et al. 2008), interpretation (Hawthorne and Tomlinson 1997), appropriate concepts and vocabulary (Huhman et al. 2005), and consideration of the population’s reading level (Ahluwalia, McNagny, and Clark 1998). Appropriate media sources were used for creating materials, such as ethnic-specific newspapers (Fitzgibbon et al. 2005) and religious newsletters (Shelley et al. 2008; Yanek et al. 2001).

Intervention “Messages” targeted the population’s social and cultural values (Wang and Chan 2005), presented a proethnic approach (Kreuter et al. 2005; Ma et al. 2004), conveyed ethnic specific data (Larson et al. 2009), were based on the population’s preferences (Kristal, Shattuck, and Patterson 1999), utilized resources that the population provided (Karanja et al. 2002), and taught needed skills. Messages also considered the population’s norms and issues unique to their context and maintained the cultural significance of their practices, for example, certain dietary practices (Agurs-Collins et al. 1997). These messages used materials created specifically for the target population (Lipkus, Lyna, and Rimer 1999; Orleans et al. 1998) or by the target population (DeBate et al. 2004). The messages also addressed concerns with medical programs (Haire-Joshu et al. 2001) and historical legacies of discrimination (DeBate et al. 2004) and mistrust (Guerin et al. 2003).

The “Delivery” of the interventions was in an appropriate/preferred format (Wong et al. 2008), which considered factors such as the gender mix (Choudhury et al. 2009); employment situations (Fang et al.

2006); any structural, financial, or emotional barriers to participation (Baranowski et al. 1990; Young and Stewart 2006); and the appropriate incentives and timing/setting of the intervention (Banks-Wallace, Enyart, and Johnson 2004; D'Eramo-Melkus et al. 2004). This often meant delivering the intervention in existing ethnically appropriate locations (Lasco et al. 1989) or adapting locations to be appropriate, for example, to respect the group's gender values (e.g., by employing for some South Asian populations only female lifeguards for women-only swimming sessions) (Kousar, Burns, and Lewandowski 2008). The delivery also considered appropriate activities; the population's preferred methods of communication and learning (Andrews et al. 2007; Utz et al. 2008); the preferred format of individual or group sessions (Boltri et al. 2008) to encourage social support (Yanek et al. 2001); and the preference of an exclusive (single ethnic group) or open (mixed ethnic groups) intervention environment (Ard et al. 2008).

This forty-six-item Typology of Adaptation Approaches is presented in more detail, and with definitions, in table 2. The adaptations identified in the 107 studies are summarized in appendix 3. As expected, the number of adaptations used in each study varied from just two to twenty-two, and many different combinations of adaptations were apparent. We purposely did not weight the forty-six items according to their importance, as they were intended to provide an overview of the range of possible adaptations. Not all adaptations will be necessary for successful adaptation, and which adaptations are given priority will depend on what is relevant to the particular population and intervention. The three most commonly used adaptations were (1) intervention content targets population's social and cultural values; (2) conducting an exploratory phase with the target population; and (3) intervention located in an ethnically appropriate/familiar location.

Pathway to Adaptation

When we considered how to use this Typology, we discovered that in practice not all adaptations were important at all times and that some adaptations were clearly related to specific stages of the intervention, from conception to the dissemination of outcomes. To convey these discoveries, we created the Pathway to Adaptation (see figure 2). This

| Intervention Pathway | Conception/ Planning | Promotion | Recruitment | Implementation | Retention | Evaluation | Outcome | Dissemination / Capacity building |
|---|---|--|--|--|--|--|---|---|
| Typology of approaches to adaptation mapped onto relevant steps in a typical intervention (one written example and otherwise numerical) | Conduct formative work with target population and community leaders 1, 2, 3, 9, 10, 11, 13, 14, 15, 16, 23, 24, 31, 35, 45, 46 | Utilizes local, respected religious and spiritual leaders 4, 7, 9, 10, 13, 14, 15, 16, 19, 22, 27, 29, 30, 35, 36, 40, 46 | Program utilizes ethnically appropriate formal and informal networks 7, 9, 10, 13, 14, 15, 16, 19, 22, 27, 29, 30, 31, 35, 36, 38, 39, 40, 41, 43, 46 | Addresses physical and financial barriers to participation 5, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46 | Program encourages social support 7, 8, 9, 10, 12, 13, 14, 15, 27, 29, 30, 36, 38, 39, 42, 43, 44, 45, 46 | Utilizes measurement tools validated within this population 4, 6, 9, 10, 27, 30, 38 | Intervention outcomes are relevant to the population 4, 6, 9, 10, 30 | Ethnically matched leadership within the study 9, 10 |

FIGURE 2. The Pathway to Adaptation.

Pathway is a generic model likely to capture some (if not all) of the steps usually undertaken in a wide range of behavior change interventions. From the forty-six items in our Typology of Adaptation (table 2), we were able to determine which of these adaptations applied to several stages and which applied to only some stages of the intervention. Figure 2 shows where the adaptations are mapped on the appropriate steps in the intervention Pathway.

RESET

Finally, we developed a decision-making tool called RESET (Relevance, Evidence base, Stages of intervention, Ethnicity, and Trends). This tool is designed to be used along with the Typology of Adaptation Approaches and the Pathway to Adaptation to further help practitioners and researchers decide which adaptations to employ and when.

Tables 3 and 4 provide examples of how the RESET tool is used to construct adapted behavior change interventions.

“Relevance” addresses whether the behavior change intervention is relevant to the target population, that is, whether the topic is sufficiently relevant to the population that action is required and whether the competing priorities for this population would lessen their engagement with this intervention. For example, interventions addressing weight loss from an aesthetic perspective may not resonate with populations who favor a larger body size and so may need to be reframed using more relevant health benefits (Resnicow et al. 2000). In regard to competing priorities, it may be difficult to engage people in a healthy-eating intervention if they are struggling financially, so offering incentives or subsidies and addressing these barriers to participation may be the foremost concern for adaptation.

“Evidence base” asks which intervention best addresses this health topic for this population. If there is evidence that an adapted intervention has had an effect on the target population, then this should guide subsequent interventions. If there is no evidence, then the best approach may be to look for evidence of an effective intervention for the mainstream population and adapt this with the target population in mind and guided by the tools.

“Stage of intervention” uses the Pathway to Adaptation to examine what stage(s) of the intervention should be adapted. First, what stages *need* to be adapted for this population? Adaptation may not be needed at every stage; for instance, English is appropriate as the language of

TABLE 3
RESET Tool Example 1

| | |
|--|---|
| <p>Relevance: Is this health promotion topic relevant to the target population?</p> | <p>The population did not view chewing paan as a health risk; in fact, it was often viewed as health enhancing, and so considerable work would be required for promotion, engagement, and recruitment to raise awareness of the health risks.</p> |
| <p>Are there competing priorities for this population that would lessen their engagement with this intervention?</p> | <p>Women were the target population, and competing priorities were their family obligations and concerns, which left little time for them to consider and take care of their own health.</p> |
| <p>Evidence base: What is the best intervention to address this health topic in this population?</p> | <p>There is evidence of the effect of using NRT for smoking cessation in both the general and the target population, but limited evidence for its use for the cessation of chewing tobacco/paan.</p> |
| <p>Is there evidence of an intervention effect in the target population?</p> | <p>Stage of intervention: What stage(s) of the intervention should be adapted?</p> |
| <p>What stages <i>need</i> adaptation for this population? (Adaptation may not be needed at every stage; e.g., English is appropriate as the language of intervention delivery for African Americans.)</p> | <p>All stages of this intervention need adaptation, if possible.</p> |
| <p>What stages <i>can</i> be adapted in this intervention? (Little adaptation can be undertaken with pharmacotherapy, e.g., nicotine replacement therapy.)</p> | <p>There is little adaptation that can be undertaken for the use of NRT, but all the other stages can be adapted.</p> |

Continued

TABLE 3—Continued

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| <ul style="list-style-type: none"> ● What stages should be <i>prioritized</i> for adaptation? (There may not be resources available to undertake all desired adaptations, so adaptations require prioritization.) | <p>There was not enough capacity to provide ethnically appropriate intervention staff in all positions, so ethnic matching was prioritized for the staff undertaking the intervention delivery.</p> |
| <ul style="list-style-type: none"> ● What are the conventional elements important to consider in adaptation (e.g., religion, language, culture, physical features, ancestry, age, gender, and socioeconomic status)? | <p>Ethnicity: What elements of ethnicity are most important to consider for this population? It was important to adapt for religion, language, culture, age, and socioeconomic status.</p> |
| <ul style="list-style-type: none"> ● What are the contextual elements important to consider in adaptation (social environments, physical space, past exposures to health research and services, and diverse life experiences, including stress)? | <p>It was particularly important to adapt for social environments, as the chewing of paan is a significant social practice, so the intervention needed to offer replacement social opportunities.</p> |
| <ul style="list-style-type: none"> ● What is the target population's degree of heterogeneity, and is it possible to assess heterogeneity (i.e., measure ethnic identity, cultural affiliation, or acculturation) and to adapt the intervention appropriately at a subgroup level? | <p>The population's heterogeneity was assessed, and the priority population (in terms of tobacco use) was determined to be the older generation. Therefore the intervention was adapted accordingly (to determine factors such as language use and intervention setting).</p> |
| <ul style="list-style-type: none"> ● Are there shifting patterns and trends in behaviors in this population? | <p>Trends: What are the shifting trends in this population? There appears to be a shifting trend in which more young Bangladeshi women are chewing paan with tobacco. This trend needs monitoring and the intervention adapted to include the needs of this younger population.</p> |
| <ul style="list-style-type: none"> ● Can we monitor the patterns and trends in population characteristics, preferences, and contexts and revise the adaptation(s) to maintain relevancy over time? | |

Note: This example demonstrates the use of the RESET tool to guide the adaptation of a tobacco cessation intervention for Bangladeshi women in the Tower Hamlets area of London and outlines some of the contextual considerations that may guide the intervention.

TABLE 4
RESET Tool Example 2

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|---|---|
| <p>● Is the topic of sufficient concern that action is required?</p> | <p>Relevance: Is this health promotion topic relevant to the target population? Weight loss may not be viewed as a topic of concern, particularly in terms of aesthetics, so adaptation to reframe weight loss in health terms may be important.</p> |
| <p>● Are there competing priorities for this population that would lessen their engagement with this intervention?</p> | <p>There may be competing priorities in terms of life stresses, so adaptations should be considered to ameliorate these through, e.g., intervention incentives, ease of access, and social support.</p> |
| <p>● Is there evidence of intervention effect in the general population?</p> | <p>Evidence base: What is the best intervention to address this health topic in this population? There is evidence of the effect of physical activity and nutrition interventions in both the general population and similar target populations, so this evidence should be reviewed to assess its transferability and then used to inform the approach to the intervention and adaptation.</p> |
| <p>● Is there evidence of an intervention effect in the target population?</p> | <p>Stage of intervention: What stage(s) of the intervention should be adapted?</p> |
| <p>● What stages <i>need</i> to be adapted for this population? (Adaptation may not be needed at every stage; e.g., English is appropriate as the language of intervention delivery for African Americans.)</p> | <p>Language would not need to be adapted, although adaptation for language use (concepts, vocabulary) may still be appropriate.</p> |
| <p>● What stages <i>can</i> be adapted in this intervention? (Little adaptation can be undertaken with pharmacotherapy, e.g., nicotine replacement therapy.)</p> | <p>All stages of the intervention can be adapted.</p> |

Continued

TABLE 4—Continued

| | |
|---|---|
| <ul style="list-style-type: none"> ● What stages should be <i>prioritized</i> for adaptation? (There may not be resources available to undertake all desired adaptations, so adaptations require prioritization.) | <p>There may not be sufficient resources to provide or maintain sufficient incentives, e.g., gym subsidies, so alternative adaptations or forms of delivery may need to be considered.</p> |
| <ul style="list-style-type: none"> ● What conventional elements are important to consider in adaptation (e.g., religion, language, culture, physical features, ancestry, age, gender, and socioeconomic status)? | <p>It is important to adapt for religion, culture, age, and socioeconomic status.</p> |
| <ul style="list-style-type: none"> ● What contextual elements are important to consider in adaptation (social environments, physical space, past exposures to health research and services, and diverse life experiences, including stress)? | <p>It is important to adapt for social environments, physical space, past exposures to health research and services, and diverse life experiences, including stress.</p> |
| <ul style="list-style-type: none"> ● What is the target population's degree of heterogeneity, and is it possible to assess heterogeneity (i.e., measure ethnic identity, cultural affiliation, or acculturation) and adapt the intervention appropriately at a subgroup level? | <p>If there is heterogeneity in age, it may affect the preference for matching an intervention facilitator so that the population felt the facilitator was a peer, matched for age, gender, etc., as well as ethnicity.</p> |
| <ul style="list-style-type: none"> ● Are there shifting patterns and trends in behaviors in this population? | <p>Trends: What are the shifting trends in this population? There may be shifting trends in the role of food for its cultural or social significance, e.g., churches becoming aware that they can promote healthy eating, and this could be utilized to help promote an intervention.</p> |
| <ul style="list-style-type: none"> ● Can we monitor the patterns and trends in population characteristics, preferences, and contexts and revise the adaptation(s) to maintain relevancy over time? | |

Note: This example demonstrates the use of the RESET tool to guide the adaptation of a healthy eating and physical activity intervention for an African American population and outlines some of the contextual considerations that may guide the intervention.

intervention delivery for African Americans. Second, what stages *can* be adapted in this intervention? Little adaptation can be undertaken with pharmacotherapy, such as NRT. Third, what stages should be given *priority* for adaptation? There may not be enough resources to undertake all the desired adaptations, so adaptations should be ranked according to what is most important for the target population in their intervention context. Resources may not be restricted to finance but also include issues such as the availability of appropriate staff; for example, if staff of suitable age, gender, and ethnicity cannot be found, consultation would be required to determine the most important consideration for the target population.

“Ethnicity” examines what elements of ethnicity are most important to consider when adapting an intervention for this population. These may include adaptations for the more conventional elements associated with ethnicity, for instance, religion, language, culture, physical features, ancestry, age, gender, and socioeconomic status (SES). In addition, more contextual elements of ethnicity may be important, such as social environment, physical space, past exposure to health research and services, and diverse life experiences, including stress. This item recognizes the multiple, intersecting elements that contribute to people’s ethnic identity and that can influence their health status and experiences. Once recognized, decisions can be made about which elements are most important to the target population and in the context of this intervention. It also is important to determine the target population’s heterogeneity and whether it is possible to assess it (i.e., measure ethnic identity, cultural affiliation, or acculturation) and adapt the intervention appropriately at a subgroup level, following the example of research carried out primarily in the United States (Resnicow et al. 2009).

Finally, “Trends” acknowledges the fluid nature of ethnicity, identity, and communities and considers the population’s shifting patterns and trends in behaviors. It looks at how we can monitor the patterns and trends in a population’s characteristics, preferences, and contexts and revise the adaptation(s) to remain relevant over time.

Discussion

Summary of Main Findings

The three tools that we presented here, the Tool Kit of Adaptation Approaches, offer a systematic way to plan, deliver, evaluate, and

report adapted behavior change interventions, thus addressing a health policy–relevant and clinically important, but hitherto methodologically neglected, field of inquiry.

In our systematic review we discovered nine primary studies (four of which also were included in the seven systematic reviews) that examined the varying effectiveness of adapted, compared with nonadapted, interventions. We found four primary studies (one of which was also included in the seven systematic reviews) that examined the supplementary effect of a single adaptation added to an already adapted intervention. The study design and adaptation of these studies were likely to have been well considered and theorized, but despite this they collectively used only forty-one of the forty-six adaptations. Among the adaptations not included in these studies was the adaptation of interventions for language and gender. At first this may seem surprising but reflects the fact that the majority of these studies were conducted with African American populations for which such considerations may have been less significant. In addition, adapting for language is not always appropriate when the population consists of “second-generation” populations of migrant origin (Ma et al. 2004). These findings emphasize that the process of selecting adaptations was not simply additive, in which more is better; rather, it required careful thought about the population’s and the intervention’s contexts. This is where we feel that the RESET tool may help guide decision making.

Generalizability

We created our Tool Kit using the body of literature in this systematic review, and therefore it is related to interventions for smoking, physical activity, and healthy eating behaviors, for African-, Chinese-, and South Asian–origin populations. We hope, however, that our work will lead to learning principles that are applicable to a wide spectrum of other health topics and population groups and perhaps also to programs outside the health sector. The tools are not prescriptive but are intended to provide a practical foundation to support practitioners working in this field. Our findings should be further developed and validated in a number of ways. First, this research might be replicated for other behavior change interventions and other ethnic minority populations, such as Hispanics and Latinos. We were not able to include the extensive body of U.S. work with Hispanic/Latino populations, but we expect that some of

our findings are similar. For example, intersecting elements of ethnicity are likely to remain important, including factors such as socioeconomic status, gender, age, and social/special environments (Keller et al. 2012). The use of specific settings, like churches and YMCAs, to deliver interventions (Guzman et al. 2012; Keller et al. 2012) and the importance of social support may also be pertinent (Keller et al. 2012). There is likely to be a greater need for providing language-appropriate interventions than we found (Guzman et al. 2012), although people's preferred language may still be influenced by generational status. There will be differences in cultural practices and beliefs, such as preferred foods and gender roles, and how these influence health behaviors (Castellanos et al. 2013). These, however, are encompassed by adaptations in our Typology, alerting practitioners to investigate the relevant cultural preference for, for instance, ethnically appropriate food, activities, and music.

These hypothesized commonalities and differences may or may not be supported by the empirical evidence. We therefore would like to use our Tool Kit in conjunction with this body of work in order to validate the existing tools and determine whether we have missed anything important from this work. One issue that was relatively minor in our review was how immigration status affected participation in interventions. We included this in the adaptation "Addresses discrimination and mistrust," and as this is pertinent to the Hispanic/Latino population (Keller et al. 2012), it may be an example of an item that we would find requires more attention in the Typology.

Second, we may want to replicate this work to explore the behavior change literature for indigenous populations such as Maori, Aboriginal, and First Nation populations, for which there already is a large body of work. Many indigenous populations have placed a high priority on self-determination, developing their own health workforce and indigenous perspectives of health, including their own models of health promotion and approaches to behavior change (Durie 2004; King, Smith, and Gracey 2009), which often have been subsequently adopted in national practice and policy and should provide valuable insights.

Strengths and Limitations

A key strength of this systematic review is its comprehensiveness; we examined a wide range of population groups and health topics to

identify research on adapting interventions for ethnic minority populations. Our search strategy was not restricted by language or the country of origin; in the overall body of work we translated twelve non-English-language papers (including Danish, French, Norwegian, Spanish, and Swedish) for assessment. Our selection criteria limited our review to the three largest minority populations in the United Kingdom, where the research was based and funded, and we recognize that this may limit its generalizability to other settings and population groups. In addition, one unavoidable limitation was the unequal geography of the literature, as a large proportion of the included research was conducted in the United States with African Americans. This is representative of the current research, in which the United States leads the field, and we could not circumvent this bias. Our creation of generic tools from this literature increases their utility for other population groups, however. Ideally, we would have liked to review the literature more extensively, including that involving Hispanic/Latino and indigenous populations.

The quality of reporting of adaptations or adapted components varied considerably across studies, so it was difficult to extract relevant information from some of them. We realize that because of inconsistencies in reporting, adaptations may have been undertaken that were not described and that we were unable to capture. We also included only studies that described the adaptations undertaken, and we acknowledge that this may have introduced some selection bias in regard to the studies included towards the types of journals with higher word limits, which allowed sufficient explanations of adaptations. This highlights the importance of journals' encouraging reporting of this type of content, and our Tool Kit provides a framework to support such reporting. We accept, therefore, that our Typology is neither exhaustive nor definitive; however, it does draw on the synthesized literature as well as the qualitative interviews and user consultations. Nevertheless, the Typology should be used as a working document that will continue to evolve through application and in the light of emerging literature.

Finally, as with any complex review, the data were limited to the search dates and deadlines of our study, and we recognize that since the search was carried out, more adapted interventions may have been undertaken and reported. Given that we reached saturation (in the accepted sense used in qualitative research or "grounded theory" approaches, meaning that no new themes emerged in later analyses), we do not anticipate that

more recent studies are likely to have a material impact on our Typology of Adaptation Approaches.

Relationship of Findings to Existing Knowledge

Much of the existing theoretical work in this area has addressed either the “process” undertaken in adaptation or the “content” of adapted interventions (Liu et al. 2012). Frameworks for content have been proposed to categorize adaptations, including Resnicow’s classification of adaptation for superficial and deep structures (Resnicow et al. 1999), though only a few researchers have combined these two approaches (Card, Solomon, and Cunningham 2011). For example, Netto and colleagues’ paper describes five principles of adaptation: (1) using community resources to publicize and increase access, (2) identifying and addressing barriers, (3) being sensitive to language and information needs, (4) identifying cultural or religious values that promote or hinder change, and (5) accommodating cultural heterogeneity (Netto et al. 2010). These and similar frameworks (Barrera, Castro and Holleran Steiker 2011; Barrera et al. 2012; Kreuter and McClure 2004; Rodriguez, Baumann, and Schwartz 2011) provided a useful foundation for this work, despite their relatively high-level reporting and descriptions of components of adaptation. Our Typology of Adaptation Approaches is novel in that it provides a more detailed classification, which complements these existing high-level frameworks but is more practical, offering detailed guidance for practitioners. At the same time, our detailed Typology provides a common language to describe adapted interventions, similar to that by Abraham and Michie (2008) in the field of behavior change. When replicating and evaluating interventions, uncategorized content may not be noticed and attributed, resulting in poor intervention fidelity and confounding relationships with effectiveness (Abraham and Michie 2008). Using our Typology to describe and categorize adaptation approaches could allow researchers to compare adapted studies more easily and also combine study data, thereby facilitating the evaluation of which adaptations are related to intervention effectiveness. The Typology therefore expands the preceding work for more practical application. Our Typology also provides a combined “content” and “process” approach in keeping with the emerging literature. The Pathway to Adaptation is original as well in that it aligns the approaches to adaptation with the development of a generic behavior

change intervention. This again is intended to be a functional advance, offering practitioners a “checklist” applicable to their work that enables them to consider adaptation more easily. We hope that this will help both knowledge transfer and the adoption of these tools. Lastly, RESET introduces a realist framework to the existing work, by recognizing that adaptation cannot be prescriptive and is entirely dependent on context. This tool encourages critical reflection when using the Typology and the Pathway to decide which adaptations would work for whom, in what context, and why. It also helps “real world” decision making, in which resources may be scarce and adaptations may have to be ranked according to importance to the target population and to service and budgetary constraints.

How This Work Can Influence Future Research and Practice

Owing to the infancy of the evidence in this field, the onus is on researchers, practitioners, and communities to develop more sophisticated and better designed and evaluated behavior change interventions so that we can distinguish the effect of the adaptations from the overall interventions. One way forward in the pursuit of a rigorous evidence base for adapted interventions and the means to appraise these studies is adopting a standardized approach that would ease the comparisons of interventions.

The importance of standardizing the conduct and reporting of research is well established in the scientific community (Moher et al. 2009, 2010). In addition to tools based on particular study designs are more recent moves to develop reporting instruments in specific fields, including reporting standards for individually “tailored” interventions (Harrington and Noar 2012). These reporting standards require a standardized typology for classifying the approaches, such as that proposed for “tailored” interventions (Harrington and Noar 2012) and created for behavior change techniques (Abraham and Michie 2008).

The tools we have described provide such a mechanism and should be relevant to those working in policy, practice, and research. For policymakers, adopting a standardized approach to adapting interventions will allow the emergence of clear evidence on the effectiveness of both adaptation and individual adapted components, which can inform

future decision making and commissioning of services. For practitioners, this approach provides an operational framework and process on which they can base their daily work. For researchers, the tools offer a standardized language to improve the development, reporting, and evaluation of adapted interventions and to help in the knowledge transfer between peers and institutions. We recommend that these tools be further validated against the literature from other ethnic minority populations, particularly the Hispanic/Latino and indigenous populations, and hope that they will be tested in both research and health promotion practice.

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APPENDIX 1

Search Terms and Databases

Search strategy and terms

- 1 ethnic minorit*
- 2 (BME or black ethnic minorit* or black minorit* ethnic*)
- 3 asylum seeker*
- 4 (migrant* or immigrant*)
- 5 mixed race*
- 6 cultur*
- 7 (multicultural or multi-cultural)
- 8 (cross-cultural or crosscultural)
- 9 (trans-cultural or transcultural)
- 10 (multi-rac* or multirac*)
- 11 (multiethnic or multi-ethnic)
- 12 refugee*
- 13 (multi-lingu* or multilingu*)
- 14 (ethno-cultur* or ethnocultur*)
- 15 (socio-cultural or sociocultural)
- 16 (divers* or diverse population* or cultural diversity)
- 17 (south asian* or bangladeshi* or pakistani* or indian* or sri lankan*)
- 18 (asian* or east asian* or chinese or taiwanese or vietnamese or korean* or japanese)
- 19 (afro-caribbean* or african-caribbean* or caribbean or african* or black* or afro*)
- 20 (islam* or hindu* or Sikh* or buddhis* or muslim* or moslem* or christian* or catholic* or jew*)
- 21 exp Ethnic Groups/ or ethnic group*
- 22 ((ethnic or linguistic) adj diversity)
- 23 (transient adj (group* or population*))
- 24 acculturation
- 25 (faith* or belief* or religion*)
- 26 or/1-25
- 27 (health promotion or health promotion intervention* or promot* health)
- 28 ((intervention* adj5 health) or (health adj5 intervention*) or interven*)
- 29 Health education.mp. or exp Health Education/
- 30 prevention
- 31 public health.mp. or exp Public Health/
- 32 community intervention*
- 33 ((community-level or community level) adj5 intervention*)
- 34 (health* adj (behaviour or behavior))

Continued

APPENDIX 1—*Continued*

-
- 35 27 or 33 or 32 or 28 or 30 or 31 or 29 or 34
 - 36 ((physical adj5 activit*) or exercise*)
 - 37 ((weight adj5 (management or control)) or weight)
 - 38 (diet* or diet* modification or diet* change* or nutrition* or food*)
 - 39 (smoking or smoking cessation or stop smoking or smoking reduction)
 - 40 exp Life Style/
 - 41 lifestyle*
 - 42 (fruit* or vegetable*)
 - 43 (activit* or inactivit*)
 - 44 (food habit* or healthy eat*)
 - 45 exp Obesity/
 - 46 (obes* or overweight)
 - 47 or/36–46
 - 48 (adapt* or modif* or sensitiv* or target* or chang* or alter*)
 - 49 35 and 26 and 47
 - 50 limit 49 to (humans)
 - 51 50 and 48
-

Databases: Applied Social Sciences Index and Abstracts, BIOSIS; Campbell Collaboration; Cumulative Index to Nursing and Allied Health Literature; Cochrane Central Register of Controlled Trials, published in The Cochrane Library; EMBASE; ISI Web of Science; LILACS; MEDLINE; PsychINFO; and the NHS Evidence Specialist Collection for Ethnicity and Health.

APPENDIX 2

Glossary of Ethnicities Used in This Article

| | |
|------------------|--|
| African | Person with ancestral origins who self-identifies, or is identified, as African, and excludes other ancestral origins. This term is the preferred description for more specific categories, e.g., African American. |
| African American | Person with ancestral origins who self-identifies, or is identified, as African American. The term most often applies to those whose origins are in sub-Saharan Africa. Most African Americans are descendants of slavery and are different from those coming from Africa or the Caribbean in the twentieth and twenty-first centuries (distant and recent ancestry). |
| Chinese | Person with ancestral origins in China who self-identifies, or is identified, as Chinese. |
| South Asian | Person with ancestry in countries of the Indian subcontinent, including India, Pakistan, Bangladesh, and Sri Lanka. |

APPENDIX 3

Usage of the Forty-Six Items of Adaptation in 107 Studies

| Adaptation | African American (90 studies) | African (1 study) | Chinese (7 studies) | South Asian (8 studies) | Multiethnic (1 study) | Total Number of Times Used |
|------------|-------------------------------------|----------------------|------------------------|-------------------------------|--------------------------|----------------------------------|
| 1. | 8 | 1 | 0 | 0 | 0 | 9 |
| 2. | 48 | 1 | 3 | 5 | 1 | 58 |
| 3. | 6 | 0 | 0 | 0 | 0 | 6 |
| 4. | 16 | 0 | 1 | 0 | 1 | 18 |
| 5. | 11 | 0 | 1 | 0 | 0 | 12 |
| 6. | 15 | 0 | 1 | 0 | 0 | 16 |
| 7. | 34 | 1 | 3 | 5 | 0 | 43 |
| 8. | 28 | 0 | 0 | 3 | 0 | 31 |
| 9. | 31 | 0 | 2 | 3 | 0 | 36 |
| 10. | 6 | 0 | 1 | 2 | 0 | 9 |
| 11. | 10 | 0 | 0 | 0 | 0 | 10 |
| 12. | 6 | 0 | 1 | 0 | 0 | 7 |
| 13. | 7 | 0 | 0 | 0 | 1 | 8 |
| 14. | 16 | 0 | 0 | 0 | 0 | 16 |
| 15. | 19 | 0 | 0 | 1 | 0 | 20 |
| 16. | 16 | 0 | 1 | 4 | 0 | 21 |
| 17. | 35 | 0 | 2 | 1 | 0 | 38 |
| 18. | 1 | 1 | 6 | 8 | 0 | 16 |
| 19. | 11 | 0 | 0 | 1 | 1 | 13 |
| 20. | 27 | 0 | 2 | 2 | 0 | 31 |
| 21. | 35 | 0 | 3 | 1 | 1 | 40 |
| 22. | 24 | 1 | 1 | 1 | 1 | 28 |
| 23. | 39 | 0 | 2 | 2 | 0 | 43 |
| 24. | 9 | 0 | 0 | 0 | 1 | 10 |
| 25. | 10 | 0 | 1 | 0 | 0 | 11 |
| 26. | 26 | 0 | 2 | 2 | 1 | 31 |
| 27. | 56 | 1 | 5 | 3 | 1 | 66 |
| 28. | 30 | 0 | 1 | 2 | 0 | 33 |
| 29. | 10 | 0 | 0 | 0 | 0 | 10 |
| 30. | 7 | 0 | 0 | 1 | 0 | 8 |
| 31. | 1 | 0 | 0 | 0 | 0 | 1 |
| 32. | 3 | 0 | 2 | 0 | 0 | 5 |
| 33. | 1 | 0 | 1 | 0 | 0 | 2 |
| 34. | 12 | 0 | 0 | 0 | 0 | 12 |
| 35. | 7 | 1 | 0 | 0 | 0 | 8 |

Continued

APPENDIX 3—*Continued*

| Adaptation | African American (90 studies) | African (1 study) | Chinese (7 studies) | South Asian (8 studies) | Multiethnic (1 study) | Total Number of Times Used |
|------------|----------------------------------|----------------------|------------------------|----------------------------|--------------------------|----------------------------------|
| 36. | 26 | 0 | 0 | 2 | 0 | 28 |
| 37. | 13 | 0 | 2 | 0 | 0 | 15 |
| 38. | 1 | 0 | 1 | 0 | 0 | 2 |
| 39. | 31 | 1 | 2 | 2 | 0 | 36 |
| 40. | 42 | 1 | 3 | 7 | 1 | 54 |
| 41. | 19 | 1 | 1 | 2 | 1 | 24 |
| 42. | 15 | 0 | 3 | 1 | 0 | 19 |
| 43. | 38 | 1 | 2 | 5 | 0 | 46 |
| 44. | 39 | 0 | 1 | 2 | 0 | 42 |
| 45. | 5 | 1 | 0 | 0 | 0 | 6 |
| 46. | 5 | 1 | 0 | 3 | 0 | 9 |