Appendix 27

Context–mechanism–outcome configurations from the realist review

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
Conception/planning	1. Exploratory phase with target population (same group as intervention group) 2. Exploratory phase with target population (different group from intervention group or unknown) 3. Exploratory phase with community leaders 7. Ethnically matched high-level/respected individuals to increase salience of programme goals 8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages 9. Ethnically matched leadership within the study 10. Utilise local/respected religious/spiritual leaders 11. Collaboration with ethnic-specific institutions and professional organisations 20. Material developed specifically for target population (by project investigators, expert opinion, tools) 21. Materials created by members of the target population 31. Address concerns with medical programmes, procedures and medication 35. Utilise ethnically/culturally appropriate formal and informal networks 42. Purposefully maintaining an exclusive or open intervention environment 44. Cross-cultural training for all study personnel 45. Address discrimination and mistrust 46. Gender considerations	Exploratory phase indicated that randomisation to a no-treatment control for a physical activity and nutrition intervention for an African American population was not acceptable to participants and therefore not utilised in the study design.[91,92,95,96] Other studies also have reiterated that randomisation was inappropriate in church settings,[308,397] particularly when interest was low[315,316] The background tailoring of control groups may remove the effect of the intervention group in terms of assessing the effectiveness of adaptation, but it was found that not tailoring for the control group was often unacceptable[296] Community-based outreach intervention for smoking cessation, physical activity and nutrition for an African American population observed that it was important to speak to actual community members about participation and not just limit discussion to the community advisory group as low participation in the health activities was observed[398] Discussions with the community for a community-based group nutrition intervention for an African American population revealed that there were many competing community-based research activities, which may limit interest in the present intervention[315,316] Parents in focus groups reported that they were attracted to a culturally specific programme that targeted only African American girls for physical activity and nutrition intervention; feedback from girls and parents suggested the same thing. There was high retention (98%) but, despite this, the intervention was ineffective for primary and secondary outcomes[410] Targeted material for a smoking cessation intervention pilot tested with African Americans in New York may not be equally salient to an African American population in Georgia, as intervention participants were observed to be more responsive to surface level targeting (e.g. materials) and less so to deep structure targeting[341] Black churches often include health in their overall mission and thus represent an established infrastructure for recruitment and retention; furthermore, they allow access to African Americans from middle and upper social economic strata, as they are often under-represented in research (Resnicow et al.[324]) An open and flexible design for a physical activity intervention may suit South Asian women with multiple responsibilities that are perceived to be more important than physical activity; this includes open schedules for data collection although this may not always be feasible in terms of cost and time[283] Utilising specified models of behaviour change in the development of the intervention was found in some cases to improve effectiveness,[293,325,335] but some behavioural theories were suggested to be more appropriate for some communities than others, e.g. social cognitive theory was felt to be salient for the personal life experiences of African American women in terms of prevailing against formidable obstacles in life[399]

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
Promotion	4. Ethnically matched intervention staff or facilitators	For a physical activity and nutrition intervention, the majority of African American participants learnt about the intervention through brochures, family/friends and mass e-mails in equal proportions; however, those who responded to e-mails and brochures were more likely to be eligible than those referred by family/friends[365–367]
	7. Ethnically matched high-level/respected individuals to increase salience of programme goals	
	8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages	
	9. Ethnically matched leadership within the study	
	10. Utilise local/respected religious/spiritual leaders	
	11. Collaboration with ethnic-specific institutions and professional organisations	
	14. Reflect target population's language (usage – concepts, vocabulary)	
	16. Reflect target population's preferred method of communication	
	22. Intervention content targets population's social and cultural values	
	23. Intervention goals and outcomes are culturally appropriate	
	28. Utilise resources from target population	
	30. Utilise and address appropriate norms	
	33. Located in ethnically/culturally appropriate/familiar location	
	34. Utilise ethnically/culturally appropriate media sources	
	35. Utilise ethnically/culturally appropriate formal and informal networks	
	45. Address discrimination and mistrust	
	46. Gender considerations	
Engagement/recruitment	4. Ethnically matched intervention staff or facilitators	Recruitment via personal contact (i.e. active strategy) for a smoking cessation intervention for African Americans tended to attract participants who said they would participate but then did not or who participated but then dropped out. Reactive strategies, however, were more likely to recruit higher socioeconomic groups of African Americans[342–345]
	7. Ethnically matched high-level/respected individuals to increase salience of programme goals	Recruitment of African Americans to a smoking cessation intervention was more successful in churches (81%) and health-care settings (78%) than in housing developments (59%), as measured by the numbers of participants willing to provide a telephone number, which suggests that more interpersonal contacts are needed to get people to disclose their telephone numbers in low-income settings[400,401]
	8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages	
	9. Ethnically matched leadership within the study	Half of the African American smokers contacted were unwilling to speak with the recruiters as they were identified over the telephone as not being black (exercised caution in talking with outsiders)[404]
	10. Utilise local/respected religious/spiritual leaders	Although matching of recruitment staff has been suggested in a physical activity and nutrition intervention for an African American population, the recruiter's experience and sensitivity was perhaps more important, particularly when demonstrating flexibility for scheduling interviews[365–367]
	11. Collaboration with ethnic-specific institutions and professional organisations	
	14. Reflect target population's language (usage – concepts, vocabulary)	

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
	16. Reflect target population's preferred method of communication	Initial recruitment through churches for African Americans for an internet-based intervention for physical activity and nutrition was expanded to the broader community and combined with media and non-media channels. Greater log-on rates were observed for African Americans recruited through the media rather than for those recruited through interpersonal channels as there may have been social pressure to sign up, despite a lack of interest. Those recruited through the media reported a 71% log-on rate for a follow-on internet-based intervention compared with 38% and 65% log-on rates for the two groups which were recruited through churches[313]
	22. Intervention content targets population's social and cultural values	
	25. Consider target population's employment situations	
	28. Utilise resources from target population	
	29. Utilise appropriate incentives and timing of programme	Recruitment of African Americans through churches and Historically Black Colleges and Universities for a computer-based nutrition intervention based in churches was successful in maintaining interest as participants were willing to wait for computers to use within the church environment[481]
	30. Utilise and address appropriate norms	
	31. Address concerns with medical programmes, procedures and medication	
	33. Located in ethnically/culturally appropriate/familiar location	A community-based group Tai Chi exercise programme for a Chinese population was popular because of the recruitment site, which was in the local community and linked in with other activities popular with women such as playing mah-jong and buying vegetables[402,403]
	34. Utilise ethnically/culturally appropriate media sources	
	35. Utilise ethnically/culturally appropriate formal and informal networks	
	36. Provide ethnically/culturally appropriate food/activities/music	
	39. Address physical/financial (structural) barriers to participation	
	45. Address discrimination and mistrust	
	46. Gender considerations	
Implementation/delivery	4. Ethnically matched intervention staff or facilitators	Matching intervention staff for ethnicity was important for a Bangladeshi population with diabetes but other characteristics, including having intervention staff with diabetes, were also raised as important[409]
	5. Ethnically matched peer role models or peer education	A group-based diabetes management programme (physical activity and nutrition) for a Chinese population experienced attrition as participants travelled for Chinese New Year and did not complete the programme, although they returned for the follow-up evaluation[346]
	6. Ethnically matched facilitators and peer role models who have successfully changed their behaviour	
	7. Ethnically matched high-level/respected individuals to increase salience of programme goals	Churches were sites rather than partners in a physical activity intervention for African American women and, as such, women did not receive health-related or targeted messages from church officials and therefore may not have affected deep-level structures[397]
	8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages	Using familiar sites for an intervention can improve effectiveness, but some sites may be better than others. For a physical activity and nutrition intervention for an African American population, it was found that sites which people held membership to, as opposed to just community sites, produced better institutionalisation of the intervention[387]
	9. Ethnically matched leadership within the study	
	10. Utilise local/respected religious/spiritual leaders	Churches as a setting for African American populations can have a positive effect on the intervention over and above being an appropriate setting, such as spreading the intervention to a wider population (not just intervention participants) and creating intervention sustainability. This was particularly true if they had a pre-existing health ministry[334]
	11. Collaboration with ethnic-specific institutions and professional organisations	
	12. Material depicts individuals from target population	

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
	13. Material (video, booklet, skits, handouts, games) in target population's language	A community-based group weight loss intervention for African American women was initially held at community locations that were familiar and close by; however, the lack of space for exercise and childcare and lack of room availability forced relocation. The second cohort was relocated to a space on campus that offered parking. This was mainly conducted with a middle-class cohort[405]
	14. Reflect target population's language (usage – concepts, vocabulary)	
	15. Match reading level and literacy	
	16. Reflect target population's preferred method of communication	A church-based group physical activity and nutrition intervention for African Americans reported that, for the self-help arm, women wanted the sessions to be led by professional leaders rather than their peers; this was supported by the observed drop in attendance when sessions were taken over by trained lay leaders
	17. Material presents ethnic-specific data	
	18. Material depicts appropriate graphics and scenarios (this can be heterogeneous)	A diabetes self-care telephone intervention for African Americans reported that 'eating healthfully' was seen as giving up their food heritage and that family members may be quite negative towards participants if they deviate from traditional foods[406]
	19. Material/guidance based on preferences of target population	
	20. Material developed specifically for target population (by project investigators, expert opinion, tools)	Family members can be a barrier to weight gain prevention interventions for African American girls as their mothers encouraged weight gain[395,396]
	22. Intervention content targets population's social and cultural values	In one intervention for physical activity and nutrition, African American girls were specifically taught communication skills to help advocate for healthy changes within the home; however, the family involvement was not very successful as parents were not supportive of their daughters in attending sessions or making changes in the home environment[324]
	24. Intervention delivered in culturally appropriate or preferred format	Social support from within the intervention group was valuable for African American participants in a physical activity and nutrition intervention but other social influences outside the intervention, such as family pressures and resistance to change, were observed to have a negative impact[365–367]
	25. Consider target population's employment situations	
	26. Intervention addresses health behaviour patterns found in target population	
	27. Dietary issues unique to their context	Encouraging family participation was built into some interventions, but in a study of a physical activity and nutrition intervention in an African American population only female adults participated despite male members of the family being encouraged to participate;[319] this may affect uptake and role-modelling within the home.
	28. Utilise resources from target population	
	29. Utilise appropriate incentives and timing of programme	Social support was an explicit intention in an intervention for physical activity and nutrition for African American cancer survivors and this was to tap into an observation that kinship networks were strongly related to health decision-making in this community[412]
	30. Utilise appropriate norms	
	31. Address concerns with medical programmes, procedures and medication	A pictorial one-on-one diabetes education intervention to improve nutrition for a South Asian population reported participant preference for one-to-one health education at clinics rather than organised single-sex group sessions. Participants wanted to keep their diabetes status private and felt unable to announce their food choices in public[407]
	33. Located in ethnically/culturally appropriate/familiar location	
	35. Utilise ethnically/culturally appropriate formal and informal networks	A churchwide smoking cessation intervention for an African American population reported that some church members were embarrassed by their smoking status and did not want to be identified, while others were not interested in programmes delivered by their peers[300,301]
	36. Provide ethnically/culturally appropriate food/activities/music	
	37. Present a pro-ethnic/race approach	A group- and individual-based diabetes management intervention for African Americans held in a rural setting revealed that group-based programmes may not have been appropriate as there were competing cultures of openness (facilitated by churches) and privacy (rural traditions)[408]
	38. Address emotional barriers and stressors	
	39. Address physical/financial (structural) barriers to participation	

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
	40. Teach appropriate communication skills 41. Encourage/involve social support 42. Purposefully maintaining an exclusive or open intervention environment 43. Maintaining cultural significance of food 45. Address discrimination and mistrust 46. Gender considerations	'Interview showed that it was particularly important to the women that they had a culturally "safe" place to exercise, not just for themselves but also for the integrity of their whole community' (p. 93). Furthermore, in this physical activity intervention delivered for South Asian women, the notion of 'safe' space operated under a different logic such that walking and playing sports after dark in an empty field behind a school was perceived to be safe, whereas walking on the sidewalk during the daytime was felt to attract derogatory comments as they would be more visible[283]
		For a smoking cessation intervention delivered to African Americans, it may be necessary to match the intervention not only to participants' apparent racial/ethnic identity but also to their degree of membership to a particular racial/ethnic group[341]
		Tailored newsletters used in a nutrition intervention for African Americans reported a stronger impact for individuals who were better matched in terms of their ethnic identity and the degree of Afrocentricness of the newsletter[296]
		A smoking cessation intervention for African Americans comparing a culturally sensitive guide with a standard guide found that participants with reported lower levels of acculturation preferred the culturally sensitive guide and displayed a greater readiness to quit; however, they had higher rates of 24-hour abstinence when they received the standard guide. It was hypothesised that mismatched content can encourage greater information processing[351]
		A group-based nutrition intervention compared the effect of group composition: an all-African American group vs groups of mixed ethnicities. The percentage of African Americans was high in the mixed groups and this may have created a group environment similar to that of the all-African American group, suggestive that there may have been a critical mass effect[323]
		Acculturation did not moderate the relationship between a tailored experimental group and an outcome measure for a home-based physical activity intervention for African Americans and a likely explanation was that the majority of the participants were bicultural and therefore receptive to both tailored and standard material[350]
		A group-based diabetes management programme (physical activity and nutrition) for a Chinese population observed that participants openly discussed and interacted when classes included only Mandarin or only Cantonese speakers, suggesting that, even with similar writing (traditional Chinese), different dialects provide an additional barrier to participation during intervention. Furthermore, some participants were reluctant to reveal their reading comprehension abilities[346]
		A sign designed for African American women to increase their physical activity was culturally salient (featured African American women) but also addressed more generic concerns (lack of time for physical activity). This sign was effective in the short term for both men and women, although it targeted women only[468]

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
		Home visitations may be carried out for convenience but they were also important to engage the support of male members of the family and build family support in an intervention for physical activity and nutrition with an African American population; in these circumstances it was important for the public health educator to be male.[318] Similarly, a concern among South Asian-origin women in a nutrition intervention was whether or not changes would be approved by spouses and whether or not spouses would prevent them from making changes[475]
		A nutrition intervention delivered to an African American population demonstrated positive results, but the intervention was not successful for younger participants and males. Younger people considered the health topic less relevant to them and also had competing priorities in their lives that made dedicated participation more difficult, and the materials may not have been relevant for males (Campbell *et al.*[320]). Therefore, both age and gender were observed to mediate intervention effects
		In a diabetes intervention with Bangladeshi adults, peer discussion and support were valued but gender differences were observed, as women were more interested in the social support and the men were more focused on the information elements[409]
Retention	4. Ethnically matched intervention staff or facilitators	Monthly self-addressed stamped postcards and a toll-free telephone number to update contact details may be good retention strategies for a parent-led nutrition intervention for African Americans[303–305]
	5. Ethnically matched peer role models or peer education	Low implementation rates (31%) of booster calls to African American participants in a smoking cessation intervention. Telephone-assisted strategies may not be feasible as they depend on the ability to obtain telephone numbers. The intervention was not effective for smoking cessation[400,401]
	6. Ethnically matched facilitators and peer role models who have successfully changed their behaviour	A genetic biomarker feedback smoking cessation intervention with telephone counselling and NRT for African Americans lost 21% of participants, with the primary reason being that participants no longer had telephone access[374]
	7. Ethnically matched high-level/respected individuals to increase salience of programme goals	Community-based after-school intervention programmes can reduce transportation barriers for a physical activity and nutrition intervention for African American girls.[411] In a related study with African American girls, when transportation was provided from school to the community centre, 70% attended on average at least 2 days a week. In another area where transportation was not provided, only 33% attended on average at least 2 days a week[329,330]
	8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages	A community-based group Tai Chi exercise programme for a Chinese population reported high adherence as classes were held at a convenient local community centre where other Cantonese-speaking seniors congregate for other activities, such as eating lunch and grocery shopping[402,403]
	9. Ethnically matched leadership within the study	A group physical activity and nutrition intervention was delivered to participants during their regular community group meeting[411]
	10. Utilise local/respected religious/spiritual leaders	
	11. Collaboration with ethnic-specific institutions and professional organisations	
	16. Reflect target population's preferred method of communication	
	22. Intervention content targets population's social and cultural values	
	25. Consider target population's employment situations	
	28. Utilise resources from target population	
	29. Utilise appropriate incentives and timing of programme	

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
	30. Utilise and address appropriate norms	
	38. Address emotional barriers and stressors	
	39. Address physical/financial (structural) barriers to participation	
	41. Encourage/involve social support	
	42. Purposefully maintaining an exclusive or open intervention environment	
	46. Gender considerations	
Evaluation	8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages	A dose-dependent response was observed after 2 years for both increased physical activity and positive attitudes about the benefits of physical activity for a multimedia campaign promoting physical activity for children. Children aware of the campaign reported greater engagement in physical activity than children unaware of the campaign.[285–287] Evidence of a dose-dependent response was also observed in other interventions,[490] e.g. African Americans who reported reading more tailored newsletters also reported eating more fruit and vegetables, but no association was observed for video watching[292,299]
	9. Ethnically matched leadership within the study	A smoking cessation intervention delivered with a guide and brief counselling plus NRT or placebo for African Americans observed that lower than expected quit rates may be influenced by environmental factors, daily life stressors and aggressive targeted advertising – all aspects that may not be measured but which may influence successful quitting[355,356]
	22. Intervention content targets population's social and cultural values	
	23. Intervention goals and outcomes for participants are culturally appropriate	A school-based diabetes prevention programme for African American children targeted the classroom, after-school activities, home and the school cafeteria; however, an unhealthy home environment in terms of food was countering gains made at school and a one-off health fair for families was not perceived to have lasting effects[310]
	25. Consider target population's employment situations	
	30. Utilise and address appropriate norms	Lay advisors used in a church-based physical activity and nutrition intervention for African Americans have networks beyond the church and assessing changes in only one part of their network (e.g. churches) may miss documenting an impact in other parts of their network. Only 10% of church members reported speaking to a lay advisor; however, it was unknown if lay advisors were operating outside the church as well[292,299]
	32. Utilise appropriate evaluation instruments and tools	Consultation with community leaders and community members and pre-testing of intervention components for centre-based behavioural counselling for exercise and diet for African American families were unable to counter the disrupting effects of unstable employment, such that frequent job changes and changes from full-time to part-time work, day shift to night shift and employed to unemployed contributed to poor regular attendance at evening sessions[321,322]
		Targeted approaches may be helpful for African American participants to initiate thinking about quitting smoking; however, individual approaches such as counselling may be needed once the quitting process has been initiated to facilitate quitting[341]
		In a group-based behavioural weight loss programme for African Americans, the addition of motivational interviewing did not increase attendance, change dietary intake or physical activity or result in weight loss compared with health education only. Motivational interviewing may not enhance the effectiveness of an already culturally adapted intervention or motivate behaviour change among participants who face socioenvironmental barriers or life stressors, as in motivational interviewing barriers are only discussed[317]

Stage in Programme Theory of Adapted Health Promotion Interventions	Adaptation (mechanism)	Context + outcome
Outcome	8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages 9. Ethnically matched leadership within the study 23. Intervention goals and outcomes for participants are culturally appropriate 30. Utilise and address appropriate norms 32. Utilise appropriate evaluation instruments and tools	Lay health advisors used in a smoking cessation intervention for African Americans in a close-knit community environment were successful at gaining community support; however, individual quit rates were less clear-cut. The role of lay health advisors was to promote the programme to those ready to quit; however, the participants were not motivated (positive associations with smoking). Community leadership in recruitment and selection of lay health workers helped to effectively navigate the community and made them more credible[453] A community-based group nutrition education intervention for African Americans reported that there were discrepancies between intervention goals and participant goals, e.g. one incentive for participants was that they received documentation of achieving nutrition-related education and competencies for potential jobs in the food service industry, as this was a largely unemployed cohort[315,316] Concerns over sustainability of a group-based physical activity as African American participants indicated that the intervention for physical activity and nutrition itself was their solution for overcoming barriers to physical activity[365–367] Group-based weight loss intervention for African Americans observed a difference between participants and investigators in interpreting intervention success. Participants were happy with their loss of 3% of initial weight whereas investigators were aiming for 7% (which is considered to be clinically significant by the National Heart, Lung and Blood Institute)[412] For a group-based nutrition education intervention for African Americans, weight loss was unlikely for aesthetic reasons; improving health was found to hold more significance as an outcome than weight change[323] Mothers' concern was with their own weight rather than their daughters' weight (majority were normal weight) and thinner mothers dropped out of the intervention at higher rates in an exercise and dietary education intervention for African American mother–daughter dyads as daughters' behaviour change was minimal[487] Weight-focused intervention did not appeal to African American girls and their parents/guardians as heavier weight was accepted or desired and a more positive body image. Instead, intervention emphasised the health benefits of physical activity[329,330] An effective intervention outcome for the community was strong community partnership and environmental/community changes in the development of new and better recreational facilities and opportunities and not the outcomes that the study had specified[413]
Dissemination	8. Ethnically matched high-level/respected individuals throughout planning, directing, reviewing and implementing stages 9. Ethnically matched leadership within the study	A community-based outreach intervention for smoking cessation, physical activity and nutrition for an African American population observed that there was little leadership within the community and lack of ownership of a health project, which may relate either to the 'outside' funding or to the fact that it addressed primary prevention (rather than an illness)[398]

NRT, nicotine replacement therapy.