

Socio-cultural agents and their impact on body image and body change strategies among adolescents in Fiji, Tonga, Tongans in New Zealand and Australia

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Received 19 April 2011; revised 24 June 2011; accepted 24 June 2011

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Summary

This paper reports on the findings of studies that were conducted as part of the Pacific Obesity Prevention in Communities project. The studies evaluated the types of messages that adolescents received in relation to body image, physical activity and eating. The participants were male and female adolescents from Fiji (two cultural groups), Tonga, New Zealand (Tongans) and Australia (European Australians). Three studies were conducted: interviews with 48 adolescents (24 male, 24 female) from each cultural group, questionnaires with 600 adolescents (300 male, 300 female) from each cultural group and the perceptual distortion study with 100 adolescents (50 male, 50 female) from the two cultural groups in Fiji and European Australians. The results demonstrate that parents, peers, the media, as well as religious influences impact on the type of body valued by adolescents in each of the cultural groups, as well as their levels of body satisfaction. These influences also shape the type and volume of food consumed, and the type and frequency of physical activity. The results of these studies highlight the major role played by the broader societal values in shaping the nature of the messages that adolescents receive in relation to their body size, eating and physical activity.

Keywords: Adolescents, body image, cultural groups, Pacific.

obesity reviews (2011) **12** (Suppl. 2), 61–67

Introduction

Obesity is becoming a major problem for children and adolescents in the Western world (1,2), as well as in the Pacific (3,4). In order to understand the reasons for this trend, it is important to investigate the nature of the socio-cultural messages that children and adolescents receive about factors that may influence their body weight. This paper reviews the findings from studies that were conducted to examine the socio-cultural factors that predict body image, physical activity and unhealthy eating among adolescents in Fiji, Tonga, New Zealand and Australia. These studies were part of the broader Pacific Obesity Prevention in Communities (OPIC) project that was designed to determine the nature of the socio-cultural drivers that relate to obesity among adolescents in Fiji, Tonga, New Zealand and Australia (5). The Pacific OPIC project also evaluated the

impact of a community-based intervention on overweight and obesity, as well as eating and physical activity patterns in these four countries (6). In the current paper, we report on the three studies that were conducted to examine the socio-cultural determinants of body image, physical activity and eating. The nature of the attitudes and behaviours of adolescents in Fiji, Tonga, New Zealand and Australia, their perceptions of the most important socio-cultural agents shaping these attitudes and behaviours, and the types of messages received from these socio-cultural agents were investigated. The overall aim of these studies was to determine the socio-cultural factors that shape body image, physical activity, eating and other body change strategies among adolescents from these four countries. A second aim was to determine how these factors vary across each cultural group: Indo-Fijians, Fijians, Tongans in Tonga, New Zealand Tongans and European Australians.

Methods

The first of these studies involved conducting individual interviews with 48 adolescents (24 male, 24 female; aged 12–18 years) in each of the five cultural groups described above. These interviews focused on body image, physical activity, food and related socio-cultural messages. In particular, adolescents were asked about the types and volume of food consumed, the distribution of food, who made food choices, levels of snacking and use of the tuck shop at school, and patterns of food consumption (e.g. skipping meals). In relation to physical activity, the interviewer asked about types and levels of physical activity and barriers to physical activity. Interview questions also addressed body satisfaction and body change strategies (e.g. strategies to lose weight, increase weight and increase muscles). Finally, in relation to socio-cultural agents and messages, participants were asked about the meaning of a large or small body within their broader society, role models in relation to body size, sources of messages regarding body size, physical activity and food, and the relative strength and importance of messages from family, peers, the media and religious groups. All interviews were analysed using qualitative analytical technique.

The second study involved the administration of a questionnaire that evaluated body image, body change strategies, and socio-cultural influences on body image, and body change strategies among about 600 adolescents (300 male, 300 female) from each of the five cultural groups. Specifically, the questionnaire contained subscales that evaluated physical activity, body dissatisfaction, body image importance, eating patterns and cultural values related to body size and eating. The initial questionnaire was pilot tested and slightly modified so that it had cultural relevance for all groups. The questionnaire also evaluated the nature of the messages regarding body size, eating, and strategies to change weight and increase muscles from each of the following sources: mothers (and female adults), fathers (and male adults), older siblings (and cousins), peers, media and religious groups. The data were analysed using multivariate analyses of variance and regression analyses.

Finally, 100 adolescents (50 male, 50 female) from each of the two cultural groups in Fiji and European Australians completed the perceptual distortion study. Using a computer-generated image of the participants' own body, it was possible for them individually to alter the width of their body parts (upper and lower body separately) to indicate their perception of their: actual body size, ideal body size and ideal body size held by their mother, father, peers and the media (separately). These measures could be compared to a digital image of the participants' body size. Discrepancies between the participants' actual body size and the above estimations allowed us to determine, using the participants' own body, if they wanted to be bigger or

smaller, or if they thought others wanted them to be bigger or smaller. This then provided information on the body size that they desired, as well as the body size that they perceived was most likely to be endorsed as desirable by the most prominent socio-cultural agents. Multivariate analyses of variance and regression analyses were used to analyse the results.

Results

Findings from the interview studies

The results demonstrated that most of the male adolescents from all ethnic groups were focused on obtaining a more muscular body (7). This finding occurred across all age groups. This was primarily to improve sporting performance, to increase strength and fitness, to maintain good health and to perform physical work. These findings were more salient among Fijian, Tongan (7) and New Zealand Tongan male adolescents (8). Consistent with research in Western societies (9), the sporting context was a strong focus for Fijian and Tongan male adolescents in both Tonga and New Zealand, and the desire to perform in the sporting area was an important factor shaping their body image, as well as the eating and exercise behaviours of these male adolescents. This focus on sport was not as clear for Indo-Fijian male adolescents. Looking good and being strong were also particularly salient themes for Fijian and Tongan male adolescents. Fijians and Tongans desired more muscularity, a stronger body and a larger body size. Physical work for both Fijian and Tongan male adolescents is a central aspect of everyday life from a young age (8). In contrast, Indo-Fijian male adolescents are encouraged to put school work ahead of chores. For all groups, health reasons were also noted as important motives to improve their body image as well as shape their body change strategies.

The interviews with Fijian and Australian female adolescents demonstrated that both groups of female adolescents were focused on obtaining a slim, fit and curvaceous body. Both groups indicated that they wanted to avoid weight gain, given that this was likely to lead to poor health, increased teasing and reduced physical mobility. Fijian female adolescents were more focused on the functionality of their body than Australian female adolescents and evidenced lower levels of body dissatisfaction (9). Again, these findings were apparent across all age groups.

Below, we compare Tongans in Tonga to Tongan adolescents living in New Zealand. These groups had the highest body mass index (BMI) of all the groups. Tongan male adolescents from both Tonga and New Zealand were focused on obtaining a body that would function well in sport, particularly rugby. Tongan female adolescents in New Zealand indicated that there were more opportunities

for them to engage in recreational activities than Tongans in Tonga. However, the opportunities for Tongan female adolescents in both countries were more restricted than for male adolescents. Both groups of Tongans had low levels of body dissatisfaction in spite of the fact that their BMI was higher than all the other groups (8). These findings were present for both groups of Tongan female adolescents across all age groups. This is a disturbing finding, as levels of overweight and obesity were already high in these adolescents. This finding may relate to the types of message that these adolescents receive about their body. These messages will be discussed later in this paper.

An examination of the socio-cultural influences indicated that Tongan and Fijian male adolescents experienced strong socio-cultural pressures regarding their body size, whereas the Australian and Indo-Fijian male adolescents received few messages about their body (10). Fijian and Tongan male adolescents appear to have strong pressures on them to achieve a large muscular body. The family (particularly fathers) was a strong source of messages to achieve a more muscular body among both Fijian and Tongan male adolescents in both Tonga and New Zealand. The media were not a strong source of messages, particularly among Tongan male adolescents. This was the case also for Tongan male adolescents in New Zealand (8). Thus, it would appear that the main socio-cultural factors associated with male adolescents' body image, eating and physical activity come from the immediate community rather than the broader society. These community agents are therefore the ones that need to be targeted in order to bring about changes in the levels of overweight and obesity.

Messages for Fijian female adolescents focused on both thinness and robustness, whereas for Australian female adolescents they were primarily focused on thinness (11). As for male adolescents, the main source of the socio-cultural messages for Fijian female adolescents was from the family (parents and siblings), with some messages from peers. Few of the messages were perceived to come from the media. As for male adolescents, the immediate community in Fiji needs to be targeted to ensure the messages lead to less obesogenic behaviours among female adolescents.

Mothers played a key role in selecting food in all groups, with fathers often contributing to these decisions. Fathers and co-resident adult kin also selected food in Tongan and Fijian families. Tongan and Fijian family structures influenced food activities, with food being selected and differentially distributed in families on the basis of status. In contrast, individual preferences determined the selection and distribution of food in Indo-Fijian and Australian families. Food activities were seen to express values in Tonga and Fiji; the provision of food expressed love and care, while respect was evident in (i) the distribution of food

according to relative status (Tongan; Fijian) and (ii) adolescent appreciation of food provided (Tongan, Fijian, Indo-Fijian) decisions.

An examination of the food selection among Tongans in Tonga and New Zealand demonstrated that the mother was the main agent of food selection, and also determined the volume of food for family members in New Zealand, whereas the food selection was determined by a broader range of family members in Tonga. The media were also more likely to shape food choice among New Zealand Tongans (12). This was one factor that led to a greater consumption of energy-dense foods and soft drinks among New Zealand Tongans compared to those in Tonga (13). New Zealand Tongans were more likely to live in nuclear families, as opposed to three generations living in the one family home in Tonga decisions. As a result, New Zealand Tongans may be adopting a more individualistic approach to body, eating and physical activity and be less focused on the views of the broader family, and so the traditional values of the Tongan society in relation to body size and the consumption of food.

Physical activity was higher among female adolescents in Australia, compared to female adolescents in Fiji or Tonga decisions. Reasons for not engaging in physical activity for Indo-Fijian female adolescents were study, a lack of interest or motivation or safety reasons. For Fijians or Tongans, the reasons were also a lack of interest or motivation and safety, but they also included having to do household chores. When Tongans in Tonga were compared to New Zealand Tongans, we found that there was less emphases on household chores for female adolescents in New Zealand, and New Zealand female adolescents were more likely to engage in recreational physical activity (12). These findings would suggest that both male and female adolescents in New Zealand seem to be adopting some of the values in relation to recreational physical activity and body size of the Western culture that is typical of the broader Western New Zealand society.

Findings from the questionnaire study

Before administering the questionnaire to participants, a small group of male and female adolescents from each country ($n = 15$) were interviewed to ensure its cultural validity, and minor changes to the wording of some questions were made. The questionnaire was also translated into Tongan for the adolescents in Tonga; translation was not seen to be necessary for adolescents in the other cultural groups. McCabe *et al.* (14) found that Tongan and Fijian male and female adolescents were more likely than Indo-Fijians and Australians to engage in strategies to increase weight and muscles. These results are consistent with the findings of the interview study and demonstrate the focus on the value of a large body that is held by these

adolescents. Given that the Tongans and Fijians were more likely than Australians or Indo-Fijians to already be overweight, these findings are consistent with the interview data; female adolescents are focused on obtaining a large body, but also a healthy body ideal. Certainly, adolescents within a particular cultural group who were overweight were more likely than normal weight adolescents in that cultural group to report higher levels of body dissatisfaction. However, although Tongans and Fijians were more likely to be overweight than Australian and Indo-Fijians, they were not as dissatisfied with their weight. This appears to be consistent with the lack of stigma associated with being overweight among Fijian and Tongan adolescents (14).

Consistent with the proposal that female adolescents from all groups are focused on obtaining a thin body, female adolescents were generally more dissatisfied with their bodies than male adolescents (14), although Australian female adolescents were more dissatisfied with their lower body region than all of the other groups. An interesting finding was that although male adolescents, particularly Fijian and male adolescents in Tongan, were more likely than female adolescents to engage in strategies to increase muscles and weight, there were no gender differences in strategies to lose weight. These findings would suggest that male adolescents in Fiji and Tonga, as opposed to female adolescents, may be focused on obtaining a large body, whereas both male and female adolescents were focused on obtaining a body low in body fat. These findings are consistent with the interview data in relation to the focus on sport found among Fijian and Tongan male adolescents, and the ways in which they shape their body image, eating and physical activity to reflect this focus. This focus on a large body was particularly apparent in the comparison between Tongans in Tonga and those in New Zealand. Both male and female adolescents in Tonga were more likely to engage in strategies to increase weight and increase muscles. Furthermore, although New Zealand Tongans were more likely to have a higher BMI that is classified as obese than Tongans in Tonga, adolescents in Tonga were more likely to engage in strategies to lose weight.

Certainly, when we examine socio-cultural messages, the value of a large body is more likely to be transmitted to adolescents living in Tonga than those living in New Zealand. These messages were more frequent for adolescents in Tonga from adults at school and at church. This was particularly the case for male adolescents. Thus, the value attached to a large body ideal seems to be most apparent among Tongan male adolescents in Tonga, who are more likely than male adolescents in New Zealand to be exposed to the traditional Tongan values.

Further findings in relation to religious values demonstrated that Tongans, compared to Indo-Fijians, Fijians and

Australians, were more likely to receive messages from their religious group regarding the value of a large body. This finding was apparent for both male and female adolescents. In terms of cultural values, Tongan and Fijian male and female adolescents were of the view that larger male and female adolescents were well respected and cared for, compared to both Indo-Fijian and Australian adolescents. Respect and care are important and central aspects of Fijian and Tongan community life, as was evident in the interview findings decisions. They are currently reflected in the way in which family, community and church members relate to one another. They are also reflected in the type and volume of food that is consumed. High-status and highly valued members of the community obtained the best-quality food and the highest volume of food (from interview data). This food is likely to also be the most energy-dense (e.g. fatty meat) and contain the most calories. As a result, a large body size is a sign of care and nurturance. This quest for a large body size is frequently at variance with obtaining a healthy and/or thinner body, which is starting to be valued by these communities. This conflict is reflected in the contradictory body change strategies adopted by adolescents: strategies to increase muscles and weight, as well as lose weight.

Findings from the perceptual distortion studies

The results of the perceptual distortion studies have not yet been published, but are reported in a Doctor of Psychology (Clinical) thesis completed by Rowland (Rowland MN. Faculty of Health Medicine Nursing and Behavioural Sciences, Deakin University; School of Psychology, Deakin University. Socio-cultural influences on body image: comparisons between Australian and Fijian adolescents. Deakin University, Melbourne, Victoria, 2008). The perceptual distortion studies showed that the body weight that was perceived to be both attractive and healthy among Fijian male and female adolescents was similar to their Western counterparts. However, Fijian male and female adolescents were more likely than Australian adolescents to perceive that a muscular body was attractive and healthy. When the results were broken down by gender, the results demonstrated that Australian male adolescents regarded a thinner female physique to be healthier than Fijian male adolescents did. This result is consistent with the finding that Fijian adolescents compared to Australian adolescents were more likely to consider that a larger body was indicative of a person who is well cared for and has good relationships with their family.

Australian female adolescents regarded the most attractive female weight as a smaller figure than the figure they considered most healthy. However, for Fijian female adolescents, there were no differences between the ratings of healthy and attractive figures, demonstrating a concor-

dance between these body images. Overall, Australian female adolescents rated a smaller body as attractive compared to Fijian female adolescents. Australian male adolescents considered the most attractive body to be more muscular than their ratings of a healthy body; there were no differences in the ratings of attractive and healthy bodies for the Fijian male adolescents. However, Fijian male adolescents overall rated a muscular body as both more attractive and healthy than Australian male adolescents.

In combination, perceived parental, same-sex peer, and media body image ideals were associated with Australian and Fijian female and male adolescents' personal body ideals. For Australian female adolescents, body image ideals were associated with perceived parental ideals for these body areas. In addition, perceived same-sex peer body ideals or perceived media body ideals were associated with these female adolescents' body ideals, respectively. Thus, Australian female adolescents who thought these socio-cultural agents wanted them to be thinner were more likely to hold a thinner personal body ideal. For Australian male adolescents, perceived same-sex peer and perceived parental body ideals were uniquely related to both their body ideals, with a bigger perceived socio-cultural ideal being associated with a bigger personal body ideal. Among Fijian female adolescents, perceived same-sex peer body ideal was the only factor associated with their ideal lower body. For these female adolescents, a smaller perceived same-sex peer ideal was associated with a smaller personal body ideal. Among Fijian male adolescents, there were no significant unique predictors for the upper and lower body regions. The overall association for the socio-cultural agents' perceived ideal was towards a bigger body for Fijian male adolescents.

Discussion

The findings of this series of studies on socio-cultural influences highlight the mode of operation of socio-cultural

factors in shaping the body image, physical activity and eating of adolescents in Fiji, Tonga, New Zealand and Australia (see Fig. 1 for a representation of these relationships). It would appear that parents, peers, media and religious influences act as filters, and moderate the way in which adolescents see the world. These attitudes, in turn, impact on their behaviours, as well as the behaviours of others in their world. These socio-cultural agents, and their messages, appear to shape the adolescents' beliefs, attitudes and behaviours. In this way, adolescents from different countries develop different types of attitudes in relation to their body size, and, in turn, adopt different types of behaviours in relation to their physical activity and eating. These behaviours are designed to achieve the body size valued by the adolescents (and their community), as well as conforming to the customs of the society in relation to food and its consumption.

These socio-cultural factors can be summarized as the structure of the society (collective as opposed to individual society), the values in relation to the meaning of food and body size, as well as the attitudes and expectation of adolescents within the society. Within a hierarchical society, rank and status influences expected and actual patterns of body size perceptions, physical activity and eating (8). Tonga appears to be more hierarchically structured than Fiji, and this structure is still somewhat apparent among New Zealand Tongans. Foods that are highly valued in these communities are those that are less available. Imported food items (e.g. mutton) are more highly valued than local fish or fruit and vegetables (15). The distribution and quality of food is also based on rank and status. In Tonga, female adolescents received more high status foods than male adolescents (16), including Western foods such as mutton flaps, tinned corned beef, sweets and soft drinks (17). In contrast, male adolescents in Fijian families are more likely to receive high-status foods and greater quantities of food (15). The type of physical activity and recreational physical activity is also strongly prescribed by the family within these hierarchical societies. A large body size

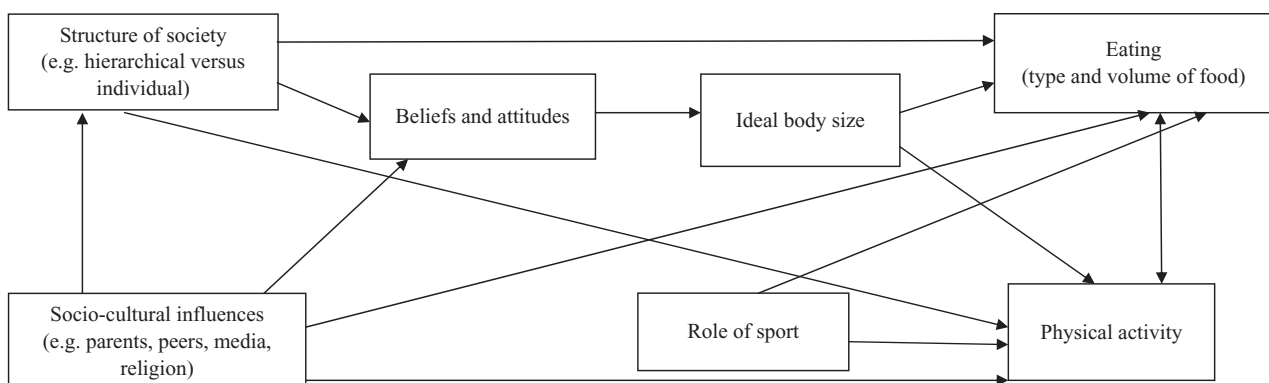


Figure 1 Diagrammatic representation of socio-cultural factors impacting on eating and physical activity.

is valued in both Tonga and Fiji (16,18), with a larger body reflecting a greater access to high-status food and less physical activity.

These values are transmitted to adolescents, such that the attitudes and values that they have in relation to body size, physical activity and food are those that are apparent in the broader community. Within Western societies, value is associated with a slim body size for female adolescents, and a muscular lean body size for male adolescents (19). As for Fijian and Tongan society, this ideal body size shapes the physical activity and eating patterns of Australian adolescents.

In addition to the hierarchical as opposed to individual nature of the societies sampled in our studies, the other major factor shaping attitudes and behaviours related to body size, physical activity and eating for male adolescents was sport. McCabe *et al.* (20) clearly identified the role of sport in the construction of male body image and subsequently on physical activity and eating. For Fijians and Tongans, the main male sport is rugby, which requires a large, robust body size for success and inclusion. This body size is consistent with that endorsed by the broader society and so whereas female adolescents can pursue a large round body size to be physically attractive, male adolescents pursue a large muscular body size so that they can be successful in rugby: female adolescents' bodies are defined in terms of appearance, male adolescents in terms of functionality (9). In contrast, Indo-Fijian male adolescents are less focused on sport, and this is consistent with their smaller and less muscular bodies.

Conclusion

The studies reported in this paper identify the pervasive role of societal values in relation to body size in shaping the body size, physical activity and eating among adolescents from different cultural groups. Families and peers are important transmitters of these values, with religious groups also playing a central role in Fiji and Tonga, and the media playing an important role in Western societies. These are the agents that need to be targeted in the development of healthy ideal body size among adolescents in these countries. In this way, it is expected that adolescents will also engage in healthy levels of physical activity as well as eating a healthy diet. A further area of study is to determine what factors lead to adolescents in each culture perceiving they have an attractive body, as this is also likely to influence the diet and physical activity of these adolescents.

Conflicts of Interest Statement

J. T. Schultz and G. Waqa's institutions have received grants, and support to cover the costs of travel to

Investigator meetings in the Pacific, from Wellcome Trust Grant. The authors were employed by Fiji School of Medicine, Fiji National University. In addition, support in kind such as writing, provision of medicines or equipment, or administrative support, was provided by Secretariat of the Pacific Community grants for school-based interventions for G. Waqa.

M. P. McCabe, H. Mavoava, L. Ricciardelli's institutions have received grants from the National Health and Medical Research Council. Support was provided to cover costs of travel to New Zealand and Investigator meetings. The author was employed by Deakin University.

K. F. Fotu declared no conflict of interests.

Acknowledgements

The authors would like to thank the many people involved in the Pacific OPIC project including co-investigators, other staff and postgraduate students, partner organizations, and especially the schools, students, parents and communities. The funding for the project was from the Wellcome Trust (UK), the National Health and Medical Research Council (Australia) and the Health Research Council (New Zealand) through their innovative International Collaborative Research Grant Scheme.

References

- Booth ML, Chey T, Wake M, Norton K, Hesketh K, Dollman J *et al.* Change in the prevalence of overweight and obesity among young Australians, 1969–1997. *Am J Clin Nutr* 2003; **77**: 29–36.
- Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999–2002. *JAMA* 2004; **291**: 2847–2850.
- Becker AE, Gilman SE, Burwell RA. Changes in prevalence of overweight and in body image among Fijian women between 1989 and 1998. *Obes Res* 2005; **13**: 110–117.
- Ulijaszek SJ. Increasing body size among adult Cook Islanders between 1966 and 1996. *Ann Hum Biol* 2001; **28**: 363–373.
- Schultz J, Utter J, Mathews L, Cama T, Mavoava H, Swinburn B. The Pacific OPIC project (Obesity Prevention in Communities): action plans and interventions. *Pac Health Dialog* 2007; **14**: 147–154.
- Swinburn B, Pryor J, McCabe MP, Carter R, de Courten M, Schaaf D *et al.* The Pacific OPIC project (Obesity Prevention in Communities) – objectives and designs. *Pac Health Dialog* 2007; **14**: 139–146.
- Ricciardelli LA, Waqa G, Fotu K. The pursuit of muscularity among adolescent boys in Fiji and Tonga. *Aust J Psychol* 2006; **58**: 184.
- Mavoava H, McCabe MP. Sociocultural factors relating to Tongans' and Indigenous Fijians' patterns of eating, physical activity and body size. *Asia Pac J Clin Nutr* 2008; **17**: 375–384.
- Williams L, Ricciardelli L, McCabe MP, Swinburn B, Waqa G, Bavadra K. Body image attitudes and concerns among indigenous Fijian and European Australian adolescent girls. *Body Image* 2006; **3**: 257–287.

10. McCabe MP, Mavoia H, Ricciardelli L, Waqa G, Fotu K, Goundar R. Sociocultural influences on body image among adolescent males from Fiji, Tonga and Australia. *J Appl Soc Psychol* 2011. In press.
11. Williams L, Ricciardelli L, McCabe MP, Swinburn B, Waqa G, Bavadra K. A comparison of the sources and nature of body image messages perceived by indigenous Fijian and European Australian adolescent girls. *Sex Roles* 2006; 55: 555–566.
12. Mavoia H, Kumanyika S, Renzaho A. Sociocultural issues and body image. In: Waters E, Swinburn B, Seidell J, Uauy R (eds). *Preventing Childhood Obesity: Evidence Policy and Practice*. Wiley-Blackwell, BMJ Books: West Sussex, 2010, pp. 138–146.
13. Utter J, Faeamani G, Malakellis M, Vanualailai V, Kremer P, Scragg R et al. *Lifestyle and Obesity in South Pacific Youth: Baseline Results from the Pacific Obesity Prevention in Communities (OPIC) Project in New Zealand, Fiji, Tonga and Australia*. University of Auckland: Auckland, 2008.
14. McCabe MP, Fotu K, Mavoia H, Faeamani G. Body image and body change strategies among Tongan adolescents in Tonga and New Zealand. *N Z Med J* 2010; 123: 37–46.
15. Ravuvu M. Fijian cultural perspective on food. In: Jansen AAJ, Parkinson S, Robertson AFS (eds). *Food and Nutrition in Fiji*. Department of Nutrition and Dietetics, Fiji School of Medicine and University of the South Pacific: Suva, 1991, pp. 622–636.
16. Tupoulahi C. *The Socio-Cultural Antecedents of Obesity in Tonga*. Flinders University: Adelaide, 1997.
17. Smith BJ, Phongsavan P, Havea D, Halavatau V, Chey T, Members of the Health Behaviour and Lifestyle of Pacific Youth Survey Collaborating Group, Tonga Core Survey Team. Body mass index, physical activity and dietary behaviours among adolescents in the Kingdom of Tonga. *Public Health Nutr* 2007; 10: 137–144.
18. Saito S. 1993 *National Nutrition Survey: Main Report*. National Food Nutrition Committee: Suva, 1995.
19. Ricciardelli LA, McCabe MP. A biopsychosocial model of disordered eating and the pursuit of muscularity in adolescent boys. *Psychol Bull* 2004; 130: 179–205.
20. McCabe MP, Ricciardelli LA, Ridge D. ‘Who thinks I need a perfect body?’ Perceptions and internal dialogue among adolescents about their bodies. *Sex Roles* 2006; 55: 409–419.