

No pain, no gain: insights into changing individual volitional behaviour

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Published

2015

Journal Title

International Journal of Nonprofit and Voluntary Sector Marketing

Version

Accepted Manuscript (AM)

DOI

[10.1002/nvsm.1524](https://doi.org/10.1002/nvsm.1524)

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NO PAIN, NO GAIN: INSIGHTS INTO CHANGING INDIVIDUAL VOLITIONAL BEHAVIOUR

Abstract

Physical activity is an important component of a healthy lifestyle. The purpose of this study is three-fold: first, to empirically examine the effect of attitudes on people's intentions toward starting a new physical activity in three weight groups; second, to explore differences within various demographic groups and finally, to offer research and practical implications for social marketers who are working in the area of physical activity. A total of 1,459 respondents participated in an online survey. Our findings indicate that when individuals hold both negative and positive attitudes toward physical activity, they will have higher intentions to start a new physical activity. Empirical examination identified that overweight and obese people have more negative and less positive attitudes than healthier people toward physical activity. The results indicate that overcoming negative attitudes and reinforcing positive attitudes remains as a necessary condition to influence volitional behaviours such as physical activity, which requires cognitive processing and actions in order for behaviour to be changed. People engaging in physical activities understand both positive and negative effects of physical activities, and they may engage in physical activities despite knowing there are short term costs.

Keywords: Physical activity, social marketing, theory of planned behaviour

Introduction

Participation in various physical activities has been found to be a core component of maintaining a healthy lifestyle (Hamilton & White, 2008). Decades of studies show that physical exercise is associated with various health benefits such as increased strength and flexibility, reduced cardiovascular disease risk, reduced stress and lower depression rates (Aarts et al., 1997; Blair et al., 2001; Sallis & Patrick, 1994). Despite its importance, studies show that only 8% of adolescents in the United States engage in the recommended level of physical activity, and physical activity rates tend to decline with age (Troiani et al., 2008). In Australia, a similar trend has been found in the general population, for example, the proportion of people who exercised at moderate levels also decreased, from 24% in 2001 to 22% in 2008. Consistent with the above data, in Australia, the proportion of people who were sedentary increased from 31% to 35% for men and 32% to 36% for women (ABS, 2011). The majority of the adult population in general is either sedentary or not sufficiently active (Dishman & Buckworth, 2001; Sniehotta et al., 2005). Consequently, programs designed to help motivate people to be physically active and maintain physical activity are important. It has been shown that physical activity involvement is also related to a healthy lifestyle pattern (Vidmar, 1992). For example, active individuals are less likely to smoke cigarettes (Aaron et al., 1995), and younger individuals are likely to exhibit better academic performance (Dwyer et al., 1996; Shephard, 1996).

Various research has been applying theoretical models to predict which individuals are, or will be, active or inactive at a given point in time (Courneya et al., 1998; Courneya, 1995; Mummery et al., 2000). One of the widely used theories to understand people's motivation to undertake physical activity is Ajzen's Theory of Planned Behaviour (TPB) (see Luca & Suggs, 2013). Nonetheless, studies on the impact of attitude toward intention have produced mixed results (Lowe et al., 2002) suggesting ongoing research attention is warranted to

understand behaviours that have a volitional component, such as physical activity. Research shows that the characteristic attributed to ‘attitude’ is evaluative in nature (i.e. weighting up the pros and cons, including planning actions – short-term and long-term) (Fishbein & Ajzen, 1975). Attitude is an individual’s disposition to respond favourably or unfavourably toward an object, person or event (Ajzen, 1989). Thus, four attitudes (i.e. negative, positive, instrumental and affective) will be explored in this study. Further, Courneya et al.’s (1999) work suggests that studies on TPB often overlook the influence of demographic characteristics such as age, gender, income and education as moderating factors. Given that physical activity participation rates vary with demographic factors such as age, this is an important omission (Cerin & Leslie, 2008; Giles-Corti & Donovan, 2002; Lindstrom et al., 2001; McAuley et al., 2003; Talbot et al., 2000). Thus, the purpose of this study is three-fold: first, to explore the effect of attitudes on people’s intentions toward starting a new physical activity; second, to explore differences in behaviours within various demographic groups that are known to be associated with physical activity and finally, to offer research and practical implications for social marketers who are working in the area of physical activity.

Literature review

Numerous psychological models have been applied to health-related behaviour (Conner and Norman, 1996), but the most widely used is the Theory of Planned Behaviour (TPB). TPB has been successful in understanding a wide range of social issues (Holdershaw et al., 2003; Parkinson et al., 2012; Smith & Paladino, 2010) and predicting health-related behaviours, including physical activity (Armitage & Connor, 2001; Conner & Sparks, 2005; Godin & Kok, 1996).

Behavioral intentions are considered to be a key ingredient in many health behaviour models (Abraham & Sheeran, 2000; Armitage & Conner, 2000; Wallston & Armstrong, 2002;

Weinstein, 2003; Sniehotta et al., 2005) including the Theory of Reasoned Action, the Theory of Planned Behaviour (TPB) and the Health Belief Model. TPB, a widely used theory in social marketing, posits that attitude together with social norms and perceived behavioural control will shape individual's behavioural intentions and ultimately, their consequent actions (Ajzen, 1991; Ajzen & Fishbein, 1980). TPB suggests that an individual's intention to perform a behaviour is a key determinant of that behaviour because it accounts for particular motivational factors such as how hard an individual is willing to try (effort to be exerted to perform the behaviour) (Courneya et al., 1999). TPB has been used for predicting exercising intention and behaviour among adolescents (Mummery et al. 2000; Hamilton & White, 2008), adults (Godin, 1993; Lowe et al., 2002), and older persons (Courneya et al., 1998); and mediating the relationship between personality and exercise behaviour (Courneya et al., 1999). Overall, there is a strong support demonstrated for the robustness of TPB in explaining intention to exercise and to perform subsequent behaviour (Hamilton & White, 2008).

The attitude toward behaviour, either positive or negative, is a function of the beliefs concerning the perceived consequences of performing a specific action and a personal evaluation of each of those consequences (Godin, 1993). An individual who holds strong beliefs that positively valued outcomes will result from performing the behaviour (e.g. physical exercise) will have a positive attitude toward the behaviour. On the contrary, an individual who holds strong belief that negatively valued outcomes will result from the behaviour will have a negative attitude (Ajzen & Fishbein, 1980; Montano & Kasprzyk, 2008).

Hypotheses development

Based on the previously discussed theoretical and empirical literature, the study proposes several hypotheses which explore the impact of attitudes (i.e. negative, positive, instrumental and affective) on individuals' intention to start a new physical activity.

Studies on the intention-behaviour relationship have shown a gap between intention and behaviour can mainly be attributed to a person who intends to act, but who does not follow through (Orbell & Sheeran, 1998; Sniehotta et al., 2005). Thus, it can be assumed that intentions play an important role in health behaviour change because those without intentions are rarely found to be engaged in action (Sniehotta et al., 2005). Moreover, an individual tends to simultaneously evaluate the positive and negative outcomes of those activities. For example, a person may believe that regular exercise will help him/her cope with stress but at the same time also would make them tired and sore. Each individual evaluates the consequences attached to each of their beliefs (Godin, 1993). Nonetheless, some attitudes will have a stronger influence than others. Studies show that negative (Nelson et al. 2009) and positive attitudes (Deforche et al., 2006; Mummery et al., 2000; Storch et al., 2007) toward physical activity each have an effect on physical activity. Overweight and obese individuals tend to have a less positive attitude toward physical activities. Thus, we propose the following hypotheses:

Hypothesis 1: *Negative attitudes toward physical activity are negatively related with individual's intention to start a new physical activity for individuals who are: (a) healthy-weight; (b) overweight; and (c) obese.*

Hypothesis 2: *Positive attitudes toward physical activity are positively related with individual's intention to start a new physical activity for individuals who are: (a) healthy-weight; (b) overweight; and (c) obese.*

One reason for the importance of attitudes to exercise in the prediction of behavioural intentions might be the instrumental and affective nature of exercise itself (Lowe et al., 2002). Studies show that the attitude component of an intention comprises both instrumental and affective beliefs. Instrumental beliefs relate to the benefits and costs associated with behaviour (e.g. harmful or beneficial, bad or good, worthless or valuable). This is in contrast to affective beliefs. Affective evaluations are emotion-laden judgments about the consequences of the behaviour (e.g. pleasant or unpleasant, enjoyable or unenjoyable) (Ajzen, 1991; Lowe et al., 2002). Research indicates that instrumental and affective beliefs play an important role in volitional exercise behaviour motivation such as intention to go jogging and hiking (Valois et al., 1988; Godin, 1987). Godin (1987) also found that affective evaluations significantly influenced exercise intention among pregnant women. Attitudes will influence people's behaviours with outcomes that are believed to be both beneficial and pleasant (Ajzen & Driver, 1992). However, the immediate physical consequences of exercise are often negative ranging from soreness, fatigue and minor discomfort to severe distress, depending on the intensity of the behaviour (Lowe et al., 2006). Despite its negative consequences, studies found instrumental and affective attitude was positively associated with physical activities (Ajzen & Driver, 1992) and maintenance of physical activities. Attitudes will be most favourable toward behaviour with outcomes that are believed to be both beneficial (instrumental) and pleasant (Lowe et al. 2002). Hence, we propose the following hypotheses:

Hypothesis 3: *Positive instrumental attitudes toward physical activity are positively related with individual's intention to start a new physical activity for individuals who are: (a) healthy-weight; (b) overweight; and (c) obese.*

Hypothesis 4: *Positive affective attitudes toward physical activity are positively related with individual's intention to start a new physical activity for individuals who are: (a) healthy-weight; (b) overweight; and (c) obese.*

Method

Potential participants' contact details were obtained from a purchased list of persons who had previously opted to be contacted for marketing and market research purposes. The population for the current study was comprised of 106,828 people who resided within 20 km of the Melbourne Central Business District (CBD), Australia. Participants were aged 18 and over. Once ethical clearance was obtained from the Human Ethics Research Committee (MKT/05/13/HREC) at (*institution withheld to preserve author anonymity*), an email invitation containing a link to the online survey was sent by PostConnect, a division of Australia Post, to each potential participant. Of the 8,033 respondents who opened the email, a total of 25.18% (2,033) clicked the survey link. A total of 1,459 respondents participated in the online survey. Overall, there were 1,413 valid survey responses. The demographic profile of respondents is shown in Table 4. Participation in the online survey was voluntary and anonymous. Quantitative analysis was undertaken using IBM SPSS v. 21. Data cleaning was used to remove incomplete surveys, respondents who were under the age of 18 and those who did not reside within 20 km of the Melbourne CBD.

Intention toward starting any new physical activity in the coming twelve months was measured by a three-item scale adapted from Fishbein and Ajzen (1975) (e.g. *I intend to start a new physical activity*) using a Likert measure ranging from -3 (*strongly disagree*) to 3 (*strongly agree*). Following the Exercise, Recreation and Sport Survey published by the Australian Sports Commission (2010) physical activity was defined in our survey as any activity for exercise, recreation or sport. Negative (e.g. *...it would be painful*) and positive attitudes (e.g. *...it would help me cope with stress*) toward physical activities were measured by scale items developed by Nelson et al. (2010) using a Likert scale anchored from 1 (*strongly disagree*) to 5 (*strongly agree*). The conceptualisation of attitudes toward physical activities assesses both perception of the immediate experience and consequences of physical

activity (Nelson et al., 2010). Finally, instrumental and affective attitude scales were based on those used by Conner and Sparks (1996). The anchors (-3 to 3) for the instrumental component were *harmful/beneficial*, *bad/good* and *worthless/valuable*, whereas the anchors for the affective attitude were *unpleasant/pleasant*, *unenjoyable/enjoyable*. The scores (i.e. -3 to +3) captured the psychology of double negatives, where a belief that a behaviour will not result in a negative outcomes contributes positively to the person's attitude (Furr, 2011). Finally, the Cronbach's alpha for all items are as follows: negative attitudes (8 items, $\alpha = .866$); positive attitudes (6 items; $\alpha = .768$); instrumental attitudes (3 items; $\alpha = .898$); affective attitudes (2 items; $\alpha = .889$); and intentions (3 items; $\alpha = .960$), all exceeding recommended thresholds. Table 1 details the scale items used in this study.

Insert Table 1 About Here

Results and discussion

Multicollinearity diagnostic analysis was conducted to examine correlations between the independent variables. The results show that the variance inflation factors (VIF) scores are around 1 and lower than 5 which is indicative of minimal effect and multicollinearity not being problematic (Hair et al., 1998). Subsequently, separate linear multiple regression analyses (enter mode) were employed to test the hypotheses. 'Negative attitudes', 'positive attitudes', 'instrumental attitudes' and 'affective attitudes' scales were the independent variables and 'intention to start a new physical activity' was the dependent variable. The respondents were divided into three categories based on their BMI level (i.e. healthy-weight, overweight, and obese). Table 2 shows the correlation matrix for the independent and dependent variables for each category. Overall, it shows that negative attitudes are negatively

related to positive, instrumental and affective attitudes but not significantly related to the intention to start a new physical activity. Despite insignificant results, negative attitude is positively related to intention (for individuals who are healthy-weight) and negatively related to intention (for individuals who are overweight and obese). Furthermore, positive attitudes are positively related to instrumental and affective attitudes including the intention to start a new physical activity.

Subsequently, based on each category (i.e. healthy-weight, overweight, and obese), we conducted regression analyses, ANOVA and post-hoc analyses (Tukey HSD) to examine differences within the demographic profiles (i.e. BMI, gender, age, income and education).

Table 3 shows that the model had an adjusted R^2 value of 0.128 (healthy-weight); 0.179 (overweight) and 0.119 (obese). Given the multitude of factors known to impact obesity (for example see <http://www.shiftn.com/obesity/Full-Map.html> for a complex systems map of obesity influences) the R^2 values reported in the current study would be in line with reasonable expectations. Obesogenic factors extend considerably beyond the individual and many are not able to be captured through cognitive processing. Contrary to our prediction, negative attitudes toward starting a new physical activity is positively related to individuals' intentions to start a new physical activity for individuals who are healthy-weight ($\beta = 0.145, p < 0.05$) and overweight ($\beta = 0.151, p < 0.05$), but not for individuals who are obese. Thus, H_{1a} and H_{1b} are not supported due to its opposite direction and H_{1c} is also not supported. In the correlation table (Table 3), the result shows that negative attitude is uncorrelated to intention to start a new physical activity for individuals who are obese. Nonetheless, the regression results show that negative attitudes toward physical activity have a positive impact on individuals' intentions to start a new physical activity in the next 12 months following the survey. This may indicate the case of a suppressor variable. Conger (1974, p. 36-37) defined a suppressor variable as "...a variable which increases the predictive validity of another

variable (or set of variables) by its inclusion in a regression equation in multi-variate testing”. This is a variable that can raise the total the variance explained even though it has an insignificant correlation with the dependent variable in bi-variate testing and a strong correlation with other predictor variables in bi-variate explorations (Hinkle et al. 1994; Pedhazur, 1982; Woolley, 1997). Therefore, negative attitude may be acting as a suppressor variable. Despite insignificant correlations with intention, when combined with other variables, negative attitude has a positive impact toward intention to start a new physical activity for individuals classified as healthy-weight and overweight. The research implication is that in order to increase people’s intention to start a new physical activity, people need to understand not only the potential benefits of physical activities but also the negative consequences such as soreness and pain. In this case, understanding the more complicated interplay between attitudinal variables is needed to determine how to effect change (Wolley, 1997).

Moreover, as predicted, results reveal that positive attitudes toward physical activity are positively related to individuals’ intentions to start a new physical activity for individuals who are healthy-weight ($\beta = 0.373, p < 0.001$); overweight ($\beta = 0.455, p < 0.001$); and obese ($\beta = 0.375, p < 0.001$). Hence, H_{2a}, H_{2b}, and H_{2c} are supported. While both attitudes influence people’s intentions, positive attitudes are more influential in predicting people’s intentions to start a new physical activity (please see Table 2). Therefore the results support the TPB, especially in the context of volitional behaviours such as physical activity as our findings show that attitudes affect behavioural intentions. Interestingly, while positive attitudes have been able to predict behavioural intentions, our findings indicate that negative attitudes are also able to predict people’s intentions (or lack thereof) to start a new physical activity for individuals who are healthy-weight and overweight but not for those who are obese (facilitating intentions to start a new physical activity). As previously mentioned, an

individual evaluates all consequences, both negative and positive, attached to each of their beliefs (Godin, 1993) and it is the outcome of this evaluation that may be driving volitional behaviour. Contrary to exchange theory which suggests that benefits need to be promoted and barriers need to be minimised, the results of the current study indicate more understanding of the attitude interplay is needed to change individual volition to perform a behaviour.

Moreover, the findings show that instrumental attitudes are significant in predicting individuals' lack of intention to start a new physical activity for individuals who are overweight ($\beta = -0.148, p < 0.05$). Due to the opposite direction of the result, H_{3b} is not supported. Furthermore, for individuals who are healthy-weight and obese, the results show that instrumental attitudes are not significant in predicting individuals' intention to start a new activity. Hence H_{3a} and H_{3c} are not supported.

The findings also show that affective attitudes are not significant in explaining individuals' intentions to start a new physical activity. Thus, H_{4a}, H_{4b} and H_{4c} are not supported. The findings suggest that knowing the benefits (instrumental) and emotional consequences (affective) did not influence people's intentions to start a new physical activity rather the combination of negative and positive dispositions towards physical activity were more influential on the intention to increase physical activity. The results of the current study indicate that inclusion of different attitude types to examine behavioural intentions may impact study outcomes. The findings of this study are in contrast to other studies which found that instrumental and affective beliefs play an important role in exercise behaviour motivation such as intention to go jogging and hiking (i.e. Valois et al. 1988; Godin, 1987). It is possible that by including more attitudinal types the role of instrumental and affective attitudes in influencing behavioural intentions is diminished.

Insert Table 2 & 3 About Here

In the context of physical activity, consideration of the perceived benefits (positive attitudes) and barriers of physical activity (negative attitudes) may offer more insights for social marketers than instrumental or affective attitudes. The results of the current study suggest that instrumental and affective attitudes did not influence people's intentions to start a new physical activity, while both positive and negative attitudes positively influence people's intentions to start a new physical activity. While people know that exercise is good for them a communication focus on benefits and barriers of physical activity is likely to increase intentions and subsequent physical activity behaviour. The results of the current study are consistent with Lowe et al. (2002) who found that the benefits of exercise were not always translated into appropriate behaviour. Instrumental and affective attitudes exhibited no link with future intention to start a new physical activity.

Furthermore, Table 4 shows differences between various demographic groups, which provides further important insights to which particular groups the positive and negative attitudes towards physical activity comes from. Within BMI levels, people who are in the *healthy-weight* category exhibit a more positive attitude (M=3.82) towards physical activity than people who are in the *overweight* (M=3.72) and *obese* (M=3.63) categories. Further, people who are in the *healthy-weight* category exhibit a less negative attitude (M= 2.41) than people who are in the *overweight* (M=2.55) and *obese* (M=2.87) categories. In other words, healthy-weight people have higher positive attitudes and lower negative attitudes towards physical activity compared to those who are underweight, and significantly so compared to the overweight and obese. It can be suggested that healthier people understand the various challenges in performing physical activities such as tiredness, pain, sweating etc. along with

the potential benefits of physical activities. In contrast, people who are overweight and obese perceive lower benefits and more barriers to physical activity, and thus are less willing to start a new activity. It is important to note that intentions to increase physical activity would be expected to be lower for respondents who are already taking on substantial amounts of activity. An examination of self-reported physical activity is provided to consider this issue. The results show obese people (M=1.58) did less physical exercise than healthy-weight (M=1.93) and overweight people (M=1.94) (see Table 5). Furthermore, obese people show less affective attitudes, which mean they perceive physical activity as more unpleasant and less enjoyable compared to people who are healthy-weight and overweight. Nonetheless, obese people report lower physical activity levels and higher intentions to start a new physical activity than overweight people.

Insert Table 4 & 5 About Here

Post-hoc regression analyses provide further insights regarding which of the three groups (*healthy-weight, overweight, obese*) contribute to the strongest attitudes towards physical activity (please see Table 6). Table 6 suggests that people in both *healthy-weight* and *overweight* categories understand the value of physical activity (instrumental attitude), however, it is the *healthy-weight group* that seems to like physical activity but not the *obese* (affective attitude and positive attitude, though the latter are not significant). This is verified by the fact that people in the *obese* category have a negative attitude towards physical activity and people in the *healthy-weight* category do not.

Insert Table 6 About Here

In regards to differences between genders, females report more positive attitudes and higher intentions to start a new physical activity than males. Furthermore, the results demonstrate that age does not influence people's attitudes and intentions. This is in contrast with McAuley et al.'s (2003) study, where older individuals were less engaged in any regular physical activities compared to younger individuals. People with higher income (> \$100,000) show a more positive attitude toward starting a new physical activity than people with lower income. Moreover, people with higher income also show higher intention to start a new physical activities compared to people with lower income. Finally, people with higher education (university or more) exhibit a more positive attitude and higher intention to start a new physical activity compared to people with lower education levels. This is consistent with Cerin and Leslie, (2008), Corti and Donovan, (2002) and Lindstrom et al.'s (2001) studies where lower socio-economic status has been found to be associated with insufficient physical activity.

Conclusions and implications for social marketing

From a theoretical perspective, the results of our study provide further empirical support for using the TPB for volitional behaviours such as physical activity and indicate that consideration of four attitude types may enhance understanding of how to influence behavioural intentions. Our findings indicate that when individuals hold both high positive and lower negative attitudes toward physical activity they will have higher intentions to start a new physical activity. Of concern in terms of addressing the obesity epidemic may be the fact that the results of the current study identified that overweight and obese people have higher negative and less positive attitudes than healthier people. The results indicate that overcoming negative attitudes and reinforcing positive attitudes remains as a necessary condition to influence volitional behaviours such as starting a new physical activity, which

requires an informed decision to join a sporting team, sign onto a gymnasium, etc. Further, the results of this research suggest that people with higher intentions to engage in new physical activities understand both positive and negative effects of physical activities, and they may engage in physical activities not only because of the process of physical activity, but also because of its outcome. In future research, reasons why people engage in new physical activities (e.g. goals) and their expectations towards outcomes should be considered to better understand behavioural intentions and subsequent physical activity behaviours.

Furthermore, the study shows that overweight people show less intention to exercise compared to obese people. It can be suggested that people who are overweight may not see themselves in a health-risk situation thus are unable to see the need for exercise. This is a gap that needs to be addressed by social marketers and can be explored in future research. Social marketing campaigns should first focus on raising the awareness of a healthy body weight, before fostering further behaviour change leading to healthier lifestyles with physical activity as it integral component (Hamilton & White, 2008). Further, as females show more positive attitudes and higher intentions to start a new physical activity than males, the investment in social marketing programs targeting women may gain the highest and quickest return on investment. This study also indicates that it is equally important to acknowledge the socio-economic aspects associated with engaging in a new physical activity. Social marketers should focus on individuals with lower socio-economic status, especially as they display less positive attitudes and willingness to start a new physical activity. This situation is further compounded as other studies show that people with lower education and income also have less healthy dietary habits (Leather & Dowler, 1997; Lobstein, 1999). This study highlights the complexity of lifestyle factors such physical activity and diet which tend to deteriorate moving from higher to lower socio-economic class (Blaxter, 1997; Adler & Ostrove, 1999).

Finally, this study has several limitations. First, it is limited to a convenience, cross-sectional sample that was comprised of one large city in Australia. Secondly, it is based on self-reported intentions which might limit the actual intentions and more importantly understanding the subsequent behaviours of these individuals. Therefore, future research is recommended that incorporates longitudinal data to examine the long-term effect of people's attitudes toward physical activity on behavioural intentions and subsequent behaviour to empirically examine causality. Future research is recommended to empirically examine alternative models. One alternate model that warrants consideration is to use instrumental and affective attitudes as moderating variables and to include additional variables known to explain behavioural intentions such as perceived behavioural control and social norms (injunctive and descriptive norms).

The results of the current study indicate that inclusion of different attitude types to examine behavioural intentions may impact study outcomes. For example, the current study indicates instrumental and affective beliefs play an important role in intention to go jogging and hiking which contrasts with previous studies (i.e. Valois et al., 1988; Godin, 1987). Meta-analyses are recommended to gain a more complete understanding of the attitude and intention interplay.

Future research employing alternate methods, such as observational data, is also recommended to extend our understanding beyond both behavioural intentions and volitional behaviours; given that intentions do not always lead to subsequent behaviour (Holdershaw et al., 2011) and not all behaviours are volitional. As acknowledged by Wymer (2011), to further understand how to combat the increasing prevalence of sedentary lifestyle and the obesity epidemic in Australia and worldwide (ABS, 2011; Kemper, 1995; Troiani et al., 2008), social marketers need to move beyond the downstream, consumer-focused interventions and assumptions of individual voluntary behaviour to address the problem of

overweight and obesity. Given that much behaviour is automatic, and that individuals may not always make an active and conscious decision in regards to such trivial behaviours as taking the stairs or elevator, it is important that research methods extend beyond self-report methods such as surveys to develop a more comprehensive view of physical activity behaviours, in particular behaviours that are involuntary. In addition, future studies should explore not only physical activities but also other health-related behaviours such as dietary patterns, drinking and smoking behaviours as these behaviours will have a significant impact on people's health.

Acknowledgements

The Victorian Health Promotion Foundation (VicHealth) funded and supported this research. The funders played no role in study design, collection, analysis, interpretation of data, or in the decision to submit the paper for publication. They accept no responsibility for contents. The authors wish to acknowledge research assistance provided during the research design and data collection stages of this project.

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Appendix

Table 1. Scale items, origin in the literature and scale anchors

Attitude (Negative) (Nelson et al., 2010)	Scale Anchors
If I were to be physically active on most day	-3=strongly disagree; 3=strongly agree
...it would be painful	
...it would be difficult	
...it would be embarrassing.	
...it would make me feel uncomfortable	
...it would make me tired	
...it would make me sore	
...it would be a hassle	
...it would take too much time	
Attitude (Positive) (Nelson et al., 2010)	
If I were to be physically active on most day	-3=strongly disagree; 3=strongly agree
...it would help me cope with stress	
...it would help me make new friends	
...it would get or keep me in shape	
...it would help make me more attractive	
...it would give me more energy	
...it would make me better in sports, dance and other activities	
Attitude (Instrumental) (Conner and Sparks, 1996)	
Exercise is...	-3=harmful; 3=beneficial
Exercise is...	-3=bad; 3=good
Exercise is...	-3=worthless; 3=valuable
Attitude (Affective) (Conner and Sparks, 1996)	
Exercise is...	-3=unpleasant; 3=beneficial
Exercise is...	-3=unenjoyable; 3=enjoyable
Intention (Fishbein and Ajzen, 1975)	
I intend to start a new physical activity in the next 12 months	-3=extremely unlikely; 3 extremely likely
I will try to start a new physical activity in the next 12 months	
I plan to start a new physical activity in the next 12 months	

Table 2. Correlation matrix for attitudes and intentions to start a new physical activity

Construct (Healthy-Weight)	Attitude (Negative)	Attitude (Positive)	Attitude (Instrumental)	Attitude (Affective)	Intention
1. Attitude (Negative)	1				
2. Attitude (Positive)	-0.238**	1			
3. Attitude (Instrumental)	-0.135**	0.109*	1		
4. Attitude (Affective)	-0.245**	0.154**	0.791**	1	
5. Intention	0.048	0.333**	-0.046	-0.022	1
Construct (Overweight) N=427	Attitude (Negative)	Attitude (Positive)	Attitude (Instrumental)	Attitude (Affective)	Intention
1. Attitude (Negative)	1				
2. Attitude (Positive)	-0.327	1			
3. Attitude (Instrumental)	-0.122*	0.248**	1		
4. Attitude (Affective)	-0.397**	0.321**	0.725**	1	
5. Intention	-0.028	0.404**	0.037	0.091	1
Construct (Obese) N=334	Attitude (Negative)	Attitude (Positive)	Attitude (Instrumental)	Attitude (Affective)	Intention
1. Attitude (Negative)	1				
2. Attitude (Positive)	-0.276**	1			
3. Attitude (Instrumental)	-0.275**	0.303**	1		
4. Attitude (Affective)	-0.470**	0.298**	0.617**	1	
5. Intention	-0.043	0.380**	0.051	-0.021	1

* $p < 0.01$. ** $p < 0.005$

Table 3. Regression analysis for attitudes on the intentions to start a new physical activity

Model (Healthy-Weight)	Standardized beta	t-value	Significant
Dependent variable: <i>Intention to start a new physical activity</i>		-6.687	0.000
Attitude (Negative)	0.145	2.847	0.005
Attitude (Positive)	0.373	7.541	0.000
Attitude (Instrumental)	-0.082	-1.031	0.303
Attitude (Affective)	0.031	0.378	0.705
R ² = 0.137	F-value = 14.968		
Adjusted R ² = 0.128	Significance = 0.000		
Model (Overweight)	Standardized beta	t-value	Significant
Dependent variable: <i>Intention to start a new physical activity</i>		-7.436	0.000
Attitude (Negative)	0.151	2.676	0.008
Attitude (Positive)	0.455	8.537	0.000
Attitude (Instrumental)	-0.148	-2.062	0.040
Attitude (Affective)	0.119	1.532	0.126
R ² = 0.188	F-value = 19.809		
Adjusted R ² = 0.179	Significance = 0.000		
Model (Obese)	Standardized beta	t-value	Significant
Dependent variable: <i>Intention to start a new physical activity</i>		-3.908	0.000
Attitude (Negative)	0.015	0.223	0.824
Attitude (Positive)	0.375	6.056	0.000
Attitude (Instrumental)	0.043	0.601	0.549
Attitude (Affective)	-0.130	-1.680	0.094
R ² = 0.132	F-value = 10.151		
Adjusted R ² = 0.119	Significance = 0.000		

* $p < 0.01$. ** $p < 0.005$

Table 4. ANOVA Between Groups (Attitude)

Demographic	Attitude				Intention
	Negative	Positive	Instrumental	Affective	
BMI (F-value/ sig)	35.54/ 0.00	9.14/ 0.00	1.50/ 0.22	21.56/ 0.00	F=8.59/ 0.00
<i>Healthy-Weight (a)(37.6%)</i>	2.41	3.82	2.04	1.68	0.34
<i>Overweight (b)(35%)</i>	2.55	3.72	2.05	1.46	0.07
<i>Obese (c)(27.4%)</i>	2.87	3.63	1.86	0.88	0.63
	Note: (a) is sig. different than (b) & (c); (b) is sig different than (c)	Note: (a) is sig. different than (b) & (c)	Note: no sig. difference	Note: (c) is sig different than (a) & (b)	Note: (b) is sig different than (c)
Gender (F-value/ sig)	3.62/ 0.70	0.04/ 0.00	3.02/ 0.13	1.01/ 0.87	0.02/ 0.00
<i>Female(62.1%)</i>	2.58	3.86	2.01	1.38	0.56
<i>Male(37.9%)</i>	2.57	2.61	1.87	1.36	-0.08
Age (F-value/ sig)	0.85/ 0.51	0.51/ 0.76	0.53/ 0.74	0.39/0.74	0.76/ 0.57
<i>18-24 (a)(1.7%)</i>	2.27	3.89	1.64	1.27	0.08
<i>25-34 (b)(12.7%)</i>	2.62	3.76	1.95	1.27	0.28
<i>35-44 (c)(15.6%)</i>	2.57	3.73	1.90	1.31	0.48
<i>45-54 (d)(21.9%)</i>	2.60	3.77	1.91	1.34	0.41
<i>55-64(e)(22.2%)</i>	2.56	3.72	2.00	1.47	0.33
<i>65 and above (f)(26%)</i>	2.60	3.73	2.06	1.42	0.20
	Note: no sig diff.	Note: no sig diff.	Note: no sig diff.	Note: no sig diff.	Note: no sig diff.
Income (F-value/ sig)	2.16/ 0.06	9.23/ 0.00	0.82/ 0.53	0.60/ 0.70	5.53/ 0.00
<i>< \$20,000 (a)(9.8%)</i>	2.76	3.55	1.84	1.36	-0.05
<i>\$21-\$39,999 (b)(18.7%)</i>	2.65	3.58	1.85	1.21	-0.12
<i>\$40-\$59,999 (c)(19.1%)</i>	2.60	3.71	2.09	1.48	0.36
<i>\$60-\$79,999 (d)(15.7%)</i>	2.54	3.80	1.91	1.43	0.58
<i>\$80-\$99,999 (e)(12.7%)</i>	2.53	3.78	1.97	1.42	0.44
<i>\$100< (f)(24.1%)</i>	2.51	3.89	2.05	1.41	0.55
	Note: no sig diff.	Note: - (f) is sig different than (a), (b) & (c). - (e) is sig different than (a) & (b)	Note: no sig different	Note: no sig different	Note: (a) is sig different than (d) & (f) (b) is sig different than (d), (e) & (f)
Education (F-value/ sig)	1.04/0.37	3.14/ 0.02	0.48/ 0.69	0.15/ 0.92	3.65/ 0.01
<i>University or higher (a)(45.8%)</i>	2.54	3.78	1.94	1.36	0.39
<i>TAFE / Diploma (b)(25.4%)</i>	2.62	3.72	2.03	1.43	0.46
<i>Completed HS (c)(14.6%)</i>	2.63	3.69	1.87	1.33	0.23
<i>Some HS or lower (d)(14.2%)</i>	2.56	3.63	2.01	1.34	-0.05
	Note: no sig diff.	Note: (a) is sig different than (d)	Note: no sig diff.	Note: no sig diff.	Note: (a) is sig different than (d)

Table 5. ANOVA Between Groups (physical exercise)

	Group (Mean)			F	Sig	Note: at p < 0/05
	Healthy-weight (a)	Overweight (b)	Obese (c)			
Physical Exercise	1.93	1.94	1.58	17.72	0.00	(c) is significantly different than (a) and (b)

Note: 0=no physical exercise (0 session/ week); 1=low physical exercise (1-2 sessions/ week); 2=medium physical exercise (3-5 sessions/ week); 3=high physical exercise (6 sessions/ week).

Table 6. Post-hoc regression analyses for attitudes on the intention to start a new physical activity.

Model 1	Standardized beta	t-value	Significant
Dependent variable: <i>Negative attitude</i>		40.879	0.000
Healthy-weight	-0.130	-2.215	0.004
Overweight	-0.024	-0.532	0.595
Obese	0.157	3.591	0.000
R ² = .059	F-value = 24.895		
Adjusted R ² = .056	Significance = 0.000		
Model 2	Standardized beta	t-value	Significant
Dependent variable: <i>Positive attitude</i>		72.582	0.000
Healthy-weight	0.081	1.778	0.076
Overweight	-0.003	-0.065	0.948
Obese	-0.063	-1.438	0.151
R ² = .015	F-value = 6.185		
Adjusted R ² = .012	Significance = 0.000		
Model 3	Standardized beta	t-value	Significant
Dependent variable: <i>Instrumental attitude</i>		12.488	0.000
Healthy-weight	0.120	2.853	0.008
Overweight	0.118	2.600	0.009
Obese	0.058	1.338	0.181
R ² = .008	F-value = 3.148		
Adjusted R ² = .005	Significance = 0.024		
Model 4	Standardized beta	t-value	Significant
Dependent variable: <i>Affective attitude</i>		9.465	0.000
Healthy-weight	0.111	2.498	0.013
Overweight	0.043	0.758	0.334
Obese	-0.110	-2.571	0.010
R ² = .035	F-value = 15.110		
Adjusted R ² = .033	Significance = 0.000		

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