

WELLNESS, SELF EFFICACY AND BEHAVIOURAL CHANGES

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Abstract:

Based on the Trans theoretical Model of Behaviour Change, a better understanding of the determinants of exercise behaviour is beginning to emerge. In this study exercise behaviour was examined to determine its association with self-efficacy and decisional making. One hundred seventy four freshman college students answered three questionnaires to assess their stage of exercise behaviour, self-efficacy and decisional balance (i.e., pros and cons). Frequency counts were used to determine the distribution of freshman students among the stages of adoption. Stage of exercise adoption was the independent variable, and self-efficacy and decisional balance were the dependent variables in the analysis. Analysis of variance showed that self-efficacy and decision-making were able to significantly differentiate one's stage of exercise change. Understanding the states of exercise behaviour change may yield important information for designing physical education curriculum that would enhance exercise adoption and adherence.

Keywords: *stages of change, self-efficacy, decisional balance, exercise behaviour*

1 Introduction

According to the accepted definition of “wellness in WHO in 2000: “Wellness is the optimal state of health of individuals and groups. There are two focal concerns: the realisation of the fullest potential of an individual physically, psychologically, socially, spiritually and economically, and the fulfilment of one’s role in the family, community, place of worship, workplace and other settings.” (WHO 2000). The “heart” of the academic and professional preparation of the Wellness Specialist is a behavioural change, signaling the fundamental philosophical shift from traditional intervention practices focused on acquisition of knowledge and skills to practices structured around the behavioural change principles with the learning outcome being a

change in the way we live.

The role of the Wellness Specialist is to positively influence the self-care practices, reinforce healthy habits and prepare responsible citizens for the future. It is hoped that this resource combined with the implementation of the nation-wide government interventions will foster healthy behaviours for daily living and prepare individuals for their roles in our culture. It will center the learning of all learning areas on the active lifestyle and social responsibility. Clients, their families and others will learn by a sequence of activities carefully designed to promote healthy lifestyles and social responsibility. All stakeholders within the community, including schools, must guarantee that efforts are made to emphasize health as a value in life and reaffirm that social responsibility is an essential element in our culture.

Participation in a regular exercise program has been confirmed to be beneficial in the prevention of most lifestyle related diseases (Dishman, 1994). Exercise is conducive to physiological and psychological well-being. The protective effect of physical activity was detected in the decreased death rate from cardiovascular disease (Blair, Kohl, Barlow, & Gibbons, 1991; LaPorte, et al, 1984; Powell, Thompson, Casperson, & Kendrick, 1987; Williams, Ekers, Collins, & Lee, 1991) and a substantial amount of evidence established exercise as a helpful treatment for psychological problems (King, Taylor, Haskell, & DeBusk, 1989; Martinsen, 1990; Steptoe & Cox, 1988).

Regular exercise can help enhance the quality of life for people of all ages (Katz, et al., 1983). However, improving the quality of life is a matter of personal choice. Therefore, the greatest challenge is no longer documenting the benefits of regular exercise, but rather teaching individuals how to take control of their health habits to ensure a better, healthier, more productive life (Marcus, Banspach et al., 1992). Krejčí presented on the base of results on research project “Use of Yoga in a re-education process”, how juvenile delinquents developed self-efficacy during the applied yoga intervention program. She aimed at the verification of a yoga program, above all for psychical tension relief, aggression reduction and positive changes in self-conception. For the praxis it means that changes on a physical level can bring about changes in psyche or in interpersonal relations - e.g. the relief of unnecessary physical tension causes relaxation on a psychical level, which

manifests itself positively in interpersonal relations and social adaptation. The wish to be more friendly and perceptive together with a feeling of being relaxed supports the already mentioned trend of more positive attitude towards the surrounding world. It was observed if there would be any change in differences between the real and the ideal level during the intervention program. There was a decrease in this difference in the experimental group, which characterises the reduction of discrepancy between self-perception and the ideal image of one's own person. This change indicates the shift in the perception of one's own person to stability, which leads to a common feeling of subjective contentment, subjective feeling of psychical health and "well-being". The yoga exercises program had a positive influence in areas of higher confidence and more positive attitude towards the surrounding world ($F_{.31} = 24.49$; $p/0.001$). Adjectives in bold type show the direction of the shift - e.g. rough - **tender**, difficult - **easy**, rebellious- **pliable**. From the found changes we consider to be essential in particular the shift from pliability and from the wish to be rough. We believe that both these tendencies hide in themselves a great potential for another educational work. The wish to be more friendly and perceptive together with a feeling of being relaxed supports the already mentioned trend of more positive attitude towards the surrounding world. We observed if there would be any change in differences between the real and the ideal level during the yoga program. There was a decrease in this difference in the experimental sample, which characterises the reduction of discrepancy

between self-perception and the ideal image of one's own person. This change indicates the shift in the perception of one's own person to stability, which lead to a common feeling of subjective contentment, subjective feeling of psychical health and "well-being". The human nervous system is best activated when we move. A motion, especially directed and controlled throughout, is of considerable therapeutic value. It shows the state of the nervous system, its inherent structure and level of development. At present, motion and kinetic activity belong more and more to the sphere of prevention and therapy in the broadest meaning of the word, including the prevention of undesirable phenomena in behaviour and in the re-education process. As a psychosomatic system, yoga has a favourable influence not only on the physical side, but it favourably effects the psychical and social development of a personality, too (Krejčí 2013, Krejčí 2011).

Consequentially, risk reduction is a major focus of the national health promotion and disease prevention objectives for the Year 2000. The objectives were proposed to ensure that health related dimensions of physical activity become part of regular behavior patterns (U.S. Department of Health and Human Services, Public Health Service, 1996).

In 1995, less than ten percent of young adults were active in their leisure time at the intensity, frequency and duration recommended by the American College of Sports Medicine (ACSM, 1995).

Exercise adherence research has received a great deal of attention in the past several years. Although various theoretical approaches have achieved some success in understanding

exercise behaviour, these approaches have also met some criticism. Exercise researchers have suggested that we need to shift from predictive to process models to better understand behaviour change. Three different social-cognitive models have been effective in understanding the process of the adoption and maintenance of health behaviours: (1) stages of change model (Prochaska & DiClemente, 1983), (2) decisional balance theory (Janis & Mann, 1977) and (3) self-efficacy theory (Bandura, 1977). While traditional behavioural change theorists conceptualized behavioral change as a linear sequence, those who prescribed to the Trans theoretical Model of Behavioral Change (TMBC) recognized that acquisition and maintenance of a behaviour was a dynamic process incorporating sequential stages rather than a dichotomous event (Prochaska & DiClemente, 1983; Prochaska, Velicer, DiClemente, & Fava, 1988). It seems to be a model that can take us one step ahead of the traditional unidimensional model to a more dynamic model.

The TMBC posits that a person moves through a series of stages when changing a behaviour. In these stages, certain processes and variables appear to facilitate the movement to a higher stage. The TMBC defines a set of outcomes or intermediate variables that includes decisional balance, the pro and cons of behaviour change, and self-efficacy both of which have been helpful in the understanding of health behaviors (Marcus, Rossi, Selby, Niaura, & Abrams, 1992; Marcus & Simkin, 1993). Prochaska and DiClemente (1983) have suggested that individuals engaging in a new

behaviour move through a series of stages of Precontemplation (not intending to make changes), Contemplation (considering change), Preparation (making small changes), Action (actively engaging in the new behavior), Maintenance (sustaining the change over time), and Termination (having no temptation to relapse) (Marcus & Simkin, 1993; Prochaska & DiClemente, 1983). The model of stages of change has been used to explain how an individual progresses through the stages of changing a behaviour. Stages are characterized as being "dynamic in nature, and behavior change is not an all-or-none phenomenon; individuals who perform a behaviour may relapse and start again" (Dishman, 1994). In essence, each stage is open to change. Unlike other health behaviours, the habit of regular exercise involves factors that may be unique, and therefore required studying the processes that occur between exercise adoption and adherence. Researchers have indicated that factors influencing initial adoption and early participation in exercise may differ from those affecting subsequent maintenance (Marcus, Rakowski, & Rossi, 1992). Regularly performed yoga exercises lead to experiencing of a healthy, adequately trained body and enhance commitment and self-efficacy (Krejčí 1993, Krejčí 2011). For this reason, yoga is recommended like an effective system of physical, breathing, relaxation and concentration exercises in disability children (Maheshwarananda 2001). Motion stimuli consist of simple movements in all parts of the body (including fingers, face, tongue) based on movement and breathing synchronizing.

A stage of exercise adoption questionnaire

(SEA) was developed in order to describe a person as being in one of the five stages of change (Marcus, Rossi, et al., 1992). Five statements were designed to assess current stage of *exercise behaviour*. Using an algorithm, researchers are able to evaluate the questionnaire in order to classify an individual as being in one of the five groups.

1. I do exercise now
2. In the next 6 months I plan to exercise
3. I exercise regularly now (regular exercise is defined as 3 or more times a week for 30 minutes or longer)
4. For the past 6 months I have exercised regularly
5. In the past, I have exercised regularly for a period of at least 3 months

Decision developed theories have been helpful in the research of behaviour change. Janis and Mann (1977) recommended that positive and negative outcomes should be recognized when investigating decision-making. They developed a decisional balance model that applied eight decision making constructs: instrumental benefits to self, instrumental benefits to others, instrumental costs to self, instrumental costs to others, approval from self, approval from others, disapproval from self, and disapproval from others (Janis & Mann, 1977). This decision-making process has been found to be highly related to current and future likelihood of participating in health behavior change (O'Connell & Velicer, 1988; Prochaska, et al., 1994; Marcus, Eaton, Rossi, & Harlow, 1994). Before change can take place, one must

perceive the behaviour as having high benefits (Pros) and low costs (Cons). Recently, researchers have simplified this model to a two factor construct based on the comparison of the perceived positive aspects (Pros) and negative aspects (Cons) of a new behavior (O'Connell & Velicer, 1988; Prochaska, et al., 1994). The balance between the Pros and Cons varies depending on the stage of change.

Marcus, Rakowski, & Rossi (1992) tested a 40-item questionnaire consisting of statements based on constructs from the Trans theoretical Model of Behaviour Change. Using a principal component analysis, they identified two factors; a six-item component that represented avoidance of exercise (Cons) and a ten-item component that represented the positive perceptions of exercise (Pros). In addition, the Pros, Cons, and decisional balance measure (Pros minus Cons) were found to be significantly associated with stage of exercise adoption. Researchers have compared the sum of the Pro, Con and Pro/Con scores across the stages of the change process (Marcus & Owen, 1992; Marcus, Rakowski, & Rossi, 1992). By using the decisional balance measure, the researchers were successful in differentiating between five groups representing the stages of change in the adoption of exercise. The sum of the Pros was lowest for the Pre-contemplators and the highest for those in Maintenance. The opposite was true of the Con scores. The significant imbalance of pros over cons appeared in the action group. Marcus, Rakowski, & Rossi (1992) appropriately characterized the usefulness of the decisional balance measure stating that "knowing participant's beliefs may

portend the degree of acceptance or reluctance encountered by attempts to produce behavioural change toward regular exercise behaviour.

Self-efficacy is the perception of one's ability to perform a task successfully (Bandura, 1977). It is a function of past learning and the judgement of the complexity or difficulty of the behaviour required. Bandura's theory places self-efficacy as a common cognitive mechanism for mediating motivation and behavior. Personal factors and personal attributes were thought to influence behaviour and efficacy cognitions were theorized to be reciprocally determined by that behaviour (Bandura, 1977). One's self-efficacy determines whether an individual attempts a given task, the degree of persistence when the individual encounters difficulties, and their ultimate mastery of the task. A low self-efficacy may lead to early attrition, whereas a high self-efficacy should strengthen future expectations (McAuley & Jacobson, 1992). The use of the self-efficacy construct appears to be related to the stages of change and has been successful in predicting exercise behaviour (McAuley, Courneya and Lettunich, 1991; Marcus, Selby, et al., 1992; McAuley, 1992; McAuley & Jacobson, 1992). Those in Pre-contemplation and Contemplation typically have low self-efficacy, whereas, those in Action and Maintenance have high self-efficacy.

Interventions based on self-efficacy have been reported to enhance exercise adherence and modify behaviour (McAuley, Courneya, Rudolph & Lox, 1994; Strecher, DeVellis, Becker & Rosenstock, 1986). McAuley et al., (1994), explored the function

of an efficacy-based information intervention on exercise adoption in sedentary, middle-aged males and females. Subjects were assigned to either an adherence-intervention group or an attention-control group. The efficacy-based intervention group had better adherence to the exercise program than did the control group. The authors found that by knowing one's self-efficacy they were able to predict exercise behaviour. However, the intervention did not have a direct effect on the participants' self-efficacy.

2 Objectives

The objective of this study was to examine self-efficacy and decision-making in relation to the stages of exercise change. The investigator hypothesized that there would be a difference in self-reported self-efficacy and decisional balance among individuals in the stages of exercise change.

3 Methodology

3.1 Participants

Three hundred students were randomly selected from first time freshmen who were living on campus. All selected students were mailed a letter describing the purpose of the study. Students were invited to participate in one of three sessions. After providing a brief description of the purpose of the study and the procedures involved, the researcher administered three questionnaires: Stages of

Exercise Adoption (SEA), Self-Efficacy Questionnaire, and Decisional Balance Questionnaire.

Initially, 50 of the 350 students contacted responded to the questionnaire, a 16% return rate. The researcher attributed bad weather and an inconvenient location to the low percentage of response. The researcher then contacted the remaining selected students by phone and offered an additional time to meet. This time, the researcher chose a more convenient location. An additional 124 participants completed the questionnaires. The final response rate was 57%.

3.2 Instruments

- *The Stages of Exercise Behavior Questionnaire (SEA) (Selby, 1989)*
The questionnaire was used to determine the present stages of readiness of exercise behaviour. The questionnaire included five statements designed to discriminate among the stages of change. Subjects were asked to answer either yes or no to each statement. This information was used to categorize subjects into one of the five stages of behaviour change via an algorithm designed to assess stage of exercise adoption in accordance with the method of Prochaska & DiClemente (1983). Reliability of the stages of exercise adoption measure has been examined by Marcus, Selby, et al., (1992) who reported the kappa index of reliability over a 2-week

period was .78 (N = 20). Concurrent validity for this measure has been demonstrated by its association with the Seven Day Recall Activity Questionnaire (Marcus & Simkin, 1993). This measure has also been shown to be significantly related to instruments measuring self-efficacy and decision making (Marcus & Owen, 1992; Marcus, Rakowski, & Rossi, 1992; Marcus, Selby, et al., 1992).

- *The Self-Efficacy Questionnaire* (Sallis, Pinski, Grossman, Patterson, & Nader, 1988)

The questionnaire was employed to measure confidence in one's ability to persist with exercising in various situations. The questionnaire contained five items that measured "resisting relapse" and seven items that measured "making time for exercise." Subjects were asked to indicate, on a 5-point Likert scale: (1) always; (2) often; (3) occasionally; (4) rarely; (5) never, how frequently each statement applied to them. The lower the sum of the scores on the Likert scale, the lower the self-efficacy. Internal consistency of this measure was reported to be 0.85 for the "resisting relapse" component and 0.83 for the "making time for exercise component" (Sallis, Pinski, Grossman, Patterson, & Nader, 1988) (Appendix A).

- *The Decisional Balance Questionnaire* (Marcus, Rakowski, Rossi, 1992)

The questionnaire contained sixteen questions designed to assess exercise

beliefs (Appendix B). Ten questions represented the positive beliefs (Pros) about exercise and six questions represented the negative beliefs or obstacles (Cons) of exercise. A decisional balance measure was created by subtracting the Cons from the Pros. Subjects were asked to indicate, on a 5-point Likert scale; (1) strongly agree (2) agree (3) unsure (4) disagree and (5) strongly disagree, how important each statement was with respect to their decisions to exercise, or not. Internal consistency for this measure was reported to be satisfactory (Cons = .70, Pros = .95) (Marcus, Rakowski, & Rossi, 1992). The lower the sum of the Pro scores the lower the perceived benefits, and the lower the sum of the Con scores the lower the perceived costs.

- *Data Analyses*

Frequency counts were used to determine the distribution of freshman students among the stages of adoption. Stage of exercise adoption was the independent variable, and self-efficacy and decisional balance were the dependent variables in the analysis. Scale scores were calculated for each subject on the self-efficacy measure. The scores are the un-weighted sum of the twelve items. A coefficient alpha was calculated for the self-efficacy scale to estimate internal consistency (Allen & Yen, 1979).

A one-way analysis of variance (ANOVA) was used to examine if there was a significant difference in self-efficacy among the stages of change. In addition, post hoc comparisons using the Newman Keuls procedure to determine which stages the self-efficacy measure was able to differentiate was employed. The researcher applied an ANOVA to determine if there was a difference in the self-efficacy scores of the active groups (Action, Preparation and Maintenance) and inactive groups (Pre-contemplation, Contemplation).

A one way analysis of variance was used to examine if there was a significant increase in the Pros scores and a significant decrease in the Cons scores between the stages of exercise adoption. In addition, the Decisional Balance measure was created by subtracting the Cons from the Pros. Scale scores were calculated for each subject on both the Pro and Con indices. The scores were the un-weighted sum of the 10 items composing the Pro scale and the 6 items composing the Con scale. Internal consistency was calculated for each scale to estimate reliability. The raw scores were converted to standardized T scores ($M = 50$, $SD = 10$) in order to provide a standard metric for use in further analysis. In addition, post hoc comparisons using the Newman Keuls procedure were applied to determine which stages the Pros, Cons and Decisional Balance indices were significantly different. This same procedure was applied to determine if there was a difference in decisional balance between the active and inactive groups. Although, the investigator assumed that there would be equal variance between the

five stages of change it should be noted that unequal cell numbers are common in non-experimental studies where the investigator uses survey data to make comparisons. When using ANOVA it is assumed that the five groups have equal variances. Based on this assumption, two groups may be statistically similar (not significantly different) when using a more conservative procedure. Therefore, it may be necessary to apply an unbiased estimate such as the Satterthwaite approximation (1946) where an approximate (i.e., lower) number of degrees of freedom are assigned so that an ordinary analysis of variance table can be used. The Satterthwaite approximation was not used in this study.

4. Results

4.1 Stage of Exercise Adoption

The stage of exercise adoption was assessed using the algorithm for determining stage of exercise behaviour originally developed for the assessment of smoking behavior (Prochaska & DiClemente, 1983). Subjects ($n = 174$) were classified into one of the five stages of exercise adoption: Pre-contemplation ($n = 7$, 4%), Contemplation ($n = 34$, 19.5%), Preparation ($n = 33$, 18.9%), Action ($n = 24$, 13.7%), and Maintenance ($n = 76$, 43.6%).

Self-Efficacy

For the twelve item self-efficacy measure, internal consistency was 0.89 ($n = 174$). Results revealed that total scores on self

efficacy items differentiated students at different stages $F(4, 169) = 33.42, p < .0001$. The proportion of variance explained by the model was .44, greatly exceeding Cohen's (1977) definition of a large effect size. Table 1 provides the means and standard deviations for all five groups and Table 2 presents the Newman Keuls post hoc comparisons of

scores. Pre-contemplators were significantly different from subjects in all other stages. A clear pattern emerged, with Pre-contemplators scoring the lowest and Maintainers scoring the highest on the self-efficacy measure, revealing that those in Maintenance had greater self-efficacy than those in the lower stages, Table

Table 1 Means and Standard Deviations on the Self-Efficacy Measure

Stage	Self-Efficacy
Pre-contemplation	21.28 (9.0)
Contemplation	33.70 (7.3)
Preparation	38.42 (8.4)
Action	42.04 (7.4)
Maintenance	46.27 (6.2)

Note: Standard deviations are given in parentheses

Table 2 Newman Keuls Post Hoc Comparisons for Self-Efficacy and Stages of Exercise Change

Newman Keuls Results		
Significant Differences ($p < .05$) Between:		
Pre contemplation	Contemplation	Preparation
	Preparation	Maintenance
	Action	
	Maintenance	

Note: $R^2 = .44; F(4,173) = 33.42 (p \leq .0001)$

Further results based on the Newman Keuls analysis, revealed that total scores on the self-efficacy items differentiated inactive students

(pre-contemplators and contemplators) from active students (preparers, actors and maintainers) $F(1, 172) = 69.81, p < .0001, r^2 =$

.29) (Table 4). The scores on the self-efficacy measure were significantly related to the stages of exercise behavior. This finding supports the work of DiClemente, Prochaska, & Gibertini, (1985) who found that Precontemplators and Contemplators had lower self-efficacy compared to those in Maintenance, although no clear differentiation between all stages was revealed.

4.2 Decisional Balance

A one way analysis of variance was used to examine the association among stages of exercise adoption and the Pros and Cons indices. In order to provide a standard metric, Pros and Cons indices were converted to T scores ($M = 50$, $SD = 10$). In addition, the decisional balance measure was created by subtracting Cons from Pros. Table 3 presents the T-score means and standard deviations by stage of exercise adoption.

Table 3 Means and Standard Deviations of the Pros, Cons, and Decisional Balance Scales by Stage of Exercise Change

Stage of Adoption					
STAGE	Pre-Contemplation	Templation	Prepar-Action	Templation	Maintenance
TPROS	41.07 (12.08)	44.84 (11.92)	49.39 (9.51)	49.12 (9.34)	53.65 (7.57)
TCONS	56.70 (9.91)	54.98 (7.69)	52.10 (10.95)	49.05 (6.86)	46.55 (10.06)
TDBAL	15.62 (9.30)	10.14 (15.66)	-2.71 (16.67)	0.07 (14.28)	-7.10 (14.99)

Note: Standard deviations are in parentheses.

Differences on the decisional balance measures by stage of exercise adoption were significant for the Pros, $F(4, 169) = 7.16$, $p < .0001$, $r^2 = .14$, Cons $F(4, 169) = 6.25$, $p < .0001$, $r^2 = .12$, and Decisional Balance $F(4, 169) = 10.4$, $p < .0001$, $r^2 = .19$. Coefficient alpha reliability (internal consistency) was .89 for the Pro scores and .78 for the Con scores.

Table 4 presents the results from the Newman Keuls analysis. Pre-contemplators were significantly different from subjects in all other stages but contemplation on the Pro measure, however, Pre-contemplators were only significantly different from the action and maintenance groups. A clear pattern emerged with Pre-contemplators scoring the lowest and

Maintainers scoring the highest on the decisional balance measure. Pre-contemplators had more negative beliefs about exercise than members of all other stages.

When comparing the active groups with the inactive groups, the total scores on

the Pros, Cons, and Decisional Balance items significantly differentiated the active and inactive students, Pros, $F(1, 172) = 19.99, p < .0001, r^2 = .10$; Cons, $F(1, 172) = 16.20, p < .0001, r^2 = .09$; Dbal, $F(1, 172) = 27.03, p < .0001, r^2 = .14$

Table 4 Newman Keuls Results for Pro, Con, and Decisional Balance Indices

Newman Keuls Results
Significant Differences ($p < .05$) Between:

Stage:	Precontemplation	Contemplation
PRO	Preparation Action Maintenance	Preparation Maintenance
CON	Action Maintenance	
DBAL	Preparation Action Maintenance	Maintenance

Note:

PRO	$r^2 = .14; F(4,169) = 7.16, p < .0001$
CON	$r^2 = .12, F(4,169) = 6.25, p < .0001$
DBAL	$r^2 = .19; F(4,169) = 10.4, p < .0001$

5. Discussion

The study was conducted to explore the cognitive and motivational aspects related to the progression through the stages of change in exercise. Self-efficacy and decisional balance of exercise are two underlying cognitions that have been identified as consistently discriminating individuals at

different stages of readiness (Marcus & Owen, 1992; Marcus, Rakowski, & Rossi, 1992). The self-efficacy and decisional balance measure reflected the hypothesized differences across the stages of exercise adoption.

5.1 Self-Efficacy

The primary interest in this study was to determine the association between the individual's self-efficacy and their exercise behaviour. The results derived from this study revealed that the self-efficacy measure significantly differentiated the stages of exercise behaviour. This measure reliably differentiated seven out of the ten possible pairings of stages. This finding supports the work of DiClemente et al., (1985) in the area of smoking and Marcus, Selby, et al. (1992) in the area of exercise, who found Pre-contemplators and Contemplators had the lowest scores on self-efficacy and those in Maintenance had the highest scores on the self-efficacy measure. The contrasts between the stages of preparation and action, and action and maintenance were statistically insignificant in this study. However, a perusal of the means from the preparation to maintenance stage (Table 2) shows that the trends for the self-efficacy construct were in the expected direction. It appears that individuals at various stages have different degrees of exercise-specific self-efficacy. This suggests that individuals at the different stages might benefit from interventions techniques that differ in their focus on enhancing self-efficacy expectations.

5.2 Decisional Balance

The Pro, Con, and Decisional balance scores were compared across the groups representing five stages in the change process:

Pre-contemplation, Contemplation, Preparation, Action, and Maintenance. The present study did not find that Pre-contemplators could be differentiated from participants in all other stages as did previous studies using the same measures (Marcus & Owen, 1992; Marcus, Rossi, et al., 1992; Marcus, Selby, et al., 1992). Five of the ten possible pairwise contrasts were significant for the Pros and only two of the possible pairwise contrasts were significant for the Cons. Four of the ten possible pairwise contrasts were significant for the decisional balance measure.

A number of limitations of this study should be noted. This research was based on a cross-sectional study that used self-report data, therefore, no objective information on actual exercise behaviour was utilized. However, the present results do provide some evidence that participants' reports of current exercise behaviour (i.e., stages of adoption) correspond to beliefs about favourable and unfavourable features (i.e., pros, cons, and decisional balance) and self-efficacy.

Secondly, the self-efficacy and decisional balance questionnaires used a Likert-scale format, where equal response intervals were assumed. In addition, the Likert scale data is discrete rather than continuous. This study utilized ANOVA, which assumes data is continuous and normally distributed. Other statistical methods could have been employed which would have recognized the discontinuous and non-normally distributed data.

Finally, use of the ANOVA with the Trans theoretical Model of Behavioural Change may have been inappropriate due to

the framework of the model. The TMBC describes cyclical movement between the stages of change; therefore, a person may have been in between a stage. An analysis of variance assumes that there is a definite position and that movement is linear. In a longitudinal design, where movement is studied, the use of an ANOVA may not adequately describe change. Analysing the TMBC in this way has been scrutinized, however, presently a more appropriate method has not been revealed.

6. Conclusion

It appears that students at various stages have different degrees of self-efficacy and decisional balance. This suggests that individuals at the different stages might benefit from interventions that differ in their focus on enhancing efficacy expectations and the awareness of the benefits (Decisional balance) of exercise. The combination of the decisional balance, self-efficacy and stages of change models appears to offer a powerful tool for relating three important elements (stage of exercise adoption, self-efficacy, and decisional balance) in an integrated theory of how change occurs naturally, and how it could be facilitated through specialized interventions. Specifying relationships among constructs may facilitate a more integrated and systematic understanding of a complex behaviour such as exercise.

The self-efficacy measure and decisional balance measures reflected the hypothesized differences across stages of exercise adoption indicating differential use of

these constructs across the five stages of change. These findings are consistent with the work of Marcus, Rakowski and Rossi (1992) and Marcus, Selby et al. (1992). The results of this study may have implications for exercise behaviour in other college populations. If the present findings are replicated in longitudinal investigations, physical educators may be assisted in designing and testing specific interventions to help students move more quickly from one stage of exercise adoption to another. Perhaps the most important application of this model is that it may allow educators to use stage specific strategies that will work best for students at different levels of exercise participation. Development of more successful interventions, in turn, will help us reach the goals of increasing the level of physical activity of young adults in the United States and attaining the fitness objectives that have been established for the year 2000 (U.S. Department of Health and Human Services, 1991).

Wellness Specialist will motivate all adults including those with chronic disease to be active daily and will emphasize family and community involvement, will address social norms of society with regard to healthy lifestyles. The Wellness Specialist will prescribe physical activity; recommend community involvement and social engagement of clients. He or she will also advocate for professional designation and employment of exercise therapists at every community and provide additional training and designation to those who are already serving in the similar roles. Finally, it will also foster strong health beliefs and value in all citizens, not just those

who are ill, frail and elderly, to voluntarily take an active role in protecting, maintaining, and improving their health, at the same time, sanitizing them to critical and moral issues that confront our society.

7. References

- Allen, M. J., & Yen, W. M. (1979). *Introduction to measurement theory*. Monterey, CA: Brook/Cole.
- American College of Sports Medicine. (1995). *ACSM S Guidelines for Exercise Testing and Prescription (5th ed.)*. Baltimore, MD: Williams & Williams.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychology Review*, 215.
- Blair, S. N., Kohl, H. W., Barlow, C. E., & Gibbons, L. W. (1991). Physical fitness and all-cause mortality in hypertensive men. *Annals of Medicine*, 23, 307-312.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences (rev. ed.)*. New York: Academic Press.
- DiClemente C. C., Prochaska, J. O., & Gibertini, M. (1985). Self-efficacy and the stages of self-change of smoking. *Cognitive Therapy and Research*, 9(2), 181-200.
- Dishman, R. K. (1994). The measurement conundrum in exercise adherence research. *Medicine and Science in Sports and Exercise*, 1382-1390.
- Janis, I. L., & Mann, L. (1977). *Decision Making: A psychological analysis of conflict, choice and commitment*. New York, NY: Free Press.
- Katz, S., Branch, L. G., Branson, M. H., Papsidero, J. A., Beck, J. C., & Greer, D. S. (1983). Active life expectancy. *New England Journal of Medicine*, 309, 1218-1224.
- King, A. C., Taylor, C. B., Haskell, W. B., & DeBusk, R. F. (1989). Influence of regular aerobic exercise on psychological health: A randomized controlled trial of healthy middle-aged adults. *Health Psychology*, 8, 305-324.
- Krejčí, M. (2013) Self-transformation process in wellness and health education. *Procedia Social and Behavioral Sciences*, 2(3) 706-719 ISSN 2146-7358.
- Krejčí, M. (2011) *Výchova ke zdraví – strategie výuky duševní hygieny ve škole/Health Education -Strategies of mental hygiene teaching at school*. České Budějovice: Jihočeská univerzita.
- Krejčí, M. (1993) Positive influences of yoga exercises for the adolescents. In: *Medicine and Mind*, 1994, VIII, 2-IX, p. 143-153.
- LaPorte, R. E., Adams, L. A., Savage, D. D., Brenes, G., Dearwater, S., & Cook, T. (1984). The spectrum of physical activity, cardiovascular disease and health: An epidemiologic perspective. *American Journal of Epidemiology*, 120, 507-517.
- Maheshwarananda, P. S. (2001) *Yoga in daily Life – The System*. Wien: University Verlag.
- Marcus, B. H., Banspach, S. W., Lefebvre, R. L., Rossi, J. S., Carleton, R. A., & Abrams, D. B. (1992). Using the stages of change model to

increase the adoption of physical activity among community participants. *American Journal of Health Promotion*, 6, 424-429.

Marcus, B. H., Eaton, C. A., Rossi, J. S., & Harlow, L. L. (1994). Self-efficacy, decision-making and stages of change: A model of physical exercise. *Journal of Applied Social Psychology*, 6, 489-508.

Marcus, B. H., & Owen, N. (1992). Motivational readiness, self-efficacy and decision-making for exercise. *Journal of Applied Social Psychology*, 22, 3-16.

Marcus, B. H., Rakowski, W., & Rossi, J. S. (1992). Assessing motivational readiness and decision-making for exercise. *Health Psychology*, 11(4), 257-261.

Marcus, B. H., Rossi, J. S., Selby, V. C., & Niaura, R. S., & Abrams, D. B. (1992). The stages and processes of exercise adoption and maintenance in a worksite sample. *Health Psychology*, 11, 257-261.

Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport*, 63(1), 60-66.

Marcus, B. H., & Simkin, L. R. (1993). The stages of exercise behavior. *Journal of Sports, Medicine and Physical Fitness*, 33(1), 83-88.

Martinsen, E. W. (1990). Benefits of exercise for the treatment of depression. *Sports Medicine*, 9(6), 380-389.

McAuley, E. (1992). The role of efficacy cognitions in the prediction of exercise behavior in middle-aged adults. *Journal of*

Behavioral Medicine, 15(1), 65-68.

McAuley, E., Courneya, K. S., Rudolph, D. L., & Lox, C. L. (1994). Enhancing exercise adherence in middle-aged males and females. *Preventive Medicine*, 23(4) 498-506.

McAuley, E., & Jacobson, L. (1991). Self-efficacy and exercise participation in sedentary adult females. *American Journal of Health Promotion*, 5, 185-191.

O'Connell, D., & Velicer, W. F. (1988). A decisional balance measure and the stages of change model for weight loss. *International Journal of the Addictions*, 23(7), 729-50.

Powell, K. E., Thompson, P. D., Casperson, C. J., & Kendrick, J. S. (1987). Physical activity and the incidence of coronary heart disease. *Annual Review of Public Health*, 8, 253-287.

Prochaska, J. O., & DiClemente, C. C. (1983). Stages and Processes of self-change in smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51, 390-395.

Prochaska, J. O., Velicer, W. F., Rossi, J. S., Goldstein, M. G., Marcus, B. H., Rakowski, W., Fiore, C., Harlow, L. L., Redding, C. A., Rosenbloom, D., & Rossi, S. R. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology*, 13, 39-46.

Prochaska, J. O., Velicer, W. F., DiClemente, C. C., & Fava, J. (1988). Measuring processes of change: Application to the cessation of smoking. *Journal of Consulting and Clinical Psychology*, 56, 520-528.

Sallis J. F., Pinski, R. B., Grossman, R. M.,

Patterson, T. L. & Nader, P. R. (1988). The development of self-efficacy scales for health related diet and exercise behaviors. *Health Education Research*, 3(3), 283-292.

Satterthwaite, F. E. (1946). *Biomedicine Bulletin*, 2, 110.

Stretcher, V. J., DeVellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. *Health Education Quarterly*, 13, 73-91.

Williams, L. R., Ekers, M. A., Collins, P. S. & Lee, J. F. (1991). Vascular rehabilitation: benefits of a structured exercise/risk modification program. *Journal of Vascular Surgery*, 14 (3), 320-326.

U. S. Department of Health and Human Services. (1991). *Healthy People 2000. National Health Promotion and Disease Prevention Objectives*. Washington, DC: U. S. Government Printing Office.

U. S. Department of Health and Human Services. (1996). *Healthy People 2000. Midcourse Review and 1995 Revisions*. London, England: Jones and Bartlett Publishers.

WHO (2000) *World health report 2000. Health Systems: Improving Performance*. Geneva: WHO. Available on: http://www.who.int/healthpromotion/about/HPRGlossary_NewTerms.pdf

8. Appendix

8.1 Appendix A

Self-Efficacy Questionnaire

1. Stick to your exercise program when your friends are demanding more time from you.
2. Stick to your exercise program when you have chores to attend to.
3. Stick to your exercise program when social obligations are time consuming.
4. Read or study less in order to exercise more.
5. Get up early, even on weekends to exercise.
6. Exercise after a long day at school or work.
7. Exercise even though you are feeling depressed.
8. Exercise while it is cold, humid or hot.
9. Exercise even though you are feeling tired.
10. Set aside at least 30 minutes, three times a week for exercising.
11. Continue to exercise with others even though they are too fast or too slow for you.
12. Stick to your exercise program when undergoing a stressful life change.

8.2 Appendix B

Decisional Balance Questionnaire

1. I would have more energy for my family and friends if I exercised regularly.
2. Regular exercise would help me relieve tension.
3. I would feel more confident if I exercised regularly.
4. I would sleep more soundly if I exercised regularly.
5. I would feel good about myself if I kept my commitment to exercise regularly.
6. I would like my body better if I exercised regularly.
7. It would be easier for me to perform routine physical tasks if I exercised regularly.
8. I would feel less stressed if I exercised regularly.
9. I would feel more comfortable with my body if I exercised regularly.
10. Regular exercise would help me have a more positive outlook on life.
11. I think I would be too tired to do my daily work after exercising.
12. I would find it difficult to find an exercise activity that I enjoy that is not affected by bad weather.
13. I feel uncomfortable when I exercise because I get out of breath and my heart beats very fast.
14. Regular exercise would take too much of my time.

15. I would have less time for my family and friends if I exercised regularly.

16. At the end of the day, I am too exhausted to exercise

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