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ORIGINAL ARTICLE

Evaluating the decisional balance construct of the Transtheoretical Model: are two dimensions of pros and cons really enough?

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Abstract
Objectives The Transtheoretical Model of behavior change (TTM) postulates that behavior change is a process involving progress through five distinct stages of change (SOC). One of the key components for progress to a later stage is decisional balance (pros and cons of changing to the target behavior). The goal of the present study is to test the two dimensions of decisional balance as postulated in the TTM in the context of exercising behavior.
Methods The analyses are based on data from an online survey of 266 freshman students at the University of Zurich; participants self-reported their frequency of exercising and their weighing of the importance of 49 pros and cons of exercising.
Results The results indicate that a two-dimensional solution of decisional balance is insufficient. The analysis of pros and cons of exercising yielded a seven-factor solution with in part different progressions through the SOC.
Conclusions With the subdivision into different pros and cons, intervention programs can be developed that better match the needs of participants in terms of fostering and decreasing the most important pros and cons of exercising.

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Keywords Decisional balance · Transtheoretical model · Exercise · Pros · Cons · Behavior change

Introduction

Regular physical activity lowers the risk of widespread health problems, such as overweight, cardiovascular disease, stroke, type 2 diabetes, colon and breast cancer, osteoporosis and back pain, and strengthens the immune system. Regular exercise also improves mental well-being, promotes better sleep and contributes to mobility and independence in older age (Sallis and Owen 1999; Fuchs 2003; Swiss Federal Statistical Office 2005; Cavill et al. 2006). Despite all these advantages, many people still engage in little leisure-time physical activity (Schoenborn et al. 2004).

A number of theories and models of behavior change offer starting points for remedying people's insufficient levels of physical activity. One is the Transtheoretical Model (TTM) (Prochaska and DiClemente 1983), which was originally developed for use with smoking cessation. It is also a useful instrument for classifying willingness for changing behavior in the areas of exercising and sports activity (Marcus et al. 1992). The TTM postulates five distinct, sequential stages of change (SOC) (Prochaska et al. 1997). Precontemplation is the stage in which people have no intention of changing a problem behavior within the next 6 months. Contemplation is the stage in which people intend making a behavior change within the next 6 months. Preparation is the stage in which persons have a serious intention to achieve the target behavior within the next 30 days and have already undertaken initial steps to achieve this. Action is the stage after people have already achieved the target behavior for more than 1 day and for

less than 6 months. Maintenance is the stage in which people have been able to maintain the desired behavior for more than 6 months (Prochaska et al. 1997). According to the TTM, to progress from one stage to the next, different processes of change are applied. At the higher order structure, these strategies/activities can be subdivided into experiential processes (cognitive–affective) and behavioral processes (Prochaska et al. 1997). Progressing through the stages is also decisively influenced by the core constructs of self-efficacy (Bandura 1997) and decisional balance.

Decisional balance is based on the decision-making model by Janis and Mann (1977). It proposes four categories each for pros and cons (gains/losses for self or significant others, self-approval/disapproval or approval/disapproval from significant others). Although their model proposed eight dimensions of pros and cons for behavior change, the simple structure of two dimensions, pros (perceived advantages) and cons (perceived disadvantages) is held to be sufficient (e.g. Marcus et al. 1992; Prochaska et al. 1997). This two-factor model was replicated for 12 different behavior areas (including smoking cessation, sunscreen use, exercise acquisition; Prochaska et al. 1994).

Figure 1 shows that the pros of a healthy behavior increase from the Precontemplation to the Action stage, whereby mainly the increase from the Precontemplation to the Contemplation stage is important. At the same time, the cons of the target behavior decrease, particularly after the Preparation stage (initialization of an action) (Prochaska et al. 1997).

Jordan et al. (2002) examined the dimensionality of decisional balance. They found at first seven factors and suspected that the multi-factor solution would be more suitable for interventions. Nevertheless, in their further studies they put the main emphasis on the two-factor solution, pros and cons.

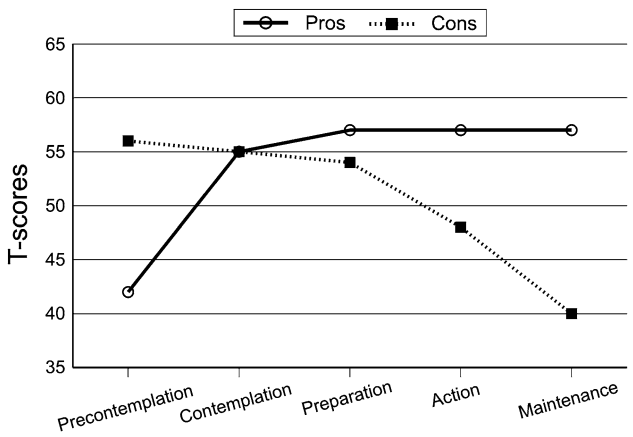

Fig. 1 Idealized progression of pros and cons across the stages of change for a healthy behavior such as exercising

Myers and Roth (1997) conducted several investigations and compared one-, two-, four-, six- and eight-factor models of the perceived pros and cons of exercising. They concluded that their eight-factor model (pros factors: psychological, body image, health, social; cons factors: time/effort, social, physical, specific) yielded the best fit to the raw data and that the division into subscales allowed better identification of subtle differences between the stages of change. For the behavioral area of exercising, the present study aims to check the dimensionality of decisional balance postulated in the TTM.

Method

Study design and sample

Data were collected by an online longitudinal survey of incoming students at the University of Zurich, Switzerland, in the fall semester of 2007. The survey was administered to the participants nine times (every 14 days) between August and December 2007. The present study uses the data from the baseline (T1) and the last measurement (T9).

In response to the call for participation in this study, 573 of the 2,230 incoming students (25.7%) read the information on the study, and 294 (13.2%) volunteered to participate. After excluding questionnaires that were filled out incompletely at T1 and/or T9, 266 students (196 women and 70 men) made up the final sample. Their mean age was 21.3 years (SD = 5.05, minimum = 17, maximum = 55).

Measures

Frequency of exercising

Participants were asked how often per week they engaged in the following activities: jogging, walking, fast bicycling, swimming, strength training, gymnastics or aerobics, dancing, team sports (such as soccer, volleyball and so on), walking, hiking, slow bicycling, yoga, going shopping on foot, taking the stairs instead of the elevator or walking instead of taking a tram. The questionnaire also allowed participants to list any other physical activities that they had engaged in. In addition to frequency, participants also stated the average length of time spent doing each physical activity. Persons were classified as physically active, if they engaged in exercising (fitness machines, dancing, gymnastics, strength training, riding and more), team sports (soccer, volleyball and so on) and/or competitive sports (such as martial arts) for at least 60 min per week. As there are no uniform international recommendations concerning frequency, duration and intensity of physical and sports

activity (Cavill et al. 2006), the present study used the recommendation issued by the Swiss Federal Office for Sport, Federal Office of Public Health, and Network HEPA Switzerland (2006) to "exercise at moderate intensity for 20 min at least three times per week."

Intention

To capture intention to exercise in the next 14 days, following Sniehotta et al. (2005), we used the item "I intend to exercise (jog, swim, bicycle, do gymnastics, etc.) in the next 14 days" with a 7-point response scale from "not true" to "very true" ($M = 5.59$; SD = 1.86). The time interval of 2 weeks was chosen based on the interval between the measurements.

Stages of change

Following the TTM, the sample was divided into three groups based on the responses for frequency of exercising and for intention. Physically inactive students were divided into a group that had no intention of exercising in the next 14 days (Precontemplation stage) and a group that intended to or already planned to be physically active (Contemplation/Preparation stage). The third group included all students who were already exercising (Action/Maintenance stage). When assigning participants to the stages, the usual staging algorithms based on arbitrary time periods were not used for two reasons: first, the arbitrary time criteria are one of the main points of criticism of the TTM (Sutton 2001); second, due to the 14-day intervals between the points of measurement of the study, the time criteria "30 days" and "6 months" from the original TTM algorithm were not applicable to the present study. Differentiation into five groups was not possible due to the unequal distribution among the SOC.

Assigning the students to the TTM stages based on their physical activity and intention to exercise resulted in 34 persons (12.8%) in the Precontemplation stage, 55 (20.7%) in the Contemplation/Preparation stage and 152 (57.1%) in the Action/Maintenance stage. There were also students who were physically active in the preceding week, but who had no intention of continuing exercising in the next 14 days. These 25 students (9.4%) were excluded from the estimation of construct validity, as it was not clear whether these persons had relapsed to the precontemplation stage or were just not able to exercise in the next 2 weeks for certain reasons (such as vacation, injury).

Decisional balance

The perceived pros and cons of physical activity were captured by means of 49 items (32 pros and 17 cons), which included items taken from the German language translation by Basler et al. (1999) of the Decisional Balance Scale, the decisional balance items in Marcus et al. (1992), the exercise benefits/barriers scale (EBBS) by Sechrist et al. (1987), and some items self-constructed for the present study. The participants weighed the importance of pros and cons on a 7-point response scale ranging from 1 (very true) to 7 (not at all true). In the original construct, the response format expects the participants to indicate the importance that the listed arguments have on their decision to perform physical activity (from "not important" to "extremely important"). As this importance rating does not match with the item wording of the German version of the Decisional Balance Scale, we changed the response format as described above instead of changing the item wording itself. This, however, should be taken into account when comparing the results of our study with studies that administered the importance rating.

Statistical analyses

The data were analyzed using SPSS (Version 15). Principal component analysis with varimax rotation with the pros and cons items at both points of measurement T1 and T9 was used to determine the dimensionality of the Decisional Balance Scale. T9 was included in the analysis to test whether the same dimensions were found at both points of measurement.

Using Cronbach's alpha and item analysis (discriminatory power), the scales were tested for internal consistency as a measure of reliability. Differences in the means were tested using ANOVA. We used Scheffé's (equal variances) and Tamhane's (non-equal variances) post hoc tests ($P < 0.050$) and Eta squared (η^2) as a measure of effect size. Eta squared can be interpreted as follows: 0.01 = small effect size, 0.06 = medium effect size and 0.16 = large effect size (Bortz 1999).

Results

When all 49 items of the Decisional Balance Scale are divided into the two dimensions pros and cons, the idealized progression shown in Fig. 1 can be replicated in the present study. After excluding three items due to low item-total correlation ($r_{it} < 0.3$), the two dimensions show good reliability (pros $\alpha = 0.93$; cons $\alpha = 0.81$).

Table 1 lists the means and standard deviations of the raw and T-transformed values ($M_T = 50$, $SD_T = 10$). The formula for the T-transformation is the following:

T-score for person 'i' = $M_T + SD_T \times z_i$ (z-score for person 'i')

$z_i = (\text{raw value}_i - M_i)/SD_i$

Table 1 Means of the raw score values and the T-score values of the pros and cons scales (University of Zurich, 2007)

Groups	Precontemplation	Contemplation/ preparation	Action/ maintenance
N	34	55	152
Pros			
M_{raw}	4.12	5.03	5.29
SD	0.87	0.75	0.76
M_T	40.23	50.40	53.35
Cons			
M_{raw}	3.01	2.71	2.44
SD	1.12	0.67	0.72
M_T	55.62	51.76	48.40

As Table 1 shows, the raw scores of the pros are always higher than that of the cons. The reverse is true for the T-scores, as a result of the T-transformation, in the Precontemplation and Contemplation stage. The visible crossover of the idealized progressions emerges consequently only after T-transformation of the raw values (Fig. 2). Through these linear transformations, the progressions on the *x*-axis do not change, but shift on the *y*-axis and cross over.

Most studies compare the courses of the pros and cons across the stages using only the T-scores and interpret the analysis showing that: in Precontemplation, the cons outweigh the pros; in the Contemplation (Basler et al. 1999) or Preparation (Marcus et al. 1992) stage, there is a balance; and in the Action and Maintenance stages, the pros outweigh the cons. However, this interpretation is questionable, since the observed raw scores in the present study and also in the study by Basler et al. (1999) show the cons to be lower than the pros in all stages. Also, Nigg and Courneya (1998) mention that when designing an intervention, it is better to look at the raw scores. Their reason is, again, the shift in the balance found in their study. For this reason, for further examination of the dimensionality, we used the raw scores in the present study.

Dimensionality of decisional balance

Both at T1 and T9, seven factors yield the best fit to the raw data (explained variance at T1 66.12%; at T9 71.56%). Twelve items had to be excluded, because they had factor loadings lower than 0.4 and also considering that content could not be unambiguously assigned to one factor.

Four of the seven factors portray different pros dimensions (that is, they are made up of pros items), and the other three portray different cons dimensions (that is, they are made up of cons items). Tables 2 and 3, separately for pros and cons, show the factor loadings of the items and the eigenvalues and factor loadings for each factor at T1. To aid clarity, the tables do not show the statistical values at T9, which were almost identical.

The first factor consists of advantages of exercising that have an effect on mental/emotional well-being; the items of the second factor are all pros concerning physical fitness and health. Factor 3 contains pros that have to do with physical appearance and attractiveness. The items in factor 4 are advantages that arise through exercising with regard to social contacts with other persons.

Factors 5 through 7 contain perceived disadvantages of exercising. The items in factor 5 describe material, organizational and social costs. The sixth factor has to do with uncomfortable side effects that can result due to exercising.

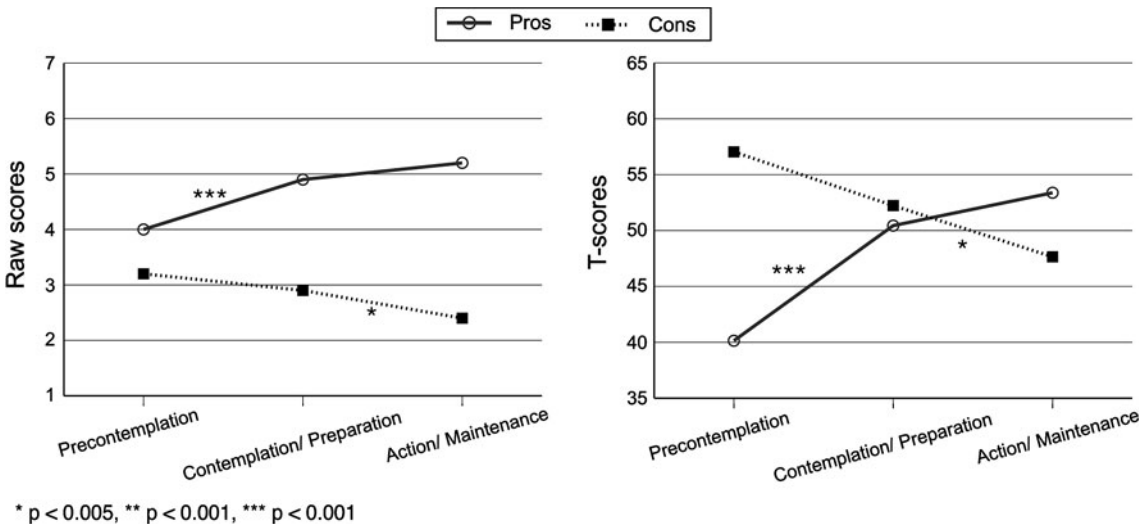

Fig. 2 Course of the pros and cons scales across the stages of change for exercising (raw scores and T-transformed scores)

Table 2 The four pros factors, after varimax rotation with T1 ($n = 266$) and ranked by explained variance at T1 (University of Zurich, 2007)

Item		Factor loading			
If I exercise…		1	2	3	4
1	…I feel better afterwards.	**0.834**	0.029	0.150	0.023
2	…it's fun.	**0.761**	0.061	−0.097	0.296
3	…I feel less stressed and tense.	**0.850**	0.088	0.022	0.111
4	…I feel more relaxed.	**0.842**	0.114	0.014	0.043
5	…my well-being improves.	**0.854**	0.158	0.116	0.012
6	…my mood improves.	**0.869**	0.120	0.099	−0.020
7	…studying is easier.	**0.738**	0.118	0.100	0.015
8	…I can concentrate better.	**0.735**	0.144	0.088	0.009
9	…I can work to my limits.	**0.674**	0.171	0.021	0.193
10	…I can let off steam.	**0.682**	0.134	-0.092	0.280
11	…my mental health improves.	**0.695**	0.286	0.107	0.163
12	…I have the feeling that I have accomplished something.	**0.532**	0.274	0.267	0.128
13	…it's good for my health.	0.338	**0.651**	0.128	−0.045
14	…my flexibility improves.	0.193	**0.750**	0.115	−0.018
15	…I am preventing cardiovascular disease.	0.108	**0.826**	0.136	0.038
16	…I increase muscle strength.	0.153	**0.803**	0.151	0.075
17	…I am preventing high blood pressure.	0.032	**0.727**	0.085	0.101
18	…my fitness improves.	0.238	**0.782**	0.088	0.003
19	…I am more attractive to others.	0.141	0.202	**0.811**	0.124
20	…I can get rid of my bodily flaws.	0.062	0.129	**0.878**	−0.058
21	…I can achieve my ideal weight.	0.101	0.115	**0.805**	0.003
22	…I get well-shaped muscles.	0.121	0.381	**0.630**	0.113
23	…I do more with other people.	0.163	0.034	−0.051	**0.862**
24	…I have more contact with people that I like.	0.331	0.029	0.058	**0.787**
25	…I will be accepted more by others.	0.011	0.035	0.398	**0.566**
26	…I meet new people.	0.167	0.075	0.029	**0.839**
	Eigenvalues T1	7.71	4.00	2.94	2.77
	Explained variance T1 (%)	20.82	10.81	7.96	7.48
	Eigenvalues T9	8.51	4.32	3.12	2.77
	Explained variance T9 (%)	23.01	11.66	8.41	7.49

The items answered by the participants were in German; they are shown here in English. Boldface indicates highest factor loadings

F1 well-being, *F2* health, *F3* appearance, *F4* social contacts

Factor 7 contains two items indicating that exercising can be exhausting.

Separately for the seven subscales, item analyses were calculated at T1 to determine item total correlation (r_{it}) and internal consistency (Cronbach's alpha) (Table 4). These were all satisfying.

Moreover, Table 5 indicates that the different subscales correlate significantly. Effect sizes of these associations, however, are small to moderate.

Construct validity

Table 6 presents an overview of the means, standard deviations and results of the univariate analyses of variance with post hoc tests and effect sizes (η^2).

Figure 3 shows the course of the four pros subscales across the stages of change for exercising. For the Well-being subscale, perceived pros increase significantly [$F(2,238) = 41.19$, $P < 0.010$] from stage to stage, with an effect size of $\eta^2 = 0.26$. For the Health subscale, the participants weight the pros as significantly more important in the Contemplation/Preparation and Action/Maintenance stages [$F(2,238) = 8.09$, $P < 0.010$] than they do in the Precontemplation stage (no significant difference, however, emerged between the Contemplation/Preparation and Action/Maintenance stage). For the Appearance subscale, the pros increase from the Precontemplation to the Contemplation/Preparation stage and also from the Contemplation/Preparation stage to the Action/Maintenance stage, but only the difference from the first to the third group is significant [$F(2,238) = 3.64$, $P < 0.050$]. The course of the Social Contacts subscale shows a slight increase from the Precontemplation to the Contemplation/Preparation stage and from the Contemplation/Preparation

Table 3 The three cons factors, after varimax rotation with T1 ($n = 266$) and ranked by explained variance at T1 (University of Zurich, 2007)

Item		Factor loading		
If I exercise…		5	6	7
27	…I feel tired.	0.021	0.086	**0.839**
28	…I feel exhausted.	0.094	0.063	**0.825**
29	…it costs a lot of money.	**0.599**	0.208	−0.112
30	…it takes a lot of effort to organize it each time.	**0.659**	0.075	−0.110
31	…it costs me a lot of time every time.	**0.764**	0.021	0.060
32	…I think I look funny in exercise clothes.	0.073	**0.767**	0.065
33	…I get smelly.	0.073	**0.604**	0.308
34	…I have less time for others in my life.	**0.730**	0.163	0.198
35	…I don't have enough time for my friends.	**0.781**	0.104	0.087
36	…I feel embarassed.	0.154	**0.786**	0.017
37	…others think I'm dumb.	0.256	**0.682**	−0.142
	Eigenvalues T1	2.77	2.29	1.99
	Explained variance T1 (%)	7.48	6.19	5.39
	Eigenvalues T9	3.36	2.56	1.81
	Explained variance T9 (%)	9.08	7.01	4.90

The items answered by the participants were in German; they are shown here in English. Boldface indicates highest factor loadings

F5 costs, *F6* discomfort, *F7* exhaustion

Table 4 Statistics and reliability of the subscales at T1

Subscales	Number of items	*M*	SD	α	r_{it}		Range of values (empirical)
					Min.	Max.	
Well-being	12	5.26	1.18	0.942	0.558	0.833	1.00–7.00
Health	6	5.59	1.05	0.864	0.598	0.774	1.50–7.00
Social contacts	3	3.58	1.61	0.855	0.667	0.783	1.00–7.00
Appearance	4	4.31	1.46	0.852	0.610	0.773	1.00–7.00
Discomfort	4	2.03	0.94	0.689	0.416	0.600	1.00–7.00
Exhaustion	2	3.80	1.53	0.855	0.747	0.747	1.00–7.00
Costs	5	2.51	1.05	0.766	0.492	0.597	1.00–6.40

Table 5 Inter-correlations of the subscales at T1

		1	2	3	4	5	6	7
1	Well-being	–						
2	Health	0.38**	–					
3	Appearance	0.22**	0.41**	–				
4	Social contacts	0.34**	0.15*	0.13*	–			
5	Costs	−0.15*	0.06	0.19**	0.10	–		
6	Discomfort	−0.21**	−0.02	0.14*	−0.03	0.34**	–	
7	Exhaustion	−0.31**	−0.06	−0.01	−0.08	0.16*	0.22**	–

* $P < 0.050$, ** $P < 0.010$, *** $P < 0.001$

to the Action/Maintenance stage. But only the differences between the Precontemplation and Action/Maintenance stage, and the Contemplation/Preparation and Action/Maintenance stage are significant [$F(2,238) = 6.89$, $P = 0.007$ and $P = 0.037$].

The course of the cons subscales are shown in Fig. 4. The Costs decrease slightly across all of the stages of change; however, the differences across the stages are not significant. The Discomfort subscale shows a decrease from the Precontemplation to the Contemplation/Preparation stage and again a slight difference from the Contemplation/Preparation to the Action/Maintenance stage; however, only the difference between Precontemplation and Action/Maintenance stages is significant [$F(2,238) = 4.56$, $P = 0.044$]. For Exhaustion, there is a decreasing tendency, but not significant difference from the first group to the second. The differences in the means between Precontemplation and Contemplation/Preparation as well as between Contemplation/Preparation and Action/Maintenance are statistically significant [$F(2,238) = 5.24$, $P = 0.045$ and $P = 0.034$].

Discussion

The aim of this study was to examine whether two dimensions of decisional balance, as postulated in the TTM (Prochaska and DiClemente 1983), suffice for the behavior

Table 6 Means, standard deviations and univariate analyses of variance with post hoc tests and effect sizes

Groups	1		2		3		ANOVA		Post hoc	η^2
Variables	*M*	SD	*M*	SD	*M*	SD	*F* (2, 238)	*P*		
Well-being	4.03	1.18	5.21	1.08	5.71	0.90	41.193	0.000	1 < 2 < 3*	0.257
Health	5.07	1.10	5.94	0.95	5.68	1.00	8.092	0.000	1 < 2, 3	0.064
Appearance	3.77	1.52	4.43	1.48	4.48	1.36	3.636	0.028	1 < 3; 1 = 2; 2 = 3	0.030
Social contacts	2.95	1.44	3.25	1.42	3.89	1.65	6.886	0.001	1, 2 < 3	0.055
Costs	2.92	1.41	2.65	0.91	2.39	1.00	4.057	0.019	1 = 2 = 3*	0.033
Discomfort	2.5	1.16	2.05	0.94	1.96	0.88	4.556	0.011	1 = 2; 2 = 3; 1 > 3*	0.037
Exhaustion	4.25	1.56	4.15	1.39	3.54	1.53	5.240	0.006	1, 2 > 3	0.042

Group 1 precontemplation, *group 2* contemplation/preparation, *group 3* action/maintenance

* Levene's test is significant, therefore Tamhane's post-hoc test

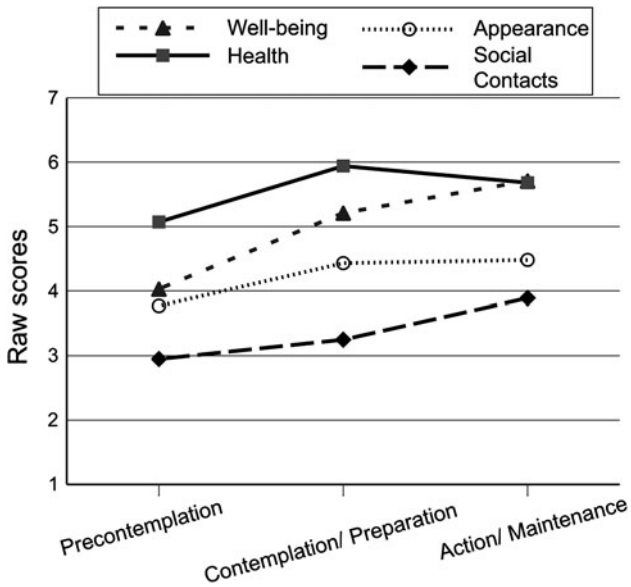

Fig. 3 Course of the four pros subscales (Well-being, Health, Appearance, Social Contacts) across the stages of change for exercising

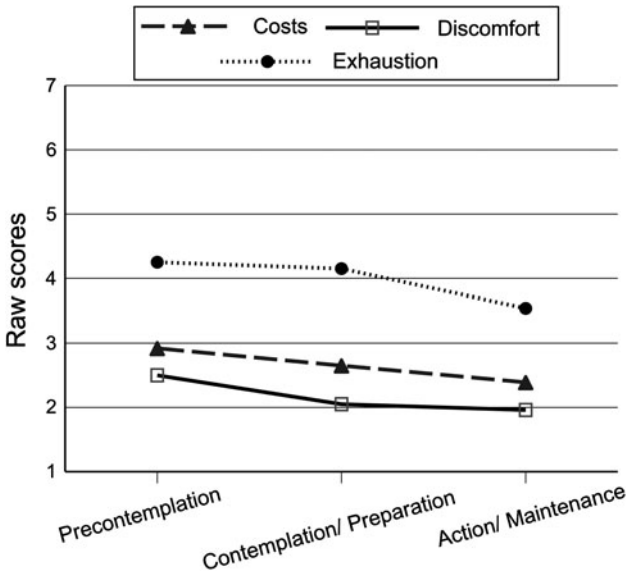

Fig. 4 Course of the three cons subscales (Costs, Discomfort, Exhaustion) across the stages of change for exercising

of exercising or whether the decisional balance construct has more than two dimensions.

The two-dimensional structure of the pros and cons as used most often in literature could be replicated. But for interventions, it is important to further differentiate between the dimensions (Prochaska et al. 1994; Jordan et al. 2002) to effectively break down barriers to physical activity in a targeted fashion, on one hand, and to promote the pros of exercising, on the other.

Seven dimensions were identified through factor analysis, with the four factors Well-being, Health, Social Contacts and Appearance containing perceived advantages and the three factors Discomfort, Exhaustion and Costs (material, organizational, social) containing perceived disadvantages of engaging in physical activity. The four pros subscales all show good to high internal consistency. Of the cons subscales, Exhaustion shows good internal consistency, and Discomfort and Costs show sufficient internal consistency. These dimensions are in line with the subscales proposed by Myers and Roth (1997).

Most of the seven subscales identified deviate from the idealized courses of the pros and cons across the stages of change. This suggests that the two-dimensional variant of decisional balance is insufficient for interventions. The different areas appear to have differing importance in the various stages of change and should be considered separately in the development of interventions. For instance, the total pros scale reveals no significant differences between the Contemplation/Preparation and Action/Maintenance stages. Examination of the pros subscales, however, shows

that the pros of Well-being continue to increase across all stages of change and that the pros of Social Contacts gain importance only starting in the Contemplation/Preparation stage.

The total cons scale shows that the cons decrease in importance only from the Contemplation/Preparation stage to the Action/Maintenance stage. If the cons are subdivided into different areas, however, the factor Costs remains constant across all of the stages of change. The Discomfort scale changes only between the Precontemplation stage and the Action/Maintenance stage, whereas the Exhaustion due to exercising scale decreases only in the group of physically active students. On the one hand, this could be an indication that the direction of the effect between decisional balance and stage affiliation could be the reverse of that postulated in the model. It appears that only when people have become physically active do they notice that exercise is not as uncomfortable or exhausting as they had assumed or that the positive consequences outweigh the negative and so the weighting of the cons decreases. This would therefore present possible starting points for interventions: The decrease in Exhaustion may reflect the fact that people beginning an exercise program set their goals too high and for that reason experience too much exhaustion or discomfort during or after exercising. This could be prevented by setting more realistic goals and increasing training more slowly.

By changing the staging algorithm used to allocate participants to stages, the main point of criticism of the TTM (i.e. arbitrary time criteria for the transitions from stage to stage; Sutton 2001) could be counteracted. This is a strength of the present study. However, this also entails a limitation, in that there is no direct comparability with the usual assignment to stages. Furthermore, due to the unequal stage distribution the participants were condensed to three stages, which also makes comparability with findings on the original model with five stages difficult. A more differentiated look at the pros and cons and particularly at the subscales for all of the stages would be necessary in further studies.

Another critical point of this study is the limitation of the sample to university students. This could explain the greater percentage of physically active persons in this sample (57.1%) compared to the commonly reported percentage of physically active persons of the Swiss population (51%; Lamprecht and Stamm 2006). Thus, the sample is somewhat biased, which should be taken into consideration when evaluating the external validity of the results.

Finally, as the response format of the Decisional Balance Scale was changed to match with the German wording of the items, comparability to other studies applying the scale with the importance rating is not fully given.

In conclusion, whereas the two-dimensional solution of decisional balance could be replicated, the subdivision into the seven subscales found here yields a more precise picture of the perceived pros and cons of exercising.

The T-transformed progressions suggest that for successful intervention, the focus has to be placed on decreasing the cons. The raw scores suggest that psychological intervention fostering the forming of intentions should focus mainly on the pros. The participants' weighting of the perceived cons is not yet reduced through the intention to exercise, but only when they actually increase their physical activity through exercise/sports. The change seems to result only through personal experience.

Further, based on the findings of the present study, intervention programs can work in a tailored fashion toward increasing and decreasing the most important perceived advantages and disadvantages. Based on the effect sizes in this study, these are the areas of Well-being and Exhaustion. Here again, for Well-being the weighting of perceived advantages increases strongly, mainly at the transition from Precontemplation to Contemplation/Preparation. But for Exhaustion, there is no increase in the weighting of perceived cons at this transition. Therefore, for the transition from Precontemplation to Preparation, interventions should aim mainly at emphasizing the advantages of Well-being; and for the transition from Preparation to Action should provide, in addition, information on the disadvantages, in particular on Exhaustion.

Person-specific interventions can be planned more precisely using the seven subscales. The more salient an area of the pros or cons is for a person, the more efficiently that area should be fostered or broken down in an intervention.

However, the extent to which the fostering of pros or the breaking down of cons is more effective for longer-term behavior change needs to be examined in randomized controlled intervention studies.

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