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APPLIED PSYCHOLOGY | SHORT COMMUNICATION

Why aren't they involved in physical activities? The hypothesis of negative self-perception due to past physical activity experiences

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Abstract: We conducted preliminary studies testing the relevance of a new construct for understanding women's uninvolved in regular physical activity: negative self-perception due to past PA experiences (NSPPPAE). In study 1, we tested the clarity of a three-item scale and computed principal component analysis, standardized Cronbach's alpha coefficients, and test-retest reliability using Pearson's correlation coefficient. In study 2, we performed principal component analysis, Pearson's correlation tests, and multiple regression analysis to determine (1) NSPPPAE's association with variables related to PA involvement and (2) NSPPPAE's power to predict time spent in vigorous or moderate recreational activity. The scale showed satisfactory internal consistency and good test-retest reliability. NSPPPAE was positively associated with time barrier ($r = .31$), tiredness barrier ($r = .52$), age ($r = .15$), and BMI ($r = .28$), and negatively associated with time in recreational activity ($r = -.36$). It significantly predicted ($\beta = -.20$, $p = .003$) time in recreational activity. This construct provides deeper insight into women's uninvolved in regular PA.

Subjects: Physical Activity and Health; Sports Psychology; Exercise Psychology; Women's Sport; Health Promotion; Women

Keywords: women's health; engagement; exercise; self-concept

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PUBLIC INTEREST STATEMENT

"No time" and "too tired" are the most frequent reasons women give to explain why they are unwilling to engage in physical activity. But is there a deeper reason? We hypothesized that past unpleasant physical activity experiences gradually lead a person to reject physical activity and think that he/she is not made for it. Our study lays the groundwork for a new construct (negative self-perception due to past physical activity experiences) and conducts the first steps to validate it. The results show that the first validation indices are satisfactory and that the new construct is different from the barriers usually described and studied but has similar impact. This has implications for those design and set up PA programs and is good news for women who want to engage in PA but think they are incapable: the thought is just a representation due to bad experiences and not a fatality.

1. Introduction

The European barometer recently showed that more women than men reported never exercising or playing sports (52% for women, 40% for men; European Commission, 2018). The proportion of women who reported no vigorous physical activity in the previous 7 days was 65% (51% for men) and the proportion who reported no moderate physical activity in the previous 7 days was 52% (42% for men) (European Commission, 2018). Yet it is now clear that low physical activity and/or high sedentary behaviour have negative effects on health and quality of life – contrary to the beneficial effects of physical activity (PA) (de Rezende, Lopes, Rey-López, Matsudo, & Do Carmo Luiz, 2014; Junghoon, Im, & Choi, 2017). Understanding the processes that lead women to resist exercise has therefore become crucial for the effective promotion of physical activity (PA) and the design and implementation of optimal PA programs.

Among the personal factors associated with PA, self-efficacy was shown to be the main determinant of involvement (Bauman et al., 2012; Choi, Lee, Lee, Kang, & Choi, 2017). Perceived self-efficacy refers to confidence in one's capabilities to successfully carry out a task and the belief that one is capable of both mobilizing and maintaining the required motivational, cognitive and behavioural resources to achieve a goal (Bandura, 1997). It affects the decision to engage in an activity, the effort to which the person will consent, the affect arising from the experience, and the willingness to overcome barriers in pursuit of the activity (Bandura, 1997; McGuire, Seib, & Anderson, 2016; Voskuil & Robbins, 2015). In studies dealing with self-efficacy as it relates to PA, self-efficacy refers to either people's confidence in their ability to perform physical tasks like climbing stairs, walking 20 minutes, etc. (Rogers et al., 2006), or their confidence in their capability to exercise despite barriers to participation (Annesi, 2018). Regarding the first sense, self-efficacy assessment provides information on a person's self-perception of present-day physical capability, while in the second sense, it provides information on the impact of various barriers to PA, but does not explain the reasons for their impact. Moreover, barriers may be real, but they can also be rationalizations to explain or justify the uninvolvement in PA. Rationalization is a defence mechanism to preserve the self, consisting of a cognitive reconstruction of reality to make it acceptable (Bernard, Stiefel, de Roten, & Despland, 2010; Festinger, 1957).

We hypothesized that another, deeper type of barrier may lead a person to rationalize. In this case, the barrier is not perceived by the person as such or he/she simply does not want to think or talk about it. In the context of this study, the deep barrier that we refer to is the person's past experience with PA. The main factor affecting self-efficacy is the enactive mastery experience (i.e., success or failure in performing a task). The repetition of success or failure in a given task builds the immediate perceived self-efficacy in this task; beyond that, people build a more global perception of their overall ability to perform when success or failure is repeated in multiple similar tasks or areas (Bandura, 1997). Thus, people who experienced failure, difficulty or unpleasant feelings while exercising during childhood/adolescence or throughout life tend to construct and internalize a perception of overall incompetence in PA. This perception in turn reinforces their reluctance to engage in PA. From this perspective, women's lower involvement in PA might be related to negative past experiences with PA. Sports and physical education are usually considered male domains in which girls are assumed to be less competent than boys (Gentile, Boca, & Giammusso, 2018; Kågesten et al., 2016). If girls accept this stereotype, they may think that they really are less competent because they are girls, which will alter their motivation and in turn their performances, ultimately confirming the stereotype (Bonnot & Croizet, 2007; Gentile et al., 2018). And this is all the more so when the setting is coeducational and performance-oriented. Males are likely to be more performance-oriented or success-oriented than females (Monacis, De Palo, & Sinatra, 2013; Xiaoxia, McBride, & Xiang, 2015), which may lead girls in coeducational classes to perceive themselves as less competent, thus giving less importance to and participating less in PA (Azzarito & Solmon, 2009; Gentile et al., 2018).

In sum, we hypothesized that women are more likely to stop perceiving PA as a form of enjoyment or a way to value the self because of past negative PA experiences. Consequently,

they become unwilling to engage in PA and instead build rationalizations as barriers to protect themselves.

The aim of this article is to present the results of preliminary studies to test the relevance of a new hypothesized construct that provides a deeper understanding of women's reluctance to engage in regular PA. Our overall aim is to investigate the impact of internalizing negative self-perceptions due to past PA experiences (NSPPPAE) on present-day PA. These studies thus aimed to validate a short scale to assess NSPPPAE and then to test the hypothesis that NSPPPAE can explain the time women spend in recreational PA.

2. Study 1. The negative self-perception due to past physical activity experiences (NSPPPAE) scale: item construction, factorial structure, internal consistency reliability and test-retest reliability

2.1. Material and methods

2.1.1. Step one: item construction

Two of the authors created items to illustrate the process leading to this negative self-perception. These items were then discussed with the other authors and three items were retained: item 1, the person makes a statement (I have never been good in sports); item 2, the person rationalizes (sport was not made for me); and item 3, the person may internalize a devalued self (I am not made for physical activity). These three items were then embedded with 11 other items related to behaviours or beliefs about PA. Twenty-six French female undergraduate students from 18 to 22 years old (19.08, 95% CI: 18.57–19.57) were asked to assess the clarity of all 14 items from 0 to 10 (0 = not at all clear, incomprehensible; 10: absolutely clear) (Vallerand, 1989).

2.1.2. Step two: factorial structure, internal consistency reliability and test-retest reliability

A new sample of 38 French female undergraduate students from 18 to 21 years old (18.97, 95% CI: 18.65–19.29) responded to the same item list as the clarity-sample group on two occasions separated by a 5-week interval (Vallerand, 1989). To ensure sufficient gradation and avoid a neutral refuge position in the answers, items were scored on a 6-point scale from 1 (totally disagree) to 6 (totally agree). We then computed principal component analysis, standardized Cronbach's alpha coefficients and test-retest reliability with Pearson's correlation coefficients on the emerged factor. Cronbach's alpha coefficients greater than .70 were acceptable, as were test-retest coefficients greater than .60 (Vallerand, 1989).

2.2. Results and discussion

2.2.1. Step one: item construction

Results showed that the three items were scored from 8 to 10 (item 1: mean 9.77, 95% CI: 9.56–9.98; item 2: mean 9.81, 95% CI: 9.61–10.00; item 3: mean 9.38, 95% CI: 9.06–9.71), suggesting that they were well understood and could be used.

2.2.2. Step two: factorial structure, internal consistency reliability and test-retest reliability

Results of factorial analyses showed that the three items loaded on a single factor that explained 63% and 79% of the variance, respectively, at test and retest. Factor loadings were, respectively, from item 1 to item 3: test $-.78$, $-.70$, $-.89$; retest: $-.86$, $-.91$, $-.90$. The standardized Cronbach's alpha coefficients at test and retest were, respectively: $\alpha = .70$ and $\alpha = .87$. The NSPPPAE test-retest correlation coefficient was $r = .83$, $p < .0001$. These results suggested that the items did not assess different constructs and that the NSPPPAE scale showed satisfactory internal consistency and temporal stability (Vallerand, 1989).

3. Study 2. The NSPPPAE as a determinant of the time spent in vigorous or moderate recreational activity (TSRA)

3.1. Material and methods

3.1.1. Study population and design

Two hundred and fifty-six French women from 18 to 62 years old volunteered to participate in this study. Data were collected during awareness-raising actions to encourage physical activity in the fight against breast cancer. The authors were present at booths featuring posters on the positive effects of PA. When people came by to inquire, they were asked if they would be willing to respond to questions in a short booklet as part of a research project on PA habits. If they agreed, they were seated at a table to complete the booklet. They were asked to respond regarding the following: (a) the NSPPPAE scale (standardized Cronbach's alpha coefficient = .83); (b) two items representing two of the most common barriers to PA (Kelly et al., 2016; Louw, Biljon, & Mugandani, 2012): lack of time and tiredness (respectively, I do not have (more) time for PA, and Between the job and everyday life obligations, I often feel too tired for PA). These items (NSPPPAE and barriers) were embedded in the same items related to behaviours or beliefs about PA used in study 1. They were scored on the same 6-point Likert scale; (c) the Global Physical Activity Questionnaire (GPAQ, World Health Organization, 2012), with the following variables retained: energy expenditure in vigorous or moderate activity at work (EEW, MET-minutes per week) and time spent in vigorous or moderate recreational activity (TSRA, minutes per week). The GPAQ has shown acceptable test-retest reliability, with correlations ranging from 0.67 to 0.81 (Armstrong & Bull, 2006) and from 0.52 to 0.89 in a French sample (Rivière et al., 2016). The concurrent validity computed against accelerometers has been low to moderate, depending on the study, for total PA, moderate PA or vigorous PA, and depending on work PA or leisure PA (Armstrong & Bull, 2006; Cleland et al., 2014; Herrmann, Heumann, Der Ananian, & Ainsworth, 2013; Rivière et al., 2016; Wanner et al., 2017); and (d) sociodemographic questions including age, weight, height and health. The demographic and medical characteristics are provided in Table 1.

3.1.2. Data analysis

First, we performed principal component analysis with the varimax-normalized rotation method to ensure the independence between the three NSPPPAE items and the two barrier items. Then, we calculated the correlations among the variables before performing multiple regression analysis to explain the TSRA scores. The independent variables entered into the analysis were: age, BMI, educational status (A levels or less = 1; Higher education = 2; Bachelor = 3; Postgraduate = 4), NSPPPAE, time barrier, tiredness barrier, and EEW.

3.2. Results

The results of the factorial analysis showed that the five items entered into the analysis loaded on two factors and explained 78.68% of the variance. The first factor (eigenvalue: 2.92; explained variance: 58.31%) was marked by high loadings on the three NSPPPAE items (respectively, 0.80, 0.90 and 0.82) while the second factor (eigenvalue: 1.02; explained variance: 20.37%) was marked by high loadings on the two barrier items (respectively, 0.93 and 0.81). This suggested that the three NSPPPAE items belonged to the same construct and differed from the other types of barrier to PA. The results of Pearson's correlations showed that the NSPPPAE score was positively associated with the time ($r = .31, p \leq 0.0001$) and tiredness ($r = .52, p \leq .0001$) barriers, as well as with age ($r = .15, p = .02$) and BMI ($r = .28, p \leq 0.0001$), whereas it was negatively associated with TSRA ($r = -.36, p \leq 0.0001$). Correlation coefficients between NSPPPAE and both EEW ($r = -.08$) and educational status ($r = -.03$) were non-significant.

The results of the multiple regression analysis showed that the variables entered into the analysis explained 25% of TSRA, $F(7,248) = 12.05, p < .0001$. Contributions of the entered variables were the following: NSPPPAE ($\beta = -.20, p = .003$), tiredness barrier ($\beta = -.12, p = .13$), time barrier ($\beta = -.23, p = .002$), EEW ($\beta = .08, p = .14$), age ($\beta = -.19, p = .001$), BMI ($\beta = -.00, p = .99$), and

Table 1. Characteristics of the study 2 population (N = 256)

	Mean	95% CI
Age	40.95	39.51–42.39
BMI	22.10	21.74–22.47
NSPPAE (range 1–6)	2.15	2.01–2.28
Barrier: lack of time (range 1–6)	2.76	2.57–2.95
Barrier: tiredness (range 1–6)	3.06	2.87–3.25
EEW (MET-min/week)	352,81	227.20–478.42
TSRA (min/week)	180.98	159.03–202.94
Activity level <i>n</i> (%)		
No recreational activity	35 (13.67)	
Only moderate recreational activity	54 (21.09)	
Vigorous recreational activity	167 (65.23)	
Diseases, <i>n</i> (%)		
Yes	37 (14.45)	
No	219 (85.55)	
Education, <i>n</i> (%)		
A levels or less	77 (30.08)	
Higher education	51 (19.92)	
Bachelor	32 (12.50)	
Postgraduate	96 (37.50)	
Work status, <i>n</i> (%)		
Student	36 (14.06)	
Working	214 (83.59)	
Not working	6 (2.34)	

CI: confidence intervals; BMI: body mass index, EEW: energy expenditure in vigorous or moderate activity at work; TSRA: time spent in vigorous or moderate recreational activity.

educational status ($\beta = -.09$, $p = .13$). Among the participants, those who were older and had both a high perceived time barrier and a negative self-perception due to past PA experiences were the least active.

4. Discussion

The aim of this study was to create a novel scale to assess a new construct conceptualized as a barrier to PA involvement: negative self-perception due to past physical activity experiences (NSPPAE) and then to test the relevance of this construct in explaining women's lack of involvement in PA.

The results showed that the NSPPAE scale provides good internal consistency and test-retest reliability (study 1) and assesses a construct that is distinct from the usually reported barriers (study 2). Specifically, NSPPAE appears to be a barrier to PA involvement, and this barrier emerged as distinct from the perceived lack of time barrier and the perceived tiredness barrier. Its power to predict PA involvement seemed to be modest but was higher than that of some of the usual variables, such as age, BMI, educational status and the tiredness barrier (Bauman et al., 2012; Choi et al., 2017; Kelly et al., 2016; Louw et al., 2012). These results support the interest of greater exploration into the nature of this construct, its effect on building other barriers, and its relationship to other variables of women's engagement in regular PA, such as self-efficacy and, particularly, the 3H syndrome or sedentary lifestyle process (SLP) (Berthouze-Aranda & Reynes, 2011; Reynes et al., 2016). A person with a high NSPPAE score is more likely to avoid sports and PA involvement and is therefore more likely to have low aerobic capacity. The SLP model assumes that altered aerobic capacity generates earlier and more intense fatigue and longer recovery, both of

which increase the perceived difficulties when exercising. These difficulties lead to an alteration in self-efficacy to perform physical tasks, as well as a decrease in the desire to do so because effort is associated with unpleasant feelings. If the person does not engage in regular PA, his/her aerobic capacity will progressively be altered, and so on. We can expect that in this context, physiological difficulties to perform a task reinforce negative PA self-efficacy, ultimately ending with NSPPPAE. With reference to SLP, our results have implications for the management of PA programs. It is reasonable to assume that a high NSPPPAE score indicates the likelihood of low long-term adherence to a PA program. Therefore, the program for such individuals should be designed to first protect the self before focusing in on such goals as weight loss, the number of steps, or physical fitness, etc. Essentially, detecting a high NSPPPAE score should help health professionals to better orient individuals towards the programs best suited to their psychological (NSPPPAE) and/or physiological (aerobic capacity) characteristics and to ensure an optimal adaptation.

Although the first results are encouraging, some limitations should be noted. First, these women who took the time to complete the booklet were likely to have differed from women in the general population, certainly because of the specific context of this study: raising awareness about physical activity benefits in dealing with breast cancer. They were also more active, as the percentage uninvolved in PA in this study was lower than in the general population (13% versus 52%; European Commission, 2018), and their rate of employment was higher than women in the general population (83% vs 60%, Dares Analyses, 2015). Thus, although we controlled for some sociodemographic variables related to PA involvement, a more representative sample will be needed in future research to explore this construct. A second limitation refers to the construct itself. Although the initial findings on the factorial validity of the NSPPPAE were satisfactory and the three NSPPPAE scale items were not labelled as reasons not to do exercise, a study is now needed to determine whether the NSPPPAE scale really assesses negative self-perception rather than being merely another rationalization. Thus, more in-depth study of the relationship between NSPPPAE and sport/PA programs and the related emotional feelings is called for.

In conclusion, despite some limitations, this study showed that taking into account negative self-perceptions due to past physical activity experiences may provide a deeper understanding of women's relationship to PA and the processes by which they set up barriers to regular PA and remain uninvolved in PA programs. We also hope our findings will provide useful information for those who design and set up PA programs so that they can ensure better care.

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