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Using short vignettes to disentangle perceived capability from motivation: A test using walking and resistance training behaviors

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Running Head: DISENTANGLING PERCEIVED CAPABILITY AND MOTIVATION

Using short vignettes to disentangle perceived capability from motivation: A test using walking
and resistance training behaviors

Abstract

1
2 Self-efficacy is arguably the strongest correlate of physical activity, yet some researchers suggest this
3 is because the construct confounds ability with motivation. Williams and Rhodes (2014) have proposed a
4 more circumscribed construct, called perceived capability (PC), meant to measure ability but not
5 motivation and propose that the construct will not be related to unskilled physical activities but may be
6 linked to skilled behaviors. The purpose of this paper was to examine whether a PC construct can be
7 stripped of motivation using a vignette approach in both walking and resistance training behaviors.
8 Participants were a random sample of 248 university students who were then randomly assigned to either
9 answer resistance training or walking behavior questions. Both groups completed a PC measure and
10 reasons for their answer before and after reading a vignette that clarified the phrasing of capability to a
11 literal use of the term. PC was significantly ($p < .01$) higher post- compared to pre-vignette and the
12 differences were greater ($p < .01$) for walking than resistance training. PC had significantly ($p < .01$)
13 smaller correlations with intention and self-reported behavior post-disambiguation, which resulted in a
14 null relationship with walking but a small correlation with resistance training behavior. When PC was
15 combined with intention to predict behavior, however, there was no significant ($p > .05$) difference in the
16 amount of variance explained pre to post-vignette. Thought listing showed that participants did not report
17 capability barriers to walking and over half of the sample construed capability as motivation/other
18 priorities pre-vignette. The findings support use of a vignette approach for researchers who wish to
19 disentangle the assessment of PC from motivation while creating no overall loss in explained variance of
20 physical activity.

21 Key Words: Physical Activity; Motivation; Intention; Opportunity; Ability

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1 Regular physical activity (PA) is linked to reduced chances of acquiring over 25 chronic
2 conditions (Warburton, Katzmarzyk, Rhodes, & Shephard, 2007), yet few North Americans
3 engage in enough physical activity to reap these health benefits (Colley et al., 2011; Troiano et
4 al., 2008). The use of theory to understand PA is important in order to provide an organizing
5 framework to identify critical constructs for future promotion initiatives (Rhodes & Nigg, 2011).
6 At the forefront of this research is Bandura's (1977) self-efficacy (SE) construct. Bandura
7 (1998) defines SE as one's perceived capability to perform a target behavior and construes it as
8 the key antecedent of outcome expectations, motivation, and incentives (Bandura, 1998). The
9 construct was created for Bandura's (1998) social cognitive theory, but it has since been included
10 and similarly operationalized in almost all popular health behavior theories (for a detailed
11 discussion see Williams & Rhodes, 2014).

12 Despite the widespread application of SE and its clear predictive capability, some researchers
13 have raised concerns that the measurement of the construct extends beyond perceived capability
14 and into general motivation (Cahill, Gallo, Lisman, & Weinstein, 2006; Kirsch, 1982; Rhodes &
15 Blanchard, 2007; Williams, 2010; Williams & Rhodes, 2014). The concern raised by these
16 researchers is that people interpret capability in terms of what they are motivated to do. For
17 example, when one is asked whether they can walk 30 min, five times per week, their
18 interpretation is not one of whether they could physically do it but whether they willing to. When
19 SE measures both capability and motivation, it may have problematic consequences for attempts
20 to understand PA. Because a blend of PA motivation and capability is of broader scope than
21 capability alone, it would show a larger correlation with intention and PA than a measure of
22 mere capability. Prior research has supported this theorizing; measures of SE and perceived
23 behavioral control that have attempted to control for motivation by asking participants whether

1 they can do PA “if they wanted to” show lower correlations with intention and PA than measures
2 that do not include this phrase that attempts to control for motivation in the response (Rhodes &
3 Blanchard, 2007; Rhodes & Courneya, 2004). An additional method of examining whether
4 motivation and ability are both considered while answering “can do” questions is to ask
5 participants why they provided their response to the question. Using this approach, Rhodes and
6 Blanchard (2007) showed that over half of participants responded with reasons such as
7 motivation, or enjoyment. Thus, many participants appear to respond to SE statements based on
8 a mix of capability and motivational reasons.

9 Despite these concerns, Bandura (2007) has suggested that the SE construct should not be
10 circumscribed to measure a researcher-defined conception of ability. Thus, Williams and Rhodes
11 (2014) have suggested a replacement construct for researchers who are concerned about the
12 motivation-ability confound called *perceived capability* (PC), defined as: perceptions of physical
13 and mental ability, capacity, or competence to perform a specific circumscribed behavior
14 independent of motivation to perform the behavior. In assessing PC, it is important to instruct a
15 respondent to consider their capability and not their motivation to perform the behavior. The
16 researchers also suggest that PC should have a very weak association with PA under most
17 circumstances where behaviors (e.g., walking) involve little skill but may have some impact on
18 PA when the behavior requires some skill (e.g., resistance training; RT) (Williams & Rhodes,
19 2014). This theorizing has not been tested in the PA domain at present.

20 The purpose of this paper was to determine if priming with examples of the colloquial versus
21 the literal use of “I can” based on an approach from Cahill and colleagues (2006), will improve
22 responses to questions about PC to carry out self-reported walking and RT behaviors. We
23 hypothesized that both PAs would be affected by the vignettes. This would be demonstrated by

1 higher mean scores post-priming (because people “can do” more than they will do), weaker
2 overall correlations with intention (i.e., motivation) and behavior (due to the shrunken
3 measurement domain), as well as reduced elicited beliefs that were motivational in nature as
4 reasons why participants could not participate in the PA. Furthermore, we hypothesized that the
5 primed effect on PC would be larger for walking than RT. This was based on the assumption that
6 respondents will colloquialize the meaning of “I can” in walking to reflect the motivational
7 domain due to the rudimentary skill required to perform the behavior, but RT may have some
8 variability around whether one can literally perform these behaviors. Finally, as the vignette is
9 meant to disentangle motivation from capability, we expected no loss of explained variance in
10 walking and RT behavior pre- to post-vignette when a measure of intention is also entered into a
11 regression equation with PC. This was hypothesized because pre-vignette PC was expected to
12 conflate motivational aspects with capability, so the addition of an independent measure of motivation
13 would account for all variability between the two constructs pre- and post-vignette.

14 **Method**

15 **Participants and Procedures**

17 Participants were students enrolled in the winter term at a western Canadian university. A
18 list of all 100- and 200-level classes at the university were collected (k=667). Classes were
19 stratified by year and faculty and nineteen classes, across 10 different Faculties, were randomly
20 selected to be contacted through the university email system. The content of the email asked
21 potential participants to complete a short survey on beliefs and motives for PA. The link for the
22 survey was provided at the end of the email.

23 After completing informed consent, participants were randomly assigned to respond to
24 questions about walking or RT. Leisure-time walking was defined as at least 150 minutes of

1 walking per week during free time that was in the moderate intensity (brisk pace) or higher range
2 (Canadian Society for Exercise Physiology, 2011). RT was defined as at least two bouts per
3 week of any work with weights (squats, deadlift, bench press, curls etc.) and other strength
4 exercises (push-ups, pull-ups, sit-ups) done during free time (i.e., not occupation, school or
5 housework).

6 The order of the questionnaire included 1) assessment of the relevant PA (walking or RT),
7 2) intentions to perform this behavior, and then 3) the relevant PC questions for the study.

8 Participants completed a measure of PC and provided reasons for their answers in an open-
9 text thought-listing response box. On the next page, participants were asked to read two vignettes
10 to help clarify what was meant when they were asked to report whether they “can” or “cannot”
11 do PA. The first vignette was:

12 Ben is lifting weights with his friend Kevin. Kevin loads several weights onto the barbell.
13 Ben tells Kevin that he “can’t” lift that much weight, although he agrees to try. Despite
14 giving it his best effort Ben “cannot” lift the bar.

15 The second vignette was:

16 Jeremy is experiencing loneliness during his first semester at college. He seeks counseling
17 at the student counseling center. The counselor suggests that Jeremy ask a female
18 classmate for coffee. Jeremy says he “can’t” ask out his classmate. The counselor points
19 out that, in fact, Jeremy “can” ask his classmate for coffee, but is afraid of being rejected.
20 Jeremy agrees with the counselor: he “can” ask his classmate for coffee, he is just afraid.

21

22 After reading the vignettes, participants were instructed to consider the words “can” and
23 “cannot” as they are used by Ben in Story 1 and by the counselor in Story 2. Participants were

1 told that it may or may not change their responses from what they said before. Subsequently,
2 participants repeated measures of PC and again, provided reasons for their answers in an open-
3 text response box.

4 **Measures**

5 *Perceived Capability.* Before and after reading the vignettes, participants completed a
6 measure of PC with the following stem: “Over the next 2 weeks, I can walk 150 minutes per
7 week/strength train two bouts (at least 20 min per bout) per week.” They responded on a 5-point
8 scale of cannot do at all to 100% definitely can do. The measure was adapted from
9 recommendations by Williams and Rhodes (2014) and followed a scaling metric similar to
10 McAuley (1993).

11 *The thought listing* measure included the statement “considering your answer on the last
12 question, please list the main reasons why you generally can or cannot walk/resistance train over
13 the next two weeks” Three short open lines followed this statement, so that participants could
14 express their views. This follows similar guidelines to general thought listing methodology (e.g.,
15 Petty & Cacioppo, 1986).

16 *Intention.* Based on the items created by Courneya (1994), participants in the RT group
17 responded to the question, “I intend to engage in regular leisure-time RT ___ times per week over
18 the next 2 weeks” and the walking group responded to the question, “I intend to engage in
19 regular leisure-time walking for ___ minutes per week over the next 2 weeks.”

20 *Behaviour.* Participants reported the frequency and duration of participation in mild,
21 moderate and vigorous intensity walking or RT using a modified version of the Godin Leisure
22 Time Exercise Questionnaire (Godin, Jobin, & Bouillon, 1986; Godin & Shephard, 1985). The
23 adapted measure has shown good predictive validity in past walking (Brown & Rhodes, 2006;

1 Rhodes, Courneya, Blanchard, & Plotnikoff, 2007) and RT research (Rhodes, Blanchard, &
2 Matheson, 2007).

3 **Analysis plan**

4 Following sample descriptives, the main hypotheses were evaluated with paired t-tests
5 applied to test differences between mean scores of pre-vignette and post-vignette PC as well as
6 an independent t-test of this change in PC between walking and RT conditions. The effect of pre-
7 and post-vignette PC on intention and self-reported behavior was subsequently examined using
8 Hotelling's t-tests and Steiger's Z tests for dependent correlations. The same procedure was also
9 applied to the multivariate R when both intention and PC were used to predict behavior pre- and
10 post-vignette.

11 Thematic coding was used to categorize reasons for PC at pre- and post-vignette. These
12 data were coded as total counts per theme (Petty & Cacioppo, 1986). Specifically, a judge was
13 trained to code the thoughts, identify the valence of each thought (barrier or facilitator) and
14 theme. A theme was created if at least 5% of the sample made reference to it as a reason for their
15 reports of PC. After primary coding, a second coder independently categorized reasons as well as
16 identified the valence of each reason. The inter-rater reliability for the categories ($\alpha=0.79$) and
17 valence ($\alpha=1.00$) were acceptable.

18 **Results**

19 Participants were 248 students ($M_{\text{age}}=21\pm 4.5$, 44% female) with 2.2 ± 1.1 years of university
20 education, and 61% were meeting the Canadian PA guidelines ($M=239\pm 499$ mins/week).

21 Participants were randomly assigned to respond to the walking ($n=99$) or RT ($n=149$)
22 questionnaires. Between groups, there were no differences in age $t(206) = 1.25, p > .05$, gender
23 $\chi^2(1)=1.19, p > .05$, year of study $\chi^2(4)=4.31, p > .05$, or PA $t(226)=-0.51, p > .05$.

1 The main test of PC by vignette demonstrated that means were significantly ($p < .05$)
 2 higher post-vignette in comparison to pre-vignette (see Table 1). Furthermore, the walking group
 3 showed a significantly ($p < .05$) larger increase on PC post-vignette when compared to the
 4 resistance-training group.

5 Hotelling's t-tests (see Table 2) for dependent sample correlations showed that both
 6 walking and RT PC correlations with intention decreased post-vignette. PC was correlated with
 7 intention for both walking ($r = .44$ $p < .01$) and RT ($r = .48$; $p < .01$) in the medium effect-size
 8 range, but walking reduced to a non-significant ($r = .11$; $p > .05$) value post-vignette, while RT
 9 reduced to a small effect size ($r = .18$; $p < .05$). Differences in this change in correlation between
 10 the two PAs was not significantly different ($p > .05$).

11 Pre-vignette PC for RT was correlated with behavior in the large effect size range ($r =$
 12 $.51$; $p < .01$), and this relationship was reduced to a small effect size post-vignette ($r = .22$; $p <$
 13 $.05$), which represented a significant change [$t(136)=3.87$, $q=0.66$]. By contrast, pre- and post-
 14 vignette walking PC was not associated with behavior.

15 The magnitude of the multivariate R when intention and PC were used to predict
 16 behavior pre- and post-vignette was also examined. For walking, the pre- (intention $\beta = .50$, $p <$
 17 $.01$; perceived capability $\beta = .08$, $p > .05$) and post- (intention $\beta = .51$, $p < .01$; perceived
 18 capability $\beta = -.11$, $p > .05$) vignette $R_s = .54$. For RT, the pre-vignette (intention $\beta = .51$, $p <$
 19 $.01$; perceived capability $\beta = .24$, $p < .01$) $R = .67$ and this was reduced to (intention $\beta = .61$, $p <$
 20 $.01$; perceived capability $\beta = .13$, $p > .05$) $R = .65$ post-vignette. The change was not significant
 21 ($z = .28$, $p > .05$).

22 Reasons Why Participants Perceived they “Can” or “Cannot” do the Physical Activities

1 Thematic analysis of the reasons provided why respondents could or could not engage in
2 walking and RT are provided in Table 3. Nine themes emerged from the thought listing
3 procedure pre-vignette including physical ability, past behavior accomplishment, school work,
4 time, motivation, resources, environment, affective judgments, and outcome expectations.
5 Comparisons of the shift of themes are also present in Table 3. Of note, perceptions of ability as
6 a facilitator (walking +15%; RT +16%) rose considerably post-vignette, while reasons of past
7 behavior (walking -17%; RT -22%) declined. In terms of barriers, school (walking -24%; RT -
8 23%), time (walking -28%; RT -10%), and motivation (walking -16%; RT -6%) all fell
9 considerably from pre-vignette to post-vignette.

10 **Discussion**

11 Our hypothesis that a primed vignette condition that clarifies the definition of “I can”
12 would affect PC measures for walking and RT had strong support and demonstrates the
13 sensitivity of wording in health-related measurement (McClain, Grant, Willis, & Berrigan,
14 2012). First, mean PC scores under the post-vignette condition showed much higher values than
15 pre-vignette, supporting our theorizing that people “can do” more than they will do. This finding
16 complements prior work by Rhodes and colleagues (Rhodes & Blanchard, 2007; Rhodes &
17 Courneya, 2003, 2004), who showed that SE constructs also had higher means when “if I wanted
18 to” was employed to hold motivation to a positive constant.

19 The thought listing procedures for the reasons behind these responses showed a clear
20 illustration of what was happening pre- to post-vignette. Among the reasons given for responses
21 pre-vignette, capability/past accomplishment represented 35-40% of the responses. The
22 remaining 60-65% of responses cited other priorities and outcome expectations. The findings
23 corroborate a similar thought listing procedure conducted by Rhodes and Blanchard (2007). Both

1 studies demonstrate that more than half of the reasons for responding to SE measures are based
2 on outcome expectations and overall motivation, which are supposed to be its consequences and
3 not its antecedents. The reasons given for PC post-vignette, however, show a marked change in
4 ability as a facilitator, as well as very large decreases in barriers such as time, school work, and
5 motivation. This is the first study to map these changes in the reasons for PC as a result of
6 clarifying the definition of “I can”.

7 We also had support for the hypothesis that the colloquial use of “I can” would be larger for
8 walking than RT. Walking showed a significantly larger mean increase in the post-vignette
9 condition compared to RT. In the thought listing procedure, ability to walk was not considered a
10 barrier for any participant and motivation shrunk from 16% to zero post-vignette. By contrast,
11 17% of respondents gave ability reasons as a barrier for RT and this showed a minor decrease
12 post vignette (- 4%).

13 Our hypothesis that the vignette would affect PC correlations with intention and PA was also
14 supported. Correlations with intention were significantly larger pre-vignette compared to post-
15 vignette. The finding corroborates prior work (Rhodes & Blanchard, 2007; Rhodes & Courneya,
16 2003, 2004), but our examination of self-reported walking compared to RT advanced prior
17 literature. Specifically, while the effects of the vignette reduced PC and intention/behavior
18 relationships to null in the walking condition, RT PC had small and significant relationships with
19 intention and behavior. This supports the summary position by Williams and Rhodes (2014) that
20 PC will have a weak relationship with non-skilled behaviors but still relate to behaviors that may
21 require more skill. The results also validate the utility of understanding PC across different
22 behaviors.

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Table 1. Means, standard deviations and dependent t-tests for pre-vignette and post-vignette perceived capability.

Behaviour	Perceived Capability			df	t	<i>d</i>
	Pre M(SD)	Post M(SD)	Pre-Post Difference ^A			
Walking	4.01 (1.27)	4.86 (0.38)	0.85	92	6.60**	1.63
Strength Training	4.19 (1.29)	4.59 (0.94)	0.40	142	4.03**	0.68

Notes: A) The pre-post difference scores were significantly different from one another, $t(234)=2.81$, $p<.05$; * $p<0.05$; ** $p<0.01$.

Table 2. Correlations and differences between pre-vignette self-efficacy and post-vignette perceived capability correlations with intentions and behavior.

Behavior	Perceived Capability- Intention						Perceived Capability- Behavior					
	Pre (r)	Post (r)	z	r	t	q	Pre (r)	Post (r)	z	r	t	q
Walking	0.44**	0.11	2.71*	0.99	2.84*	0.58	0.19	-0.17	2.79*	0.99	2.91*	0.59
Strength Training	0.48**	0.18*	3.72*	0.99	3.93*	0.67	0.51**	0.22*	3.67*	0.99	3.87*	0.66

Notes: ** p<0.01, *p<0.05. t = Hotelling's t for dependent correlations. Walking behavior df=96, Strength training df=136.

