



Abstinence expectancies and quit attempts

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HIGHLIGHTS

- Whether expectancies about quitting influence the ability to quit is unclear
- The Perceived Risks and Benefits of Quitting scale had good internal, test-retest and concurrent validity, but did not predict making a quit attempt or duration of abstinence.
- Further development of quitting expectancy scales and predictive validity tests are needed.

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ABSTRACT

Introduction: Several scales have been developed to measure expectancies about smoking cessation. This secondary analysis tested the reliability and validity of one of the most commonly used expectancy measures - the Perceived Risks and Benefits of Quitting Scale (PRBQ).

Methods: Smokers ($n = 143$) who planned to quit at some point in the next 3 months entered an observational study in which they called an Interactive Voice Response system nightly for 3 months to report quit attempts and abstinence. They completed the PRBQ at baseline and the end of 1, 2 and 3 months. No treatment was provided. **Results:** The Risks scores and Benefit scores of the PRBQ had high internal reliability ($\alpha = 0.88$ – 0.96 across administrations) and high test-retest stability ($ICC = 0.67$ – 0.80), but poor to moderate concurrent validity (correlation with other cessation measures = 0.09 – 0.52), and poor predictive validity (no significant prediction of quit attempts or duration of abstinence). Results were similar for men and women.

Conclusions: The PRBQ appears to be reliable but, similar to other scales of cessation expectancies, its validity appears to be poor. The face valid notion that expectations influence quitting requires further testing.

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1. Introduction

Several scales have been developed to measure expectancies about the pros and cons of continuing smoking (Hendricks & Brandon, 2016). Other scales have been developed to measure expectancies about smoking cessation (Abrams, Zvolensky, Dorman, Gonzalez, & Mayer, 2011; Macnee & Talsma, 1995; McKee, O'Malley, Salovey, Krishnan-Sarin, & Mazure, 2005; Hendricks, Wood, Baker, Delucchi, & Hall, 2011; Kale, Gilbert, & Sutton, 2015; Dijkstra, De Vries, & Bakker, 1996; Sirota, Rohsenow, Monti, Tidey, & Swift, 2010; Kahler, McHugh, Metrik, & Spillane, 2013; Orleans, Rimer, Cristinzio, Keintz, & Fleisher, 1991; Sorensen & Pechacek, 1986; Sutton, Marsh, & Matheson, 1990). Determining expectancies about smoking cessation could suggest targets for media and clinical interventions; however, this requires knowing which expectancies actually influence quitting. Although several

studies have examined the reliability and concurrent validity of quitting expectancy scales (Dijkstra et al., 1996; Hendricks, Wood, & Hall, 2009; Sirota et al., 2010; Kale et al., 2015; Abrams et al., 2011; Hendricks et al., 2011; Kahler et al., 2013; Eklund, Hiltunen, Melin, & Borg, 1997; Lee, Catley, & Harris, 2014; Macnee & Talsma, 1995; McKee et al., 2005; Rohsenow et al., 2015), few have tested whether they predict future quit attempts or abstinence success. During a previously published natural history study (Hughes et al., 2014), we collected information on one of the more widely used of these scales - the Perceived Risks and Benefits Questionnaire (PRBQ) (McKee et al., 2005). The current secondary analysis reports on this scale's psychometrics, especially whether the scale prospectively predicts future quit attempts or duration of abstinence.

2. Methods

The methods of our observational study are described in more detail in our prior publications (Hughes et al., 2014; Hughes, Naud, Fingar, Callas, & Solomon, 2015). The study was approved by the University of

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Vermont Committees on Human Research and was registered at www.clinicaltrials.gov (NCT00995644).

In 2011–2013, we recruited 152 smokers to a prospective, natural history study on smoking cessation. Major inclusion criteria were: probably or definitely intended to quit sometime within the next 3 months; ≥ 18 years of age; smoked ≥ 10 cigarettes/day for at least 1 year; and did not use other forms of tobacco or nicotine. Across the monthly surveys, 47%–63% stated they planned to quit in the next month.

The study was entirely phone-based and no treatment was provided. Participants called an Interactive Voice Response (IVR) system nightly for 3 months and reported cigarettes/day, quit attempts, and abstinence. At study entry and at the end of the 1st, 2nd and 3rd months, participants completed surveys. The PRBQ asked participants “to rate how likely each item would be if you were to stop smoking” (e.g. “I will gain weight”) from 1 = no chance to 7 = certain to happen. The scale includes 39 cessation outcomes that are grouped into a Risks scale that is composed of six subscales (each with 2–5 outcomes) and a Benefits scale composed of six subscales (each with 2–5 outcomes) (Table 1). In addition, we used the difference between Benefits and Risks scores to measure a “Difference Score” with positive scores indicating the Benefits were endorsed more than the Risks. Participants also completed a two-question measure of self-efficacy (Dijkstra & de Vries, 2000), a single question of whether the participant planned to quit in next month (Hughes et al., 2014), and single-item measure of perceived addiction (Hughes et al., 2004). The self-efficacy score was the average score of two questions: 1) “Please rate how successful you think you would be if you tried to stop smoking from 1 = would not be successful to 10 = would be successful”, and 2) “how difficult would it be to not smoke all day tomorrow” from 1 = very easy to 10 = very difficult. We reverse scored the second question and calculated the mean of the two questions. The addiction question was “Please rate how addicted you are to cigarettes from 1 = not at all addicted to 10 = very addicted”. The intent-to-quit question was the yes/no question: “Do you plan to quit in the next 30 days.” The self-efficacy (Dijkstra & de Vries, 2000), intention to quit (Hughes et al., 2014), and perceived addiction (Hughes et al., 2004) measures have all been shown to have predictive validity; i.e., to predict quitting.

We examined internal reliability of the PRBQ via Cronbach's alpha at each of the four time-points. Test-retest stability was examined by the Intraclass Correlation Coefficient between the score at one time point and the score at the next time-point (i.e., one month later) using an

absolute agreement definition. Concurrent validity was measured by the correlation of the PRBQ with the self-efficacy, addiction and intent-to-quit scores at the four measurement times using the Pearson correlation-coefficient for the first two measures and point-biserial correlations for the dichotomous intention measure. For brevity, we present the range of scores for these outcomes across the four measurement times; i.e., baseline and end of 1, 2, and 3 months.

Predictive validity was measured by whether total PRBQ Risk score, total Benefit Scores score, total difference score, and subscale scores prospectively predicted the incidence of a quit attempt of any length, and the duration of abstinence after a quit attempt over the following month, via a multilevel logistic regression. Statistical analyses used SAS v9.4 (SAS Institute, Cary NC) except the ICCs were calculated using SPSSv21 (IBM Corp, Armonk NY).

3. Results

The sample size varied across follow-ups from 143 to 109. Only 3% of non-responses were due to missing data; the others were due to abstinence from smoking at the time of measurement. Most participants (68%) were women and had completed high school (94%). Few (23%) were minorities. Their mean age (sd) was 45 (13), mean cigarettes/day was 21 (9), and mean Fagerstrom Test for Cigarette Dependence (FTCD) score was 5.4 (2.2).

The mean scores on the PRBQ outcomes (total Risks, total Benefits, Difference Score, and the 12 subscale scores) were very consistent across the four measurement times (Table 1). Cronbach's alphas for the total Risks scores and total Benefits scores were very high (0.88–0.96). Cronbach's alphas for 10 of the 12 subscales were above 0.70 across measurement times. Test-retest stability was moderate for the total Risks scores, Benefits scores and Difference scores (ICC = 0.66–0.80). Test-retest correlations for 10 of the 12 subscales were between 0.51 and 0.79. Higher total Risks scores were correlated with lower self-efficacy, higher addiction and lower intention to quit scores, and this was true for many of the subscales (Table 1). Higher total Benefits scores and its subscales were not consistently related to self-efficacy, addiction or intention-quit-scores. Higher Difference scores were related to higher self-efficacy and lower addictions scores. Except for one subscale - loss of enjoyment, neither total Risks scores, total Benefit scores, the Difference scores, nor any of the subscales predicted quit attempts or duration of abstinence in the following month.

Table 1
Range of psychometric test statistics for PRBQ^a across four time points.

PRBQ predictors ^b	Mean ^b	Reliability		Concurrent validity			Predictive validity	
		Internal (Cronbach's alpha)	Test-retest (Intraclass correlation coefficient)	Correlation with other scales			Prediction of quit attempt t statistic	Prediction of abstinence statistic
				Self-efficacy (Pearson r)	Addiction rating (Pearson r)	Intent to quit (Point biserial)		
Total Risks	4.8–4.8	0.88–0.93	0.67–0.75	–0.35 to –0.47	0.31 to 0.40	–0.28 to –0.19	–1.7	–1.6
Weight gain	4.8–5.1	0.86–0.90	0.74–0.75	–0.09 to –0.22	0.08 to 0.27	–0.04 to –0.22	–0.2	–0.3
Negative affect	5.1–5.2	0.75–0.88	0.53–0.65	–0.31 to –0.44	0.28 to 0.38	–0.11 to –0.27	–1.1	–1.8
Attention	4.1–4.2	0.96–0.98	0.52–0.67	–0.16 to –0.35	0.12 to 0.26	–0.32 to 0.00	–1.8	–0.5
Negative social	3.1–3.3	0.56–0.64	0.51–0.62	–0.20 to –0.32	0.13 to 0.22	–0.14 to –0.05	0.9	–0.3
Loss of enjoyment	5.1–5.3	0.70–0.89	0.54–0.65	–0.21 to –0.34	0.25 to 0.34	–0.20 to –0.09	–2.2	–2.2
Craving	6.1–6.2	0.91–0.96	0.42–0.62	–0.41 to –0.55	0.43 to 0.59	–0.22 to –0.14	–1.6	–1.9
Total Benefits	6.2–6.3	0.93–0.96	0.78–0.80	–0.14 to 0.03	0.03 to 0.23	–0.08 to 0.07	0.5	–0.6
Long-term health	6.2–6.2	0.85–0.93	0.61–0.68	–0.27 to 0.02	–0.02 to 0.18	–0.12 to 0.04	–0.4	–0.6
Wellbeing	6.0–6.2	0.88–0.92	0.65–0.71	–0.11 to –0.01	0.02 to 0.20	–0.07 to 0.06	–0.4	–1.1
Self esteem	6.3–6.4	0.91–0.93	0.71–0.79	–0.09 to 0.11	–0.08 to 0.22	–0.01 to 0.04	0.9	–0.01
Finances	6.3–6.5	0.63–0.69	0.48–0.64	–0.09 to –0.02	–0.07 to 0.22	–0.11 to 0.09	0.2	–1.4
More physical appeal	6.5–6.7	0.84–0.96	0.54–0.79	–0.14 to 0.08	0.03 to 0.40	–0.06 to 0.08	0.8	–0.4
Positive social	6.2–6.3	0.79–0.84	0.62–0.78	–0.11 to 0.02	0.03 to 0.26	0.00 to 0.17	1.1	–0.3
Benefits minus Risks^c	1.4–1.5	N/A	0.66–0.74	0.21 to 0.43	–0.18 to –0.31	0.12 to 0.28	1.8	0.9

Bold values, $p < 0.05$.

^a PRBQ = Perceived Risks and Benefits of Quitting.

^b All rated 1–7.

^c Positive values = Mean Benefits Score > Mean Risks Score.

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