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Self-reported reasons for smoking : Predicting abstinence and implications for smoking cessation treatments among those with a psychotic disorder

Clark, Vanessa, Baker, Amanda, Lewin, Terry, Richmond, Robyn, Kay-Lambkin, Frances, Filia, Sacha, Castle, David, Williams, Jill and Todd, Juanita

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Title: Self-reported reasons for smoking: Predicting abstinence and implications for smoking cessation treatments among those with a psychotic disorder.

Short Title: Predicting abstinence from smoking in psychosis

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Vanessa Clark, PhD, School of Medicine and Public Health, University of Newcastle, New South Wales, Australia; Vanessa.Clark@newcastle.edu.au

Amanda Baker, PhD, School of Medicine and Public Health, University of Newcastle, New South Wales, Australia; NHMRC Centre for Research Excellence in Mental Health and Substance Use, National Drug and Alcohol Research Centre, University of Newcastle; Amanda.Baker@newcastle.edu.au

Terry Lewin, BCom(Psych)Hons, Priority Research Centre for Brain and Mental Health, University of Newcastle, New South Wales, Australia; Terry.Lewin@hnehealth.nsw.gov.au

Robyn Richmond, PhD, School of Public Health and Community Medicine, University of New South Wales, Australia; R.Richmond@unsw.edu.au

Frances Kay- Lambkin, PhD, Priority Research Centre for Brain and Mental Health, University of Newcastle, New South Wales, Australia; NHMRC Centre for Research Excellence in Mental Health and Substance Use, National Drug and Alcohol Research Centre, University of New South Wales; F.kaylambkin@unsw.edu.au

Sacha Filia, PhD, MAPrc, Central Clinical School, Monash University, The Alfred Hospital, Victoria, Australia; Sacha.Filia@monash.edu

David Castle, MD, St. Vincent's Hospital Melbourne; The University of Melbourne; Faculty of Health Sciences, Australian Catholic University; David.Castle@svha.org.au

Jill Williams, MD, Division of Addiction Psychiatry, Rutgers-Robert Wood Johnson Medical School, New Brunswick, NJ; williajm@rutgers.edu

Juanita Todd, PhD, School of Psychology, University of Newcastle, New South Wales, Australia; Juanita.Todd@newcastle.edu.au

Correspondence: Vanessa.Clark@newcastle.edu.au

School of Medicine and Public Health,

University of Newcastle, University Drive, Callaghan, NSW, 2308. Australia.

Ph: +61 2 40335715; Fax: +61 2 403 35692

ABSTRACT

Objectives: People living with a psychotic illness have higher rates of cigarette smoking and face unique barriers to quitting compared to the general population. We examined whether self-reported reasons for smoking are useful predictors of successful quit attempts among people with psychosis.

Methods: As part of a randomised controlled trial addressing smoking and cardiovascular disease risk behaviours among people with psychosis, self-reported reasons for smoking were assessed at baseline (*n* = 235), 15-weeks (*n* = 151) and 12-months (*n* = 139). Three factors from the Reasons for Smoking Questionnaire (Coping; Physiological; Stimulation/Activation) were entered into a model to predict short- and long-term abstinence. The relationship between these factors and mental health symptoms were also assessed.

Results: Participants scoring higher on the Stimulation/Activation factor (control of weight, enjoyment, concentration and 'peps me up') at baseline were just under half as likely to be abstinent at 15-weeks. Female participants were five times more likely to abstinent at 15-weeks, and those with a higher global functioning at baseline were 5% more likely to be abstinent. There was a positive correlation between change over time in the Stimulation/Activation factor from baseline to 12-month follow up, with the Brief Psychiatric Rating Scale total score at 12-month follow up. This indicates that increasingly higher endorsement of the factor was associated with more psychological symptoms. There was also a negative correlation between the change over time Stimulation/Activation factor and global functioning at 12-months, indicating increasingly higher endorsement of the factor lead to lower global assessment of functioning.

Conclusions: The Stimulation/Activation factor may be particularly important to assess and address among smokers with psychosis. It is recommended that further research use the

Reasons for Smoking Questionnaire among smokers with psychosis as a clinical tool to identify specific quit barriers. Further research into why females have higher smoking cessation rates in the short-term and relapse prevention interventions seem worthy of further investigation.

This is a secondary data analysis collected as part of a clinical trial registered as ACTRN12609001039279 on the Australian and New Zealand Clinical Trials Registry, at http://www.anzctr.org.au/TrialSearch.aspx?searchTxt=ACTRN12609001039279&ddlSearch=Registered

Key words: Smoking, psychosis, self-reported reasons, predicting abstinence.

Introduction

Tobacco smoking is one of the largest preventable factors associated with chronic disease, such as cardiovascular disease, cancers and lung related diseases (Le Houezec, McNeill, & Britton, 2011). Cigarette smoking in the general Australian community has now declined to around 13.3% (*National drug stratergy household survey detailed report: 2013*, 2014), 16.7% in the USA (Hahn, Rigby, & Galletly, 2014). Despite the declining smoking rates among the general population, smoking rates among people living with a mental illness have remained stable and high.

Smoking and psychosis are highly comorbid, with approximately 66.6% of people with psychosis being current smokers (Cooper et al., 2012). In addition to the high prevalence of smoking, people with schizophrenia have a very high rate of nicotine dependence (Hahn et al., 2014; Olincy, Young, & Freedman, 1997). They have longer demonstrated smoking histories compared to those without a psychotic disorder and tend to smoke stronger cigarettes, more frequently (De Leon, 1996; De Leon & Diaz, 2005).

People with psychosis, similar to those from other disadvantaged groups, face unique barriers to quitting (Bryant, Bonevski, Paul, McElduff, & Attia, 2011) and may have different motivations to maintain their cigarette use compared to members of the general community (Lawrence, Hafeskost, Hull, Mitrou, & Zubrick, 2013). Self-reported reasons for smoking reflect a person's awareness of specific motivations for substance use, and can be an important factor to address when attempting to modify the behaviour (Shiffman, 1993). Understanding specific self-reported motives for smoking can have important treatment implications (Shiffman, 1993), and are an important part of a smoking cessation program. Given this, cessation programs might be more effectively structured in a way that accounts for differences in perceived benefits. For example, while an extra tax on cigarettes may deter

many people in the general community or those from low socioeconomic backgrounds from commencing smoking, or continuing to smoke (WHO, 2008), there is currently a lack of evidence to suggest that a tax increase may be effective among many people with psychosis (Bader, Boisclair, & Ferrence, 2011).

Consistent with smokers in the general population, smokers with schizophrenia report multiple motivations for smoking (Baker et al., 2007; Berlin et al., 2003; Galazyn, Steinberg, Gandhi, Piper, & Williams, 2010; Tate & Pomerleau, 1994). Among people without psychosis, six factors are consistently identified among self-reported reasons for smoking. These factors are commonly defined as stimulation, pleasure, sensorimotor, habit, addiction and negative affect reduction (Tate & Pomerleau, 1994; Tate, Schmitz, & Stanton, 1991). Whilst people with psychosis also report smoking for addiction and habit (93%; Thornton et al., 2012), they report smoking for stress reduction at higher rates (75-86%) compared to those without psychosis (38-72%; Gurpegui et al., 2007; Pederson, Bull, Ashley, & MacDonald, 1996; Thornton et al., 2012). Additionally people with psychosis report smoking for stimulation at much higher rates (33-58%), compared to those without psychosis (7-8%; Gurpegui et al., 2007; Thornton et al., 2012). Similar discrepancies in the proportion of people endorsing particular reasons for smoking have been found for other variables, with 49% of people with psychosis reporting that they smoke cigarettes to improve their mood, compared to 11% of control subjects (Gurpegui et al., 2007). This is in line with the findings of Spring, Pingitore, and McChargue (2003), who concluded that people with schizophrenia find smoking more rewarding and perceive more benefits than heavy smokers without schizophrenia. Conversely, the only motive that people with psychosis do not endorse more heavily or at least on par compared to healthy controls are social motives (Barr, Procyshyn, Hui, Johnson, & Honer, 2008).

There have been few studies that examine the role of self-reported reasons for smoking in predicting future successful quitting or cigarette reduction (Berlin et al., 2003). In a study examining self-reported reasons for smoking in healthy controls who were candidates for a smoking cessation programme, the automation factor of habit was predictive of failure to quit (Berlin et al., 2003). This study also revealed that there were gender differences in reasons for smoking, with females more likely to endorse reasons associated with tension reduction and relaxation (Berlin et al., 2003). In addition, females reported greater subjective motivations related to smoking, and greater benefits from smoking compared to males. For example, compared to males after cigarette smoking, women reported significantly greater reductions in concentration difficulties and subjective relief from withdrawal, despite no differences in physiological indices (Eissenberg, Adams, Riggins, & Likness, 1999).

Whilst there has been a small amount of research identifying self-reported reasons for smoking in psychosis (Forchuk et al., 2002; Galazyna, Steinberga, Gandhia, Piperc, & Williams, 2009), to our knowledge, none of these studies have investigated whether these reasons are useful for predicting successful quit attempts or successful cigarette reductions amongst people with psychosis, or how self-reported reasons change over time in relation to smoking cessation treatment or in relation to psychiatric clinical factors. These questions are important to understand, as answers may help provide insight into the subjective motives that are related to quitting, or smoking maintenance, in people with psychosis.

The current study undertook a secondary analysis of a randomised controlled trial for smoking cessation amongst people with psychosis (N = 235; Baker et al., 2015) which was a two arm trial that assessed the efficacy of nicotine replacement therapy plus a face to face or telephone intervention. There were no significant differences between intervention conditions in smoking outcomes at 15 weeks or 12 months. Both conditions showed improvements from

baseline rates of smoking (e.g. confirmed point prevalence abstinence rate at 15 weeks 11.5% and at 12 months: 6.4%; mean reduction in cigarettes per day at 15 weeks: 14.3 cigarettes per day, and at 12 months was 8.6 cigarettes per day). As part of this trial self-reported reasons for smoking were assessed using a modified version of the Reasons for Smoking Questionnaire (RSQ; Pederson et al., 1996). This modified version has been validated among a psychosis sample (Baker et al., 2007), and has had two additional items added in relating specifically to mental illness (Baker et al., 2006). This study has two main aims. The first aim is to investigate the predictive value of self-reported reasons for smoking. It is expected that RSQ factors will be predictive of cigarette abstinence, or cigarette reduction following a smoking intervention. Specifically, it is predicted that lower endorsement on each of the factors will be associated with greater success in cigarette reduction or cigarette abstinence. The second aim is to assess the temporal stability of these reasons. It is predicted that reasons will change over time, during active treatment at short-term follow up (15-weeks) or after treatment at long-term follow up (12-months), as a function of cigarette abstinence (or reduction). It is expected that self-reported reasons associated with coping will be less frequently endorsed as cigarette use decreases.

Method

This study was conducted as part of a secondary analysis of data from a randomised controlled trial with the aim of reducing smoking in people with psychosis, conducted at the School of Medicine and Public Health, University of Newcastle, Australia. 'The Healthy Lifestyles Project' (Baker et al., 2011; Baker et al., 2015) examined the effectiveness of psychological interventions and nicotine replacement therapy on smoking cessation and other cardiovascular risk behaviours in people with psychosis. Participants were randomly allocated to either a multi-component face-to-face intervention addressing multiple health

risk behaviours or to a telephone delivered intervention largely monitoring smoking. Following an initial 90 minute session, there were 7 weekly, 3 fortnightly and 6 monthly sessions scheduled, of approximately 60 minutes duration in the face-to-face condition and 10 minutes in the telephone condition. Nicotine replacement therapy was provided for the first 6 months in both conditions. Assessments were carried out at baseline, 15 weeks, and 12 months. The participants completed a series of questionnaires, which included the RSQ.

Participants

Demographic information for the 'Healthy Lifestyles Project' is presented in Table 1. Inclusion criteria were: aged at least 18 years, currently smoking at least 15 cigarettes per day and a diagnosis of a psychotic disorder according to the DSM-IV, as determined by the MINI neuropsychiatric exam (DSM-IV-TR, 2000). Written, informed consent from participants and permission to conduct these analyses were obtained via Hunter New England Human Research Ethics Committee, ref: 08/12/17/5.10.

Table 1 about here

Measures

The full test battery has been reported elsewhere (Baker et al., 2011; Baker et al., 2006; Baker et al., 2015). Of relevance to this study are demographic characteristics, smoking variables, psychological functioning and the self-reported RSQ. Self-reported reasons for smoking were obtained from an adapted for psychosis version of the RSQ (Baker et al., 2006; Pederson et al., 1996) at baseline and follow-up. The RSQ is a 14 item questionnaire, including two qualitative questions. Responses were given in the form of endorsing the reasons with a "yes", or not endorsing the reason with a "no" or "don't know". These responses were collapsed into "Yes", or "did not endorse". As reported by Thornton et al. (2012), two additional items were added to the original questionnaire (12 items) to account

for mental illness related reasons for smoking. Since the data from the RSQ is coded as dichotomous data an exploratory factor analysis was conducted using a tetrachoric correlation matrix (Lorenzo-Seva & Ferrando, 2012). Three factors from the RSQ were formed based on an initial exploratory analysis of the items (Supplementary Table 1), using data collected from a previous smoking and psychosis study (Baker et al., 2006). A confirmatory factor analysis was then conducted on the RSQ responses from the current study (Supplementary Table 2). Current symptom data were collected at baseline and follow-up using the Brief Psychiatric Rating Scale (BPRS; Ventura et al., 1993), the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Garbin, 1988) and the Global Assessment of Functioning (GAF) on the three assessment occasions.

Cigarette usage was measured by the Fagerstrom Test for Nicotine Dependence (FTND; Fagerstrom et al., 1996) and the Opiate Treatment Index Tobacco Module (OTI; Darke, Heather, Hall, Ward, & Wodak, 1991), which provides a measure of average number of cigarettes per day in the month preceding assessment. At each assessment, expired carbon monoxide was measured via a piCO smokerlyser for all participants, to confirm self-reports of abstinence or cigarette reduction.

Data analysis

Data analysis was conducted using IBM SPSS Statstics (version 20, Chicago, IL, USA). The RSQ questions were dichotomised into “yes” or “not endorsed” variables, with missing items coded as “not endorsed”. Missing data for the other measures were treated as missing. Since there were no significant overall differences between treatment conditions (telephone versus face-face) for the Healthy Lifestyles Project, data analysis was conducted across treatment conditions. Data was analysed on participants who completed the RSQ. Factors for the RSQ were calculated based on the confirmatory factor analysis

(Supplementary Table 2). Factor 1 (coping), Factor 2 (physiological) and Factor 3 (stimulation, activation). Abstinence was computed as 7-day point prevalence abstinence, which was calculated from the OTI tobacco module and confirmed by expired carbon monoxide <10ppm. A reduction of at least 50% in number of cigarettes per day was calculated by dividing the OTI cigarettes per day at baseline by the OTI cigarettes per day at 15-weeks, or 12-months, and objectively verified via an expired carbon monoxide reading of at least 20% less than baseline levels.

Logistic regressions were used to predict 50% or greater reduction in cigarettes per day or 7 day point prevalence abstinence at 15-weeks and 12-months. Fifty percent or greater reduction in cigarettes per day as well as point prevalence abstinence were both used as outcome measures, as reduction in cigarettes per day is often the first aim of smoking cessation interventions amongst those with psychosis (Hitsman, Moss, Montoya, & George, 2009). Predictor variables were selected based on their known effect on tobacco use, including baseline cigarettes per day, gender, age, diagnosis of psychosis, treatment condition (telephone versus face-to-face), treatment sessions attended and global assessment of function. Univariate analyses were performed on baseline data and follow-up, with categorical variables such as gender and marital status analysed using a chi-square test, while continuous variables such as cigarettes per day were analysed via mixed model analysis of variance (ANOVA). Planned comparisons between phases were performed using paired t-tests. Change scores were calculated for each of the RSQ factors by subtracting the 15-week and 12-month overall factor scores from the baseline score for that factor. A 3(time) x 3(factor) factorial repeated measures ANOVA was also conducted. Correlations were conducted on continuous variables. Significance levels for all analyses were set to $p < .05$.

Results

Factor Structure

The RSQ provided a stable factor structure assessing three key domains of smoking among people with psychosis, namely, smoking to cope with stress and for relaxation (Factor 1) with items including smoking "helps you relax", "take a break" and "handle stress"; smoking related to the physiological effects of smoking (Factor 2), with items including smoking "because it's a habit or addiction" and "craving to smoke"; and smoking to assist concentration, and for stimulation (Factor 3), with items including smoking to "pep you up", "help concentration" and "to reduce weight gain".

As shown in Supplementary Table 2, a three-factor solution was a significantly better statistical fit compared to a one-factor solution. The three-factor solution was confirmed on all measurement occasions (baseline, 15-week and 12-month) and in the follow-up only data (15-week and 12-month phase), indicating that the three-factor solution displays temporal stability. The RSQ showed reasonable internal consistency (Cronbach's alpha .71). All of the items contributed to the scale, with the deletion of any of the 11 items leading to a reduced Cronbach's alpha, and thereby weakening the scale.

Baseline self-reported reasons for smoking in predicting smoking at short and long term follow-up

A logistic regression was performed to predict point prevalence abstinence (7 days) and 50% or greater reduction in cigarettes per day at follow-up from baseline self-reported reasons for smoking. The model contained general demographic characteristics of age and gender, and the three factors derived from the RSQ (corresponding to the sums of the items that make up the factor), Factor 1 (coping, which included four items), Factor 2 (physiological, which included 3 items); and Factor 3 (stimulation/activation, which included

four items). Treatment specific variables of treatment condition and number of sessions attended were also included as was lifetime diagnosis (schizophrenia spectrum disorder, bipolar affective disorder or psychosis, not otherwise specified) and baseline cigarettes per day.

Table 2 about here

At 15-weeks (n = 161), the full model (predictors shown in Table 2) significantly predicted point prevalence abstinence (7 days, n = 28), X^2 = 25.74 (11), p = .007, accounting for between 14.8% and 24.5% of the total variance, with 85.1% of predictions accurate. The same model was not significant at 12-month follow-up (n = 139 overall, n = 17 abstinent). As shown in Table 2, Factor 3 (Stimulation/Activation), gender and global assessment of function were significant predictors of point prevalence abstinence at 15-weeks, but only gender remained significant at 12-months. According to the adjusted odds ratios, participants with a one unit higher score on Factor 3 at baseline were approximately half as likely to be abstinent at 15-weeks, female participants were approximately 5 times more likely to be abstinent at 15-weeks, and each one unit increment in global functioning at baseline was associated with re 5% increase in the likely of being abstinent. There was also a significant Factor 3 (Stimulation/Activation) by gender interaction. This interaction can be seen in Figure 1, with females who were abstinent at 15-weeks having lower scores on Factor 3 at baseline, compared to those who were not abstinent (F(1,60) = 8.65, p = .005), while there was no relationship between Factor 3 scores at baseline and 15-week point prevalence abstinence for males.

Figure 1 about here

The same model was analysed for the outcome of 50% or greater reduction in cigarettes. The models for 15-week and 12-months were not significant. The analysis was

also conducted for nicotine replacement therapy use (60.8% of the sample currently using nicotine replacement therapy at 15 weeks, and 19.4% at 12 months), whilst the model was significant at 15 weeks and 12 months the RSQ factors were not significant predictors of nicotine replacement therapy use.

Change in reasons for smoking over the three phases of assessment

The three factors derived from the factor analyses were used in a repeated measures ANOVA across the three assessment time points (baseline, 15-weeks and 12-month). After using a Greenhouse-Geisser correction, there was a significant main effect of time, $F(2,188) = 6.46$, $p = .002$, a significant main effect of factor, $F(2,188) = 69.09$, $p < .001$, and a significant factor by time interaction, $F(4,376)$, $p = .02$.

Planned comparisons were calculated comparing the baseline reasons for smoking factors at the two follow-up phases. As shown in Figure 2, the Coping Factor (4 items) was the most endorsed of all the factors, but endorsement significantly decreased as treatment progressed, baseline to 12-months, $t(114) = 3.15$, $p = .002$. There was no significant difference between baseline and 15-weeks, or 15-weeks and 12-months. The Stimulation/Activation factor (4 items) was the second most endorsed factor and endorsement significantly decreased over assessment phases, baseline to 15-weeks, $t(152) = 2.44$, $p = .02$, and baseline to 12-months, $t(114) = 1.97$, $p = .05$. There was no significant difference between 15-week assessment and 12-month assessment. The Physiological Factor (3 items) was the least endorsed, and remained stable over the assessment period, all comparisons, $p > .05$.

Figure 2 about here

A mixed model analysis of variance was also calculated examining the between subjects variable of treatment allocation and 50% cigarettes per day reducers at 15-weeks and 12-months. There was no significant effect of treatment allocation on smoking reduction for RSQ factor endorsement, $p > .05$.

The change scores between baseline and 15-weeks were correlated with the following variables from the 15-week assessment: cigarettes per day, age, GAF, BDI-II, BPRS and number of sessions attended. The same variables from the 12 month assessment were correlated with the change scores over time (baseline to 12-months) for each factor of the RSQ. There were no significant correlations for the change in RSQ factors between any of the variables at 15-weeks. There was a significant positive correlation between the change in Factor 3 (Stimulation/Activation) scores from baseline to 12-months for the BPRS at 12 months *(*$r = .26$, $p < .01$), with higher Factor 3 scores (greater endorsement) associated with higher BPRS scores (worse symptomatology). In addition, there was significant negative correlation between the GAF at 12 months ($r = -.21$, $p < .05$), with lower scores on the GAF (worse function) associated with higher scores change scores (greater endorsement) of Factor 3 (baseline to 12 months).

Discussion

The predictive validity of the RSQ for short-term and long-term smoking cessation and smoking reduction was examined. The factors that may predict smoking cessation and smoking reduction, included the three factors of the RSQ (Coping, Physiological and Stimulation/Activation), the treatment condition (face to face versus telephone) for the Healthy Lifestyles Project, the number of treatment sessions attended, GAF score, diagnosis, age, gender and cigarettes per day at baseline were entered into a logistic regression model. The first hypothesis was supported in part, with the analysis revealing that lower scores on the stimulation and activation factor, being female and higher GAF scores were predictive of short-term point prevalence abstinence, with only gender remaining a significant predictor at long-term follow up. For cigarette reduction, the overall model was not significant.

The Stimulation/Activation factor predicted short-term abstinence which indicates that reasons for smoking that load onto this factor (control of weight, enjoyment, concentration and peps me up), are highly motivating reasons to continue smoking in the short term. This would suggest that treatment interventions addressing smoking should first focus on strategies and activities that the participant can implement to address their symptoms related to activation and stimulation, such as alternate activities, like exercise, that a participant could use to "pep them up". Initially, these self-reported reasons are highly relevant, but their relevance reduces over time, possibly as the role of cigarettes in the person's life also changes.

The analysis also revealed gender as a significant predictor of 15-weeks and 12-month point prevalence abstinence. This finding is in contrast to the literature, which reports that females with psychosis and in the general population have greater difficulties with smoking cessation compared to their male counterparts (Gonzalez-Pinto et al., 2012). There was also a

significant Stimulation/Activation factor by gender interaction at the short-term follow-up. As illustrated in Figure 2 the interaction suggested that females who had lower baseline scores on the simulation activation factor were more likely to be abstinent at short term follow-up. There was no such relationship for men. This suggests that self-reported reasons for smoking related to activation and stimulation provide a greater quit barrier for women, and may need to be addressed in a different way to men. Since the stimulation and activation factor also incorporates a smoking and weight gain question, it may be that women are more sensitive to the possibility of weight gain after smoking cessation, and there were more women than men who coded "yes" for the weight gain as a concern item (28.8% men versus 37.9%) although this difference was not significant (analysis not shown). If this is the case, this would be a perceived barrier to quitting as there was no significant difference in weight gain ratios between males and females for those who were abstinent at 15 weeks (analysis not shown). Weight gain is a concern for many smokers with and without psychosis and is frequently cited as a reason to put off a quit attempt in smokers without psychosis (Farley, Hajek, Lycett, & Aveyard, 2012). This finding indicates that weight gain is important to address, in addition to smoking cessation. Baker et al. (2009) found that addressing weight control did not undermine smoking cessation interventions in psychotic populations.

The second hypothesis was not supported, although self-reported reasons related to Coping and Stimulation/Activation did decrease over time, this decrease was not related to cigarette reduction, or treatment allocation. It may be, thus, that reasons for smoking cigarettes in psychotic populations are only related to the likelihood of abstinence and not reduction. Of note, the Physiological Factor did not change over any assessment time point, although the three items which comprise this factor (habit, addiction and reduction in medication side effects) did increase in their correlation with each other over time (Supplementary Table 2). The reduction in endorsement for the coping and stimulation

factors may be related to the psycho-education that was received in both treatment conditions, although there was a greater amount of psycho-education in the face-to-face condition. Another possible explanation for the reduction in endorsement for both of these factors may relate the follow-up assessment process, which required participants to talk about and quantify their smoking. Since this is the first study to assess the stability of self-reported reasons for use over time, there are still many questions that need to be addressed.

A change score analysis was undertaken to attempt to understand the change in reasons for smoking over time. Change over time in reasons for smoking were correlated with number of treatment sessions attended, number of cigarettes per day, age, GAF, BDI-II, and the BPRS. The stimulation factor was the only factor to correlate with any measure, correlating with the BPRS and GAF at 12 months. This would indicate that with greater reliance on cigarettes to provide stimulation or activation (increase in endorsement Factor 3 from baseline to 12 months) there is a relative decrease in overall functioning and an increase in psychiatric symptomatology. This result adds to the growing evidence from this study that self-reported reasons for smoking are related to clinical measures of functioning and psychiatric wellness. Taken together, it is possible that at baseline, higher endorsement of the Stimulation/Activation factor indicates that a participant is more unwell, and less likely to achieve point prevalence abstinence 12 months later.

This study has several limitations. The RSQ is only a brief measure, and allows only for ‘yes’, ‘no’ and ‘don’t know’ responses. This restricts the information that can be gathered using this instrument. For example, there were no questions to address the self-reported sensorimotor benefits or social aspects of smoking (Forchuk et al., 2002), as well as the strength of endorsement for a certain motive for smoking. In addition, a person may very strongly agree with a motive related to smoking for a habit, but only moderately agree with a

motive for smoking related to assisting their concentration. There would also be benefit to assessing reasons for quitting in association with reasons for smoking. Regardless, this measure still provided sufficient detail to cover the domains identified in other studies (Lohr & Flynn, 1992) and makes an important contribution to the literature on the usefulness of self-reported reasons for smoking.

This is the first study to examine the predictive capacity of self-reported reasons for smoking in a sample with psychosis, as well as the first to establish the stability of self-reported reasons for smoking over time. Based on these findings, it is important that future anti-smoking strategies target self-reported reasons for smoking related to activation and stimulation motives, as well as addressing overall mental illness symptoms. There are now several studies stating that mental illness symptoms do not worsen because of smoking cessation strategies (Baker et al., 2006; Evins et al., 2005), although higher levels of mental illness impairments appear to make it more difficult to achieve abstinence. It is recommended that future smoking cessation treatments use the self-reported reasons for smoking as a clinical tool to identify a person's specific quit barriers.

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Disclosures

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Table 1. *Participant characteristics from the Healthy Lifestyles Project (n = 235).*

Baseline Characteristic	% (*N*)	*M* (*SD*), Range
Demographic Characteristic		
Age		41.63 (11.06, 19-69)
Male	58.7 (138)	
Australian born	83.3 (194)	
Single, never married	66.8 (157)	
Diagnosis		
Bipolar affective disorder	22.1 (52)	
Schizophrenia spectrum disorder	58.7 (138)	
Other non-organic psychotic syndrome	19.1 (45)	
Smoking factors		
Cigarettes per day		28.2 (14.6, 15-160)
FTND		6.8 (2, 1-10)
Functioning (Mean, S.D., range)		
Global Assessment of Functioning		51.2 (10.8, 30-90)
BDI-II		17.4 (12.8, 0-62)
BPRS		42.6 (12.9, 14-87)

FTND = Fagerstrom Test for Nicotine Dependence, BDI-II = Beck Depression Inventory II, BPRS = Brief Psychiatric Rating Scale

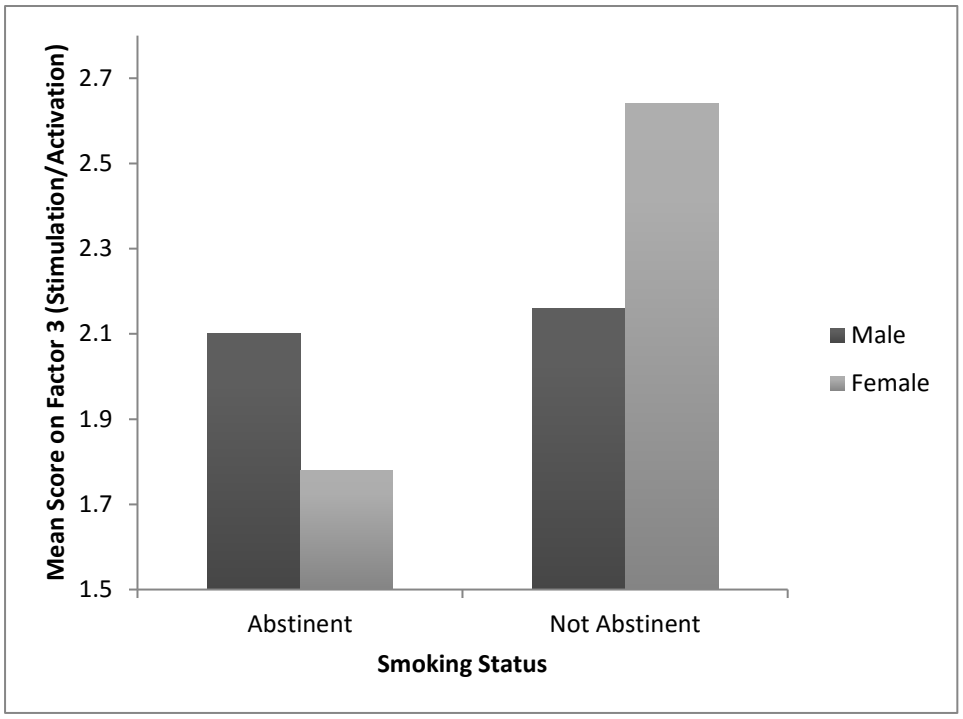

Figure 1. Smoking status at 15-weeks by gender interaction for mean baseline Factor 3 (Stimulation/Activation) score.

Table 2: *Logistic coefficients for point prevalence abstinence (7 days), at 15-week and 12-month follow-up.*

	15-week follow-up (*n* = 151)						12-month follow-up (*n* = 139)					
Predictor	*OR*	99% CI		*AOR*	99% CI		*OR*	99% CI		*AOR*	99% CI	
		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
Factor 1 (Coping)	1.01	[0.61-	1.68]	1.24	[0.66-	2.35]	1.36	[0.64-	2.89]	1.31	[0.56-	3.07]
Factor 2 (Physiological)	1.03	[0.4-	2.63]	1.37	[0.44-	4.22]	1.72	[0.53-	5.63]	1.49	[0.37-	6.04]
Factor 3 (Stimulation, Activation)	0.72	[0.45-	1.16]	0.58**	[0.31-	1.08]	1.19	[0.65-	2.17]	1.12	[0.55-	2.27]
Treatment Condition (Therapy	1			1	-	-	1			1.00	-	-
Treatment Condition (Telephone)	1.07	[0.37-	3.13]	1.02	[0.27-	3.84]	1.16	[0.31-	4.42]	0.83	[0.17-	3.98]
Number of Sessions	1.10*	[0.97-	1.24]	1.05	[0.98-	1.11]	1.04	[0.91-	1.18]	1.04	[0.90-	1.19]
Global Assessment of Functioning	1.04*	[0.99-	1.1]	1.05*	[1.00-	1.1]	1.05	[0.99-	1.11]	1.05	[0.98-	1.13]
Diagnosis												
Bipolar Affective disorder	1			1	-	-	1			1.00	-	-
Schizophrenia	1.51	[0.37-	6.12]	2.66	[0.50-	14.26]	1.05	[0.21-	5.23]	1.97	[0.31-	12.78]
Psychosis- NOS	1.26	[0.19-	8.17]	1.04	[0.16-	12.15]	0.85	[0.08-	9.08]	1.01	[0.07-	14.79]
Age	1	[0.95-	1.05]	0.99	[0.93-	1.04]	1	[0.94-	1.06]	0.98	[0.91-	1.06]
Gender (Male)	1			1	-	-	1			1.00	-	-
Gender (Female)	3.68***	[1.2-	11.27]	5.03***	[1.4-	18.13]	4.57***	[1.07-	19.61]	5.25***	[1.06-	26.00]
Cigarettes per day	1	[0.97-	1.04]	1.01	[0.97-	18.13]	0.98	[0.92-	1.05]	0.99	[0.91-	1.07]

*$p < .05$, ** $p < .02$, *** $p < .01$

AOR= Adjusted odds ratio; CI= Confidence Interval; NOS= not otherwise specified; *OR*= Odds ratio

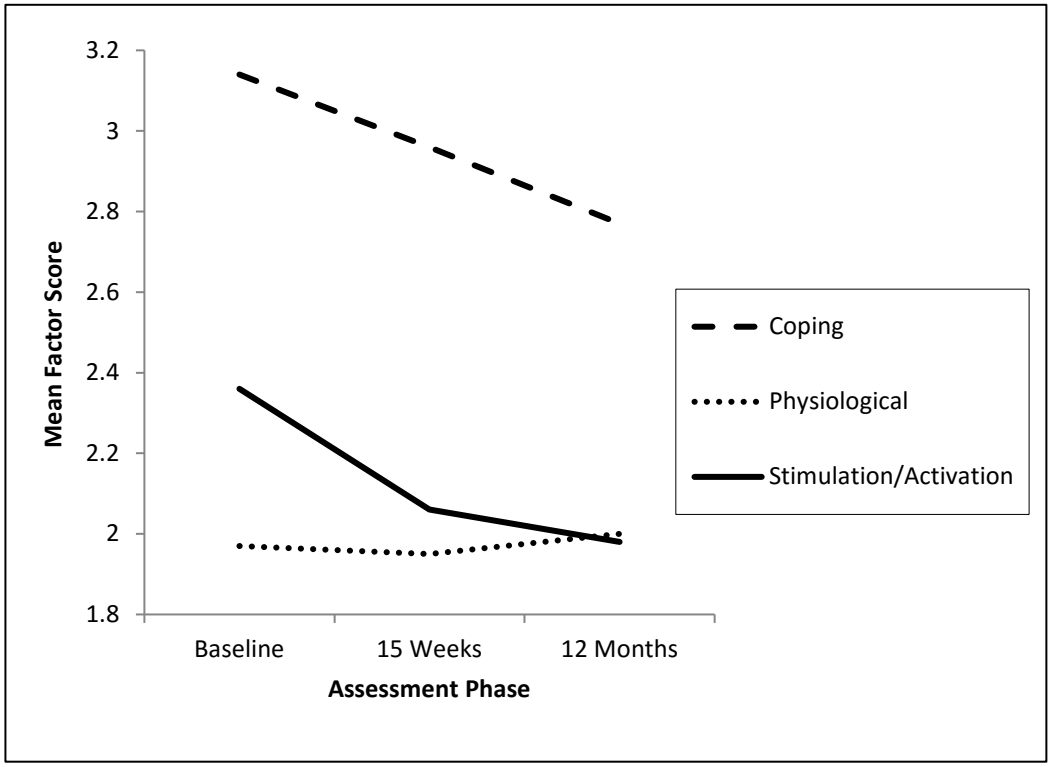

Figure 2. Mean Factor Score across the three assessment phases.

Supplementary Table 1. *Factors identified by the principal component analysis from the Smoking Study (N = 298) and frequency of responses to the items in the Reasons for Smoking Questionnaire (RSQ) by assessment occasion for the Healthy Lifestyles project (N = 235)*

	Factors			Phase		
	Coping (Factor 1)	Physiological (Factor 2)	Stimulation/ Activation (Factor 3)	Baseline (*N* = 232)	15-week (*N* = 155)	12-month (*N* = 117)
Helps you relax	0.834	-0.084	0.043	87.9 (204)	89.0 (138)	83.8 (98)
Lets you take a break	0.756	-0.060	0.016	83.2 (193)	78.1 (121)	72.6 (85)
Helps you handle stress	0.618	0.078	0.172	86.2 (200)	83.2 (129)	77.8 (91)
Helps reduce symptoms associated with your mental illness	0.617	0.326	-0.072	51.7 (120)	45.8 (71)	41.9 (49)
Because it is a habit	-0.336	0.812	0.210	85.3 (198)	85.8 (133)	88.0 (103)
Satisfies cravings or addiction	0.206	0.758	-0.165	95.7 (222)	90.3 (140)	96.6 (113)
Reduce medication side effects	0.135	0.641	0.164	17.7 (41)	17.4 (27)	12.8 (15)
Keeps you from gaining weight	-0.122	0.114	0.700	32.3 (75)	32.3 (50)	28.2 (33)
Helps you concentrate	0.130	-0.127	0.697	48.7 (113)	41.3 (64)	38.5 (45)
Smoking peps you up	0.062	0.230	0.620	60.8 (141)	50.3 (78)	53.0 (117)
You enjoy smoking	0.324	-0.215	0.441	81.0 (188)	81.9 (127)	78.6 (92)

Supplementary Table 2*: Confirmatory Factor Analysis for the Healthy Lifestyles Project data for baseline and across occasions for the Reasons for Smoking Questionnaire (N=235)*

Phase	Model	Model Fit Chi-square (*df*)	TLI	CFI	RMSEA	90% CI	Difference Chi-squared (*df*)
Baseline, 15-week and 12-month data	One factor	86.41*** (41)	0.90	0.92	0.04	[.03, .06]	
Baseline, 15-week and 12-month data	Three factor model	69.24*** (41)	0.93	0.95	0.04	[.02, .05]	17.17 ***
Baseline Only	Two factor model (8 items only)	24.71 (19)	0.93	0.95	0.04	[.00,.07]	
Baseline Only	Three factor model	65.76**(41)	0.82	0.86	0.05	[.03, .07]	
15-week and 12-month only	Three factor model	56.88 (41)	0.95	0.96	0.04	[.00, .06]	

TLI, Tucker-Lewis Index (non-normed fit index); CFI Comparative Fit Index; RMSEA, Root Mean Square Error of approximation and associated 90% confidence interval: ** $p < 0.01$, *** $p < .001$.