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EMOTION REGULATION IN SMOKERS: HOW COGNITIVE REAPPRAISAL AND ACCEPTANCE AFFECT SUBJECTIVE, PHYSIOLOGICAL, COGNITIVE AND BEHAVIOURAL CORRELATES OF CRAVING

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The present Doctoral Dissertation was submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy at the Department of Psychology and was approved on the ***13TH November 2018*** *by the members of the* ***Examination Committee***.

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DECLARATION OF DOCTORAL CANDIDATE

The present doctoral dissertation was submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy of the University of Cyprus. It is a product of original work of my own, unless otherwise mentioned through references, notes, or any other statements.

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ΠΕΡΙΛΗΨΗ

Παρά το γεγονός ότι το κάπνισμα είναι η πρωταρχική αιτία πρόωρων θανάτων που μπορούν να προληφθούν (WHO, 2016), οι πλείστοι καπνιστές που επιθυμούν να διακόψουν το κάπνισμα, ακόμη και με τη λήψη βοήθειας, δε φαίνεται να καταφέρνουν να μείνουν μακριά από τα τσιγάρα (Ferguson, Bauld, Chesterman, & Judge, 2005). Καθώς οι υφιστάμενες θεραπευτικές παρεμβάσεις δε φαίνεται να είναι αποτελεσματικές για έναν αριθμό καπνιστών, είναι σημαντικό να κατανοήσουμε πώς τα βασικά θεραπευτικά συστατικά μέρη επηρεάζουν τις βαθύτερες διαδικασίες της εμπειρίας της επιθυμίας για κάπνισμα (δηλαδή τις υποκειμενικές, φυσιολογικές, γνωστικές και συμπεριφορικές πτυχές) που προηγούνται του καπνίσματος.

Στην παρούσα ομάδα μελετών, 79 καθημερινοί καπνιστές (46.8% γυναίκες, *M*ηλικίας=25.07) τοποθετήθηκαν τυχαιοποιημένα σε ομάδες για την εκμάθηση της γνωστικής αναδόμησης ή της αποδοχής ως στρατηγικές ρύθμισης του συναισθήματος, ή τους ζητήθηκε να χρησιμοποιήσουν τη συνηθισμένη στρατηγική τους για τη διαχείριση της επιθυμίας για κάπνισμα. Μετά την εκπαίδευση, οι συμμετέχοντες εκτεθήκαν σε βίντεο που περιείχαν ερεθίσματα σχετικά με το κάπνισμα καθώς και στα προσωπικά τους αντικείμενα σχετικά με το κάπνισμα και λήφθηκαν μετρήσεις αναφορικά με την υποκειμενική αίσθηση όσον αφορά την επιθυμία για κάπνισμα και το αρνητικό συναίσθημα καθώς και μετρήσεις των φυχοφυσιολογικών αντιδράσεων. Επιπρόσθετα, οι συμμετέχοντες έπρεπε να ολοκληρώσουν την τροποποιημένη δραστηριότητα Stroop η οποία αξιολογεί την ύπαρξη μεροληψιών στην προσοχή που επιδεικνύεται σε ερεθίσματα σχετικά με το κάπνισμα, και την τροποποιημένη δραστηριότητα Paced Auditory Serial Addition Task (PASAT-C) η οποία αξιολογεί την ανεκτικότητα στη δυσφορία. Οι συμμετέχοντες κλήθηκαν να καπνίσουν ένα τσιγάρο πριν και μετά την πειραματική συνεδρία ενώ λαμβάνονταν μετρήσεις αναφορικά με την τοπογραφία του καπνίσματος.

Τα αποτελέσματα κατέδειξαν ότι οι τρεις στρατηγικές ρύθμισης του συναισθήματος δε διέφεραν όσον αφορά τις πλείστες πτυχές της επιθυμίας για κάπνισμα, δείχνοντας ότι όλες οι εξεταζόμενες στρατηγικές επηρεάζουν με τον ίδιο τρόπο τις διάφορες πτυχές της επιθυμίας για κάπνισμα στα πλαίσια του εργαστηρίου. Εντούτοις, η γνωστική αναδόμηση και η αποδοχή οδήγησαν σε σημαντικές μειώσεις στο μέσο όρο της διάρκειας της εισπνοής καπνού σε σύγκριση με την ομάδα ελέγχου. Αυτά τα αποτελέσματα είναι υποσχόμενα όσον αφορά τη χρήση της γνωστικής αναδόμησης και της αποδοχής για την τροποποίηση της συμπεριφοράς του καπνίσματος.

ABSTRACT

Although cigarette smoking is the primary cause of preventable premature death (WHO, 2016), the majority of smokers who want to quit, even with help, are not successful in staying away from cigarettes (Ferguson, Bauld, Chesterman, & Judge, 2005). As current psychological interventions do not seem to be effective for a large number of smokers, it is important to understand how the basic therapeutic components affect the underlying processes of the craving experience (i.e., subjective, physiological, cognitive and behavioural) which precedes tobacco use.

In the present set of studies, 79 daily smokers (46.80% females; *M*age=25.07) were randomly allocated to cognitive reappraisal or acceptance emotion regulation training, or to a control condition where they were asked to use their usual emotion regulation strategy to cope with smoking cravings. After training, participants were exposed to videos containing smoking-related cues and to their smoking paraphernalia in vivo, and during that time measures of self-reported craving and negative affect as well as psychophysiological reaction measurements were taken. Moreover, participants had to complete a modified Stroop task measuring attentional bias to smoking-related cues and the modified Paced Auditory Serial Addition Task (PASAT-C) which measures distress tolerance. Participants also smoked a cigarette before and after the experimental session while smoking topography measures were obtained.

Results showed that the three emotion regulation strategies did not differ on most of the correlates of smoking craving, as all the examined strategies affected smoking craving aspects in the laboratory context in the same way. However, cognitive reappraisal and acceptance led to significant decreases in mean puff duration compared to the control group. These results are promising for the use of cognitive reappraisal and acceptance to change smokers' tobacco use.

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CHAPTER I: GENERAL INTRODUCTION

Cigarette smoking is the primary cause of preventable premature death (U.S. Department of Health and Human Services [USDHHS], 2014), with estimates that about half of individuals who smoke will die from a smoking-related health condition (World Health Organization [WHO], 2016). Cigarette smoking is related to a number of diseases and with poor health status (USDHHS, 2014). Data on smoking cessation, mainly from studies conducted in U.S., show that almost 70% of individuals who smoke want to stop smoking, and more than 55% had tried to quit smoking during the previous year (Centers for Disease Control and Prevention [CDC], 2017; Fiore et al., 2008; Health and Social Care Information Centre [HSCIC], 2015). However, among those trying to quit smoking without help, less than five percent are successful at six months (Hughes et al., 1992), and among those who try to quit smoking and receive help, only one in seven is found to be successful one year later, with relapse more likely to occur in the first 6 months of cessation (Ferguson, Bauld, Judge, Chesterman, & Judge, 2005). These data show that even with help from a professional or medication, the majority of individuals who try to quit smoking relapse and thus continue to be at risk for serious smoking-related health problems. Thus, to develop more effective smoking cessation interventions, it is important to better understand the processes that precede tobacco use, and to investigate how basic therapeutic components affect them.

A major factor leading to cigarette smoking is craving. Craving is divided into two categories: general and cue-induced craving (Wray, Gass, & Tiffany, 2013). General craving refers to the general levels of craving which fluctuate slowly during the day and are related to deprivation levels (Schuh & Stitzer, 1995). Although, general craving is important as it has been found to predict smoking relapse, especially when craving levels are measured post-quit (Wray et al., 2013), more scientific emphasis has been given to cue-induced craving, the overwhelming desire to smoke in the presence of smoking-related cues (Ferguson & Shiffman, 2009a). Indeed, cue-induced craving significantly affects treatment effectiveness and smoking cessation (Ferguson & Shiffman, 2009a). Exposure to smoking-related cues leads to increases in self-reported craving (e.g., Erblich, Bovbjerg, & Sloan, 2011) and often to lapses and relapses among smokers who trying to quit (e.g., Shiffman, Paty, Gnys, Kassel, & Hickcox, 1996). Cue-induced craving does not seem to affect only the subjective aspect of smoking craving, but the physiological aspect too. Although scientific emphasis has been given mainly to craving self-reports, a number of studies showed that smoking cue-exposure leads to increases in physiological activity too (e.g.,

Carter & Tiffany, 1999). The need for further studies examining the physiological aspect of the craving experience has been highlighted, as this type of measurement is seen as more objective compared to self-reports (Serfaty, Gale, Beadman, Froeliger, & Kamboj, 2018).

Apart from the significant impact of cue-induced craving on tobacco use (e.g., Waters et al., 2004), attentional bias to smoking-related cues affects smokers' craving experience and smoking behaviour. Learned associations, which are developed from repeated exposures to smoking cues during tobacco use, affect smokers' attentional processes (e.g., Sayette, 1999). Smokers tend to show extended focus on smoking-related cues compared to neutral stimuli, which leads to the experience of high levels of craving (e.g., Field & Cox, 2008; Waters et al., 2014). Attentional bias seems to have an important role in tobacco use as it significantly affects lapses and relapses in smokers who are trying to quit (Marhe, Waters, van de Wetering, & Franken, 2013).

Smokers who want to quit smoking should effectively cope with the presence of smoking-related cues in their environment and any craving emotional and physical symptoms which they may experience in order to abstain from smoking. However, as exposure to smoking-related cues usually leads to physical and psychological discomfort, many smokers end up smoking in order to escape from the unpleasant feelings and somatic symptoms, such as negative affect and craving symptoms (e.g., Brown, Lejuez, Kahler, Strong, & Zvolensky, 2005). As distress and negative affect can be observed during exposure to smoking-related cues, but also during other everyday life situations, distress tolerance is essential for an effective smoking cessation attempt (e.g., Abrams et al., 1987; Brown et al., 2005). Indeed, distress intolerance has been found to characterize smokers, who smoke as a way to escape or avoid negative emotions, making their quit attempts even more difficult (Zvolensky & Otto, 2007). To sum up, exposure to smoking-related cues and smokers' attentional bias to smoking-related cues lead to intense cravings to smoke. The intolerance that smokers show to the unpleasant internal events seems to worsen even more the situation, leading individuals to smoke even if they are trying to stop smoking (Cameron, Reed, & Ninnemann, 2013). Taking into account the difficulties that a smoker experiences during his/her effort not to smoke, smoking cessation interventions have undertaken a crucial role in helping individuals to successfully quit smoking.

As smokers have to effectively cope with unpleasant internal and external situations to abstain from tobacco use, several smoking cessation interventions emphasize training on emotion regulation. Cognitive Behavioural Therapy (CBT) and Acceptance and Commitment Therapy (ACT) are two of the main therapeutic approaches that have shown

to be effective, including substance abuse treatment (Hofmann, Asmundson, & Beck, 2013; Powers, Vörding, & Emmelkamp, 2009; Ruiz, 2012). CBT's main emotion regulation strategy is cognitive reappraisal (Hofmann & Asmundson, 2008) which refers to the cognitive transformation of the situation to change its emotional impact (Gross, 1998b). One of the main emotion regulation strategies of ACT is acceptance, which refers to the active and aware embracing of unpleasant thoughts, feelings and somatic symptoms without attempting to change their form or frequency (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Cognitive reappraisal differs from acceptance as CBT supports that dysfunctional thoughts should be changed to be more realistic, while ACT supports that individuals should not act upon dysfunctional thoughts and emotions but they should give them the opportunity to come and go (Chambers, Gullone, & Allen, 2009).

Because of the differences between cognitive reappraisal and acceptance, the two strategies likely differ on how they affect craving experience and subsequent smoking behaviour (Hofmann & Asmundson, 2008). However, only one study has compared cognitive reappraisal vs. acceptance for smoking craving (Szasz, Szentagotai, & Hofmann, 2012). This study showed that cognitive reappraisal affects the whole craving experience (i.e., self-reported craving and negative affect, attentional bias and distress tolerance) leading to lower levels of craving, negative affect and attentional bias to smoking-related cues and higher levels of distress tolerance in comparison to acceptance. However, as the study had a number of methodological issues (Serfaty et al., 2018), including a lack of a control group, further studies need to be conducted for more conclusive results. Moreover, it is unclear whether these two basic therapeutic emotion regulation strategies affect physiological reactions during cue-exposure, and most importantly smoking behaviour.

Present studies

The aims of the present studies were to examine the effectiveness of two emotion regulation strategies, cognitive reappraisal and acceptance, on subjective, objective, cognitive and behavioural correlates of craving in comparison to a control group. An active control group (i.e., usual strategy for coping with smoking cravings) was included in these studies, as it is the closest to what participants use in their everyday life and it was thought that it is the best group for comparison regarding the effectiveness of the other two emotion regulation strategies. Moreover, for these studies, Barnes-Holmes & Hayes' (2003) recommendations regarding the conductance of experimental studies in examining the effectiveness of treatment components were followed for the design of the experiment. To achieve the overarching goals of this thesis, these aims were addressed over 3 studies:

Study 1.

The aim of Study 1 (Chapter II) was to examine the impact of cognitive reappraisal, acceptance, and usual emotion regulation strategy on the subjective, physiological and behavioural aspects of smoking craving. Specifically, smokers were randomly assigned to receive training in using cognitive reappraisal, acceptance or their usual emotion regulation strategy to cope with cue-induced smoking craving. Participants were exposed to smoking cues via videos and in vivo, and their craving experience was measured with the use of self-reports (for craving and negative affect) and physiological measures. Moreover, their actual smoking behaviour was assessed pre- and post-experiment. The three emotion regulation strategies were compared to investigate the presence of differences in subjective, physiological and behavioural aspects of smoking craving due to their use. Furthermore, it was examined if in vivo exposure produces higher levels of craving compared to video exposure to smoking-related cues.

Study 2.

The aim of Study 2 (Chapter III) was to examine the impact of cognitive reappraisal vs. acceptance training, compared to participants' usual emotion regulation strategy, on attentional bias to smoking-related cues. After training in either reappraisal or acceptance, participants completed a modified Stroop task which included neutral and smoking-related words and pictures to better understand emotion regulation strategies' impact on attentional bias. Moreover, it was examined if the pictorial version of the modified Stroop task produced higher levels of attentional bias compared to the linguistic version based on the assumption that pictorial stimuli are more ecologically valid.

Study 3.

This aim of Study 3 (Chapter IV) was to examine if the use of the three emotion regulation strategies differently impacts task persistence (i.e., the behavioural aspect of distress tolerance) and emotional response (i.e., dysphoria and craving) during a psychologically challenging situation. After the modified Stroop task (see Chapter II), participants completed the modified Paced Auditory Serial Addition Task (PASAT-C), a mentally challenging task found to induce negative affect (e.g. frustration and distress) to assess task persistence in the face of negative emotions and completed self-reports for smoking craving and dysphoria. Results of this study will help to better understand how the different strategies aid individuals to cope effectively with psychological distress.

CHAPTER II – STUDY 1: HOW EMOTION REGULATION STRATEGIES AFFECT SUBJECTIVE, PSYSIOLOGICAL AND BEHAVIOURAL ASPECTS OF SMOKING CRAVING?

Introduction

Craving

Craving is the emotional state that reflects the activation of motivational and drug-acquisitive systems that are related to particular subjective, physiological, behavioural and cognitive correlates (Baker, Morse, & Sherman, 1986; Sayette, Martin, Hull, Wertz, & Perrott, 2003). Craving, the overwhelming desire to use a drug, is important in cigarette addiction as it affects smoking cessation attempts in several ways (Fergurson & Shiffman, 2009a). Before a smoking cessation attempt, the fear of experiencing craving during the quit attempt is an important reason for not trying to quit smoking (Ferguson & Shiffman, 2009a). Moreover, after a quit attempt, craving severity negatively influences the quit attempt by leading to lapses (Ferguson & Shiffman, 2009a; Ferguson, Shiffman, & Gwaltney, 2006; Killen & Fortmann, 1997; Serre, Fatseas, Swendsen, & Auriacombe, 2015; Shiffman et al., 1997). The intensity of craving during the first days and weeks of smoking cessation predicts if the quit attempt will be effective (Ferguson et al., 2006; Killen & Fortmann, 1997; Shiffman et al., 1997). The importance of craving in tobacco use is also highlighted by its inclusion as one of the Diagnostic and Statistical Manual of Mental Disorders - 5th edition (DSM-5; American Psychiatric Association, 2013) criteria of tobacco use disorder.

Understanding what triggers craving to smoke may contribute to unveiling unsuccessful smoking cessation attempts. Based on the idea of general craving and the physiologic model of craving, nicotine produces changes in the brain of individuals who smoke by increasing the number of nicotinic receptors which seem to be related to tolerance and addiction (Breese et al., 1997). These brain changes produce an urge to smoke when nicotine is not available (Ferguson & Shiffman, 2009a). Support for this hypothesis comes from significant negative correlations found between self-reported craving and blood nicotine levels (e.g., Jarvik et al., 2000). However, craving is not induced only as a result of limited blood nicotine levels (Ferguson & Shiffman, 2009a). Thus, this physiologic model alone does not seem to explain the whole experience of craving.

Additionally, smokers attempting to quit smoking often report experiencing short episodes of intense urge to smoke during their attempt (Ferguson & Shiffman, 2009a). The unpredictability of the craving episodes in this case is difficult to be explained only by the

physiologic model of craving. If blood levels of nicotine were the only factor causing the urge to smoke, then self-reported craving should be consistent, as nicotine levels drop in a predictable manner following smoking cessation (Ferguson & Shiffman, 2009a). Interestingly, craving self-reports occur even after blood nicotine level has reached zero (Ferguson & Shifflman, 2009a; Tiffany, 1990) with ex-smokers reporting craving even 10 years after smoking cessation (Fletcher & Doll, 1969). Thus, craving seems to be a complex phenomenon and to fully understand it, research should go beyond its purely physiological aspects of withdrawal symptoms. Episodic (cue-induced) cravings which increase as the abstinence period increases (Bedi et al., 2011), seem to play a key role for lapses and relapses and be an important factor in the craving experience.

Cue-induced craving and its subjective and physiological aspects

Episodic craving, commonly called cue-induced craving (Ferguson & Shiffman, 2009b), refers to acute episodes of high intensity craving in response to a conditioned stimulus (Niaura et al., 1988). Any stimuli and events can become conditioned triggers for craving, with typical ones being the sight and smell of cigarettes, the sight of a lighter, the sight of someone else smoking, drinking coffee or alcohol, eating and feeling stress (Payne, Schare, Levis, & Colletti, 1991; Sayette & Hufford, 1994; Shiffman et al., 2002; Shmueli, Prochaska, & Glantz, 2010). Smoking-related cues have been found to elicit self-reported craving in many studies (e.g., Bailey, Goedeker, & Tiffany, 2009; Carpenter et al., 2014; Conklin, Robin, Perkins, Salkeld, & McClernon, 2008; Erblich et al., 2011) and negative affect (e.g., Hutchison et al., 1999) which predict later relapse in individuals who try to quit smoking (Waters et al., 2004). Moreover, clinical studies show that almost half of first lapses are preceded by exposure to smoking-related cues (e.g., Shiffman, 1982; Shiffman et al., 1996).

Craving responses to smoking-related cues have been primarily studied using self-reports, with few investigations examining the autonomic reactions to these cues (Erblich et al., 2011). Physiological reactions to smoking-related cues can be important as the somatic changes and possible dysphoria that nicotine users experience during exposure to cues, may significantly affect smoking craving and behaviour. Moreover, physiological reactions are mostly reflexive, and could constitute a better index of reaction to smoking-related cues compared to self-reports which can be affected by response bias (Franken, 2003). Indeed, evidence supports that learned associations between substance-related stimuli and physiological reactions lead to substance use (Childress et al., 1993). When a substance user is exposed to substance-related cues that have been repeatedly presented and related to the

past with the substance and its use, he/she tends to respond with increased physiological activity, such as somatic arousal (Childress et al., 1993).

Studies that examine the autonomic effects of smoking-related cues have shown that exposure to smoking cues leads to significant increases in systolic and diastolic blood pressure (e.g., Erblich et al., 2011; Heishman, Lee, Taylor, & Singleton, 2010; Taylor & Katomeri, 2006), heart rate (e.g., Balter, Good, & Barrett, 2015; García-Rodríguez, Weidberg, Gutiérrez-Maldonado, & Secades-Villa, 2013; Pachas et al., 2015), skin conductance (e.g., Grady, 2011; Heishman et al., 2010; Jerome, Jordan, Rodericks, & Fedenczuk, 2009; LaRowe, Saladin, Carpenter, & Upadhyaya, 2007; Pachas et al., 2015), corrugator electromyogram (e.g., Pachas et al., 2015), respiration rate (e.g., Jerome et al., 2009) and subjective craving (e.g., Carter & Tiffany, 1999; Conklin & Tiffany, 2001; Elash et al., 1995; García-Rodríguez et al., 2013; Heishman et al., 2010; Jenks & Higgs, 2010; Pachas et al., 2015). Increases in physiological reactions and self-reported craving due to exposure to smoking-related cues are found to persist for almost 30 minutes after exposure (Heishman et al., 2010), a finding that underlines the powerful role of smoking-related cues to craving.

However, other findings regarding the two basic measures of physiological reactivity (i.e., heart rate and skin conductance) to smoking cues have been equivocal. There are studies supporting that heart rate decreases during smoking cue-exposure (e.g., Niaura, Abrams, Demuth, Pinto, & Monti, 1989), while others find no difference in heart rate (e.g., Conklin et al., 2008; LaRowe et al., 2007) and skin conductance reactivity (e.g., Elash, Bovbjerg, & Sloan, 1995) between smoking-related and neutral stimuli. A number of factors may play an important role in this inconsistency. Studies differ in their inclusion criteria and many times small sample sizes are used (e.g., LaRowe et al., 2007) affecting the studies' power to identify statistically significant differences. Furthermore, there is variability in the way that smoking-related cues are presented (e.g., imaginary, via pictures or videos, in vivo), although in vivo cues and videos including smoking-related cues usually create higher levels of craving compared to imaginal exposure to smoking-related cues (Balter et al., 2015; Drobes & Tiffany, 1997; Hutchison et al., 1999). Finally, studies also differ on how they handle and analyse the collected physiological data. For example, some studies computed and analyzed difference scores for physiological data (e.g., Conklin et al., 2008; Niaura et al., 1989), while others analyzed data based on different time points (e.g., Balter et al.,, 2015; García-Rodríguez et al., 2013). These inconsistencies highlight the need for further studies

on how smoking-related cues affect physiological responses that employ large samples and standardized stimuli and measures.

Tobacco topography: A behavioural correlate of craving

The majority of studies examining craving and smoking behaviour in the laboratory measured latency to smoke a cigarette (e.g., Beadman et al., 2015; Carter & Tiffany, 2001; Warthen & Tiffany, 2009). Although smoking topography, the way a cigarette is smoked (such as number of taken puffs, inter-puff interval, puff duration; Arndt et al., 2013; Strasser, Pickworth, Patterson, & Lerman, 2004), is an important aspect of smoking behaviour, it has not received much attention to date. Smoking topography, which together with physiological reactions reflect the unconscious part of the craving experience (Gass, Motschman, & Tiffany, 2014; Tiffany, 1990), is crucial in tobacco use consequences. Increases in smoking topography's measures, such as puff volume and puff frequency, has been associated with increased exposure to nicotine and tobacco carcinogens, thus raising the risk for smoking-related health problems (Djordjevic, Stellman, & Zang, 2000).

The few studies using smoking topography measurements show that exposure to smoking-related cues leads to increases in craving and measures of smoking behaviour assessed by topography (e.g., increase in number of puffs: Hogarth, Dickinson, & Duka, 2010; total puff duration and latency to first cigarette: Payne et al., 1991; puff frequency and latency to first cigarette: Surawy, Stepney, & Cox, 1985). In addition, smoking topography measurements (such as puff volume, inter-puff interval and puff velocity) predict abstinence from tobacco use (Strasser et al., 2004). Findings from these studies provide preliminary evidence that tobacco topography is an important behavioural correlate of the craving experience, which needs to be further examined.

Emotion regulation: Cognitive reappraisal and acceptance

To resist smoking, individuals must effectively cope with their smoking craving. "Emotion regulation" refers to the processes by which individuals influence the type, intensity, duration and expression of emotion. Emotions are composed of experiential, physiological and behavioural aspects, and emotion regulation can instigate changes in all of these emotional aspects (Gross, 1998b). As non-effective emotion regulation of smoking-related craving plays a crucial role in tobacco use (e.g. Johnson, Farris, Schmidt, & Zvolensky, 2012), the necessity to identify and use effective emotion regulation strategies during exposuse to smoking-related cues is necessary to avoid lapses and relapses (Beadman et al., 2015).

Emotion regulation strategies for coping with craving and negative affect are main components of many psychological treatments for substance use (Kober, 2015; Potenza, Sofuoglu, Carroll, & Rounsaville, 2011; Litvin, Kovacs, Hayes, & Brandon, 2012). Cognitive Behavioural Therapy (CBT) and Acceptance and Commitment Therapy (ACT) are two widely used therapeutic approaches nowadays (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012; Pakenham, Scott, & Uccelli, 2018). CBT has a longer history and has been found effective for dealing with numerous psychological difficulties, including smoking (Hofmann et al., 2013; National Institute on Drug Abuse [NIDA], 2018). Recently, ACT has also shown promise in treating a number of psychological disorders (Powers, Vörding, & Emmelkamp, 2009; Ruiz, 2012), including addictions (de Groot, Morrens, & Dom, 2014).

CBT is considered to be a "second wave" behavioural therapy (Hayes, 2004; Öst, 2008) and is closely related to the philosophy of critical rationalism (Popper, 1959), which supports the existence of an ultimate truth that can be exported by examining hypotheses. According to CBT, individuals have the tendency to develop: a) beliefs regarding themselves, others and the world around them and b) automatic thoughts that occur when individuals feel threatened for any reason. Individuals learn to act based on these beliefs and thoughts which many times are irrational and maladaptive. CBT invites individuals to examine the truthfulness of their beliefs and thoughts by treating them as hypotheses to be tested to achieve a more rational way of thinking (Hofmann & Asmundson, 2008; Hofmann et al., 2013). In CBT cognitions play a crucial role, as cognition and perception of events are considered to strongly affect emotion and behaviour, with negative emotions and unhealthy behaviours being consequences of dysfunctional cognitions (Hofmann & Asmundson, 2008; Hofmann et al., 2013; Wright, Basco, & Thase, 2006). One main emotion regulation strategy, based on this theoretical approach, is cognitive reappraisal (Hofmann & Asmundson, 2008). Cognitive reappraisal refers to the cognitive transformation of a situation-stimulus to change its emotional impact (Goldin et al., 2012; Gross, 1998b).

ACT belongs to the "third wave" behavioural therapies (Hayes, 2004; Herbert & Forman, 2013; Öst, 2008) and is based on Relational Frame Theory and Functional Contextualism (Hayes, 2004; Hayes, Barnes-Holmes, & Roche, 2001). Relational Frame Theory suggests that thoughts, emotions and bodily sensations earn their power mainly from the context in which they appear and not only from their frequency or form (Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004). ACT thus targets the context in which thoughts and emotions occur to bring about change (Hayes, 2004). It supports that psychological problems are a result of psychological inflexibility, the inability to change one's behaviour to be in

accordance to his/her values (Hayes, 2004). The goal of ACT is to increase psychological flexibility, which refers to a number of dynamic processes that unfold over time and include a) adaptation to fluctuating situational demands, b) reconfiguring of mental resources, c) shifts in perspective and d) balance of competing desires, needs and life domains (Kashdan & Rottenberg, 2010). Acceptance is a main ACT emotion regulation strategy and it refers to the active and aware embracement of thoughts and feelings without attempting to change their form, intensity or frequency (Hoffman & Asmundson, 2008). Its aim is to change the function of thoughts and emotions rather than their content (Hofmann & Asmundson, 2008).

Both CBT and ACT include dealing with cognitions as a crucial part of their therapeutic model (Hofmann & Asmundson, 2008), but they differ on philosophical roots and, by extension, on the techniques utilized to change behaviour (e.g., differences on how techniques, such as cognitive reappraisal and acceptance deal with problematic cognitions), and on the putative way their techniques affect emotion regulation aspects (subjective, physiological, behavioural). In the case of smoking craving, by using cognitive reappraisal individuals change any dysfunctional (unrealistic) smoking-related thoughts to more functional (realistic) ones (Beadman et al., 2015; Serfaty, Gale, Serfaty et al., 2018). By using acceptance, individuals embrace all smoking-related thoughts (make room and stop struggling to change them), thus actively tolerating difficult feelings and thoughts (Jenkins & Tapper, 2014) related to craving, and instead exert their energy for engaging in valued actions (e.g., taking care of themselves or others and their health; Hernández-López, Luciano, Bricker, Roales-Nieto, & Montesinos, 2009). These two emotion regulation strategies are thought to fall in different stages of the Process Model of emotion regulation (Gross, 1998b; Hoffman & Asmundson, 2008), with each having different effects on the craving experience.

Cognitive reappraisal and acceptance in the Process Model of emotion regulation

The Process Model of emotion regulation postulates that emotion generation is a dynamic process that unfolds over time. During this time, individuals evaluate emotional internal and external cues and show experiential, physiological and behavioural responses to these cues (Gross, 1998b). Emotion regulation strategies are differentiated based on when they have their primary impact on the timeline of the unfolding emotional response (Gross, 1998b) and they can be divided in antecedent-focused and response-focused (Gross, 1998a; 2002). Situation selection, situation modification, attention deployment and cognitive change are considered to be stages of antecedent-focused emotion regulation while response modulation belongs to response-focused emotion regulation (Gross, 1998a; 2002). Strategies

that take place during the antecedent-focused emotion regulation phase are expected to change the trajectory of the entire emotional response producing low levels of subjective, physiological and behavioural-expressive reactions to negative affect and craving. On the contrary, strategies targeting the response-focused phase are expected to decrease behavioural-expressive reactions but not the subjective experience. Also, response-focused emotion regulation strategies are expected to increase physiological responses due to the coexistence of the inhibition of behaviour while experiencing the emotion (Gross, 1998a; 2002). Indeed, earlier emotion regulation of emotions has been found to have better results on emotional experience and behaviour compared to later regulation (Farb, Anderson, Irving, & Segal, 2015).

As the CBT technique of cognitive reappraisal helps in emotional adaptation to a negative event by reappraising the emotional cues early on, immediately following their appearance, it is considered to constitute an antecedent-focused emotion regulation strategy, acting in the cognitive change stage of Gross's model (Gross, 1998b). In cognitive change, individuals examine and re-evaluate the present situation to influence their emotional experience before the full generation of emotion (Gross, 1998b). On the contrary, the ACT technique of acceptance is thought to help in emotional adaptation by decreasing emotional avoidance while inviting the individual to experience the whole emotional experience (e.g., craving) and is thus considered by some to constitute a response-focused emotion regulation strategy, acting in the response modulation stage (Hoffman & Asmundson, 2008). Response modulation is suggested to appear after all the emotional aspects have been fully generated and includes efforts to affect experiential, physiological or behavioural responses to emotion-elicited cues (Gross, 1998b). In the case of ACT, acceptance seems to try to affect primarily behaviour and not the emotional experience itself (subjective and physiological reaction), and any emotional changes are considered to happen as a by-product of giving up the futile struggle to control or change emotions. Nevertheless, not all scientists agree with this division of the specific emotion regulation strategies. Specifically, Herbert and Forman (2013) postulate that both strategies (cognitive reappraisal and acceptance) are response-focused strategies. However, no evidence is provided to support this argument, so more research is needed to examine their assertions.

Preliminary evidence suggests that cognitive reappraisal can reduce cue-induced self-reported smoking craving (e.g., Kober, Kross, Mischel, Hart, & Ochsner, 2010; Zhao et al., 2012) and self-reported smoking craving while exposed to negative stimuli (Wu et al., 2015). Functional magnetic resonance imaging (fMRI) studies show that the use of cognitive

reappraisal to regulate craving leads to activations in regions (ventrolateral, dorsolateral and dorsomedial prefrontal cortices) which are usually activated in non-emotional forms of cognitive control. Cognitive reappraisal has also been found to result in a decrease of activation in regions such as ventral striatum and amygdala (e.g., Kober, Mende-Siedlecki et al., 2010), suggesting that the use of cognitive reappraisal is related with lower emotion activity. Additionally, cognitive reappraisal leads to greater restraint in smoking behaviour immediately after emotion regulation training compared to suppression (a strategy considered to be response-focused which aims to help individuals cope with craving by trying not to think about it) and less cigarettes smoked at 7-day follow-up (Beadman et al., 2015). These findings suggest that cognitive reappraisal is an effective strategy to reduce cue-induced craving and suggest that cognitive reappraisal acts on emotion generation processes before the full activation of emotion and its related response patterns (i.e., physiological, behavioural) develop.

In terms of acceptance and craving, there are few studies examining how ACT techniques affect smoking craving experience and behaviour. In one of the few available studies, training in acceptance resulted in less cigarettes smoked at 7-day follow-up compared to a control group (i.e., use your usual emotion regulation strategy for craving); however, the two groups did not differ on self-reported craving levels and negative affect (Bowen & Marlatt, 2009). In another study comparing acceptance, suppression and a control group (no instructions provided), acceptance resulted in less tobacco craving in one of the two self-reported craving measures and less negative affect compared to the control condition (Litvin et al., 2012). The suppression and acceptance groups did not differ on self-reports of craving. Regarding smoking behaviour, no significant differences in cigarettes smoked at 3-days follow-up after the training was found between the three groups (Litvin et al., 2012). It is important however to mention that, in the specific study (Litvin et al., 2012), the acceptance strategy also included cognitive defusion (i.e., distancing oneself from unhelpful thoughts by focusing on the process of thinking; Hesser, Westin, Hayes, & Andersson, 2009) which is another core technique of ACT, so the results do not reflect solely the impact of acceptance. Finally, in a study in which smokers were viewing smoking-related pictures passively or by noticing and accepting their internal experience while undergoing fMRI, mindful attention significantly reduced self-reported craving and distress. Moreover, mindful attention led to reduced neural activity in an area of subgenual anterior cingulate cortex which is related to craving (Westbrook et al., 2013). These findings suggest that acceptance regulates craving by preventing the increase of craving symptoms, rather than by

reducing them once they appear (Kober, 2015; Westbrook et al., 2013). As can be seen, these results do not provide a clear picture regarding the impact of acceptance on smoking craving. Specifically, the inconsistencies regarding the impact of acceptance on self-reported craving and cigarettes smoked at follow-up may be an artifact of significant methodological differences between the studies regarding abstinent time, level of nicotine dependence, way of training on the emotion regulation strategies and type of stimuli used to induce craving.

Apart from the above limitations, one important drawback regarding the examination of emotion regulation in smokers is that although CBT and ACT are widely used in smoking cessation programs, there is a gap in the literature on studies examining and delineating differences on how the two main strategies, cognitive reappraisal and acceptance, act in the different aspects of the craving experience and whether indeed only cognitive reappraisal acts early in the emotion generation stage. To our knowledge, only one study has directly compared the effectiveness of the two approaches (cognitive reappraisal and acceptance) on smoking craving. Szasz and colleagues (2012) found that individuals who applied cognitive reappraisal showed lower self-reported smoking craving and negative affect compared to individuals who used acceptance and suppression. These results suggest that these strategies work on different phases of emotion generation and affect differently the smoking craving experience. However, this single study had limitations, including the absence of: a) any measure of actual smoking behaviour after training, b) physiological measures of craving experience and c) an actual control group (Svaldi, Tuschen-Caffier, Lackner, Zimmermann, & Naumann, 2012). The absence of more objective measures of craving is a significant limitation of emotion regulation research in general, as the majority of studies that examine the effectiveness of emotion regulation strategies are based on self-reports and do not investigate the other aspects of emotion regulation (Sarfaty et al., 2018; Wu et al., 2015). The absence of studies comparing cognitive reappraisal and acceptance on coping with smoking craving and the limitations of the conducted studies are important as non-conclusive statements can be made on how the specific emotion regulation strategies actually work and differ from each other (Gross, 1998b).

A more comprehensive comparison of cognitive reappraisal and acceptance and their effects on subjective experience, physiology and actual behaviour could aid in the understanding of whether different strategies are related with different consequences in craving experience. This knowledge could guide the promotion of the most effective emotion regulation strategies, based on their action (Gross, 2002), in smoking cessation programs.

Present study

The Study 1 aim was to contribute to the understanding of how two emotion regulation strategies which are suggested to act on different stages of the emotion regulation process affect craving correlates. Cognitive reappraisal, acceptance and individuals' usual emotion regulation strategy regarding craving compared in order to investigate their impact on subjective (self-reports of craving and negative affect), objective (physiological reactions) and behavioural (smoking topography) correlates of smoking craving.

Based on the theorizing that cognitive reappraisal is an antecedent-focused emotion regulation strategy as opposed to acceptance, which is proposed by some to be a response-focused strategy, and on existing research findings, it was expected that the:

1. Cognitive reappraisal group would show significantly lower levels of subjectively measured smoking craving and negative affect compared to the acceptance and control groups. No statistically significant differences were expected between the acceptance and control group.

2. Cognitive reappraisal group would show significantly better results on objective measures (lower heart rate, lower skin conductance) of smoking craving during exposure to smoking-related cues (videos and in vivo), compared to the acceptance and control group. No statistically significant differences were expected between the acceptance and control group.

3. Cognitive reappraisal would show the most significant improvements in tobacco topography (lower puff number, puff duration and higher inter-puff interval) compared to the acceptance and control group. The acceptance group was expected to show statistically significant differences (more improvement) in tobacco topography measures compared to the control group.

Moreover, as exposure to in vivo smoking cues has been found to be more effective in inducing craving compared to other types of exposure (e.g., imaginal; Balter et al., 2015), we included exposure to smoking cues via videos and in vivo exposure to personal smoking paraphernalia to assess the effectiveness of the three emotion regulation strategies upon different cue presentation modalities. Moreover, as in vivo exposure to personal smoking objects is more vivid and closer to what a smoker has to cope with in everyday life, with more sensory systems being involved compared to video exposure (Shadel, Niaura & Abrams, 2001), it was expected that in vivo exposure would create, in general, higher levels of self-reported craving compared to video exposure. Another study has examined the

difference between video exposure and in vivo exposure, however in vivo exposure did not include participants' personal smoking paraphernalia and the participants had to abstain from smoking for at least 12 hours prior to experimental session which may affect the results (Shadel et al., 2001). In this study, participants did not have to abstain from smoking and they were exposed to their own smoking paraphernalia which is closer to daily conditions.

Methods

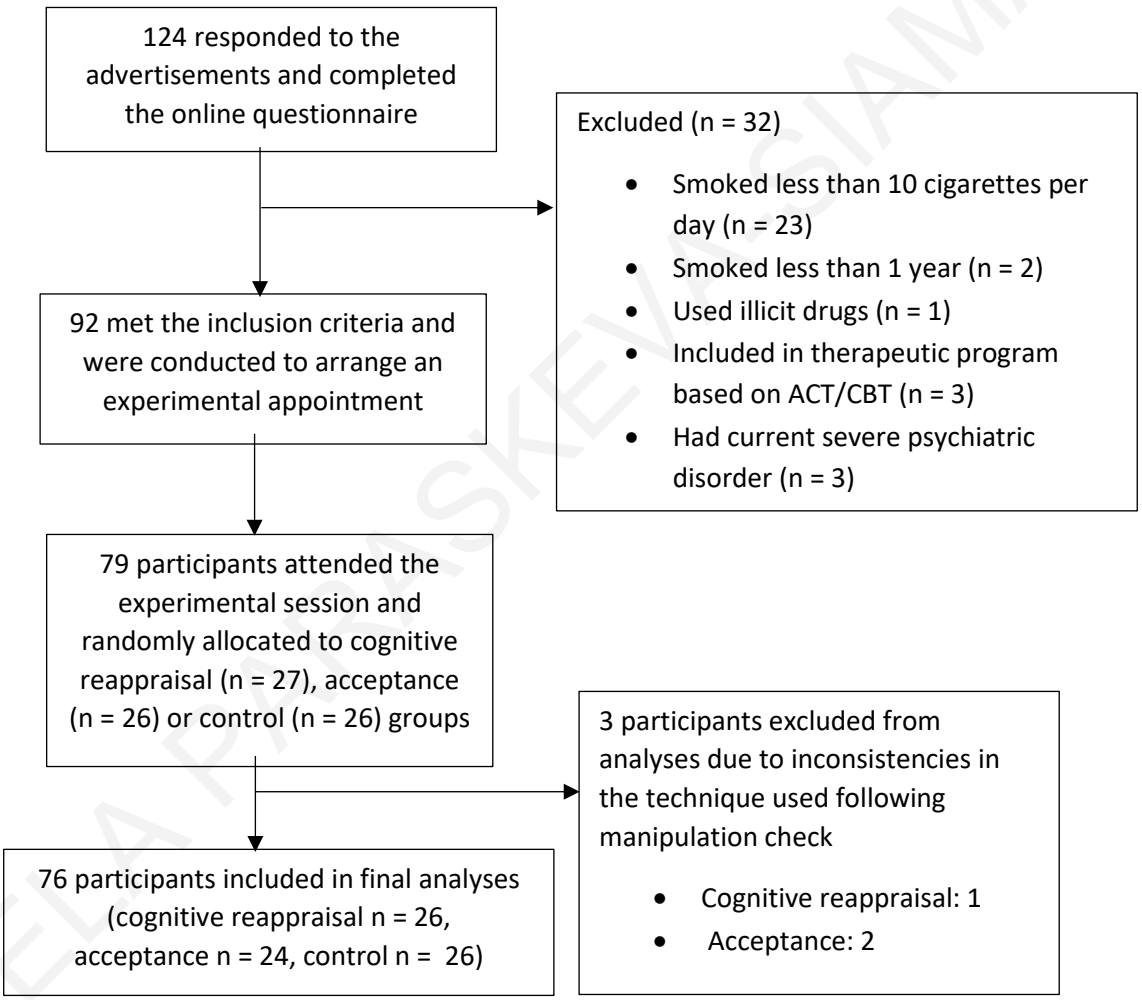
Participants

Of the 124 smokers who recruited through announcements in university courses, posters on University of Cyprus billboards, online announcements on "ACT*healthy* Laboratory" social media and word of mouth, and who completed the online screening questionnaire, 79 adult daily smokers (46.80% females; *M*age=25.07; 98.70% Greek-Cypriot/Greek) completed the experimental session. Regarding the final sample size, of the 79 participants, 3 of them were excluded, based on manipulation check (see below), from further description and statistical analyses, leaving a final sample of 76 participants (Figure 2-1). Complete data were available for 26 participants in the Cognitive Reappraisal group, 24 in the Acceptance group and 26 participants in the Control (usual strategy) group. Recruitment of participants was based on a priori power calculation (Faul, Erdfelder, Lang, & Buchner, 2007) which showed that a total sample of at least 69 participants was required to detect an interaction in a repeated measures ANOVA with an alpha level of 5%, desired power of 80% and effect size of η^2=0.13 for self-reported craving (Szasz et al., 2012).

Advertisements presented this as a study that sought to understand smokers' behaviour and not as a smoking cessation treatment. Inclusion criteria were: a) be 18 years of age or above, b) be an active smoker for at least 1 year, c) smoke at least 10 cigarettes per day, d) speak and write Greek fluently, e) be willing to provide a carbon monoxide breath sample and f) be willing to smoke two cigarettes while being video-taped as part of the experimental procedure. Motivation to stop smoking was not an inclusion criterion for these studies. Exclusion criteria were: a) suffering from a current severe self-reported psychiatric disorder (e.g., major depressive episode, psychotic episode) or meeting the DSM-V criteria for alcohol use disorder, b) current use of medication for a psychiatric disorder, c) current use of illicit drugs, d) previously or currently enrolled in a psychological intervention based on CBT or ACT and e) current use of nicotine replacement therapy or any other smoking cessation program. These exclusion criteria were queried and individuals had to reassure the absence of these conditions.

For participation in the study, university students could opt to receive extra credit and all participants received compensation of €10. Moreover, all participants who completed the experimental session had the opportunity to receive a brief personality assessment (Traits Personality Questionnaire 5, TPQue5; Tsaousis & Kerpelis, 2004), and received a personality report. Ethical approval from the Cyprus National Bioethics Committee was obtained and participants gave their written consent to participate to the study.

Figure 2-1. Recruitment procedure and actual attendance to the experimental session.



Measures

Demographic and smoking history questions.

For demographic information, questions were included regarding gender, age, ethnicity, education level and marital status. Regarding smoking history, number of cigarettes smoked per day, years of smoking, previous smoking cessation attempts, and preferred cigarette type were assessed (e.g., Karekla, Symeou, Tsangari, Kapsou, & Constantinou, 2009).

Nicotine dependence.

The Fagerström Test for Cigarette Dependence (FTCD; Fagerström, 2011; Heatherton, Kozlowski, Frecker, & Fagerström, 1991; Greek version: Karekla et al., under preparation) is the most commonly used self-report questionnaire assessing nicotine dependence (De Leon et al., 2003). It includes 6 questions regarding smoking and can be completed within 2-3 minutes. FTCD provides a total score ranging from 0-10, with the cut-off score for nicotine dependence to be ≥4 (Huang, Lin, & Wang, 2008). FTCD has been found to be related to biological markers of smoking and dependence such as plasma levels of nicotine and cotinine (Fagerström, Heatherton, & Kozlowski, 1992), expired air carbon monoxide (Kozlowski, Porter, Orleans, Pope, & Heatherton, 1994), and it is supported that it measures mainly the physical aspect of dependence (Dijkstra & Tromp, 2002). FTCD has shown good test-retest reliability and internal consistency (α=.64: Pomerleau, Carton, Lutzke, Fleeland, & Pomerleau, 1994; α=.68: Etter, 2005) and it is supported to be a valid measure of nicotine dependence (Fagerström et al., 1992; Pomerleau et al., 1994). FTCD showed acceptable internal consistency in the current sample (α=.61).

Carbon monoxide (CO) measurement.

Expired carbon monoxide was measured at arrival to the laboratory to assess participants' smoking status and also immediately before the beginning of the experiment to assess their CO level after smoking a cigarette at the beginning of the experimental procedure. CO level was measured using breathanalyzer (Micro^{+TM} Smokelyzer$^{®}$, Bedfont Scientific Ltd). Carbon monoxide is the most commonly used biological measure in experimental smoking studies as it provides an easy, non-invasive and immediate way of assessing participants' smoking status (Middleton & Morice, 2000).

Motivation to quit smoking.

Motivation to Stop Scale (MTSS; Kotz, Brown, & West, 2013) refers to a scale consisting of one item which asks individuals to select one of the seven choices that better represents their motivation to quit smoking. Possible responses range from "I don't want to stop smoking" to "I REALLY want to stop smoking and intend to in the next month". It is supported that this single scale includes intention, desire and belief regarding smoking cessation which have been suggested to be necessary components of motivation (West, 2005). MTSS is found to successfully predict future smoking quit attempts (Kotz et al., 2013)

and was translated and used to assess participants' motivation to quit smoking during recruitment.

Emotion regulation style.

Affective Style Questionnaire (ASQ; Hofmann & Kashdan, 2010; Greek version: Paraskeva-Siamata, Michael, & Karekla, 2018) is a 20-item self-report questionnaire that assesses individual differences in emotion regulation. It was developed based on the notion that emotion regulation strategies can be divided in three categories: strategies that aim to conceal or suppress affect, strategies that aim to manage affect to adapt successfully to the situation and strategies that aim to tolerate and accept emotions even unwanted ones. Based on this theory, the questionnaire consists of 3 subscales: Concealing, Adjusting and Tolerating, with suppression, reappraisal and acceptance be representative strategies of the first, second and third subscale respectively. Individuals use a 5-point Likert scale, with 1 meaning "not true of me at all" and 5 "extremely true of me", to answer questions regarding how they experience and manage their emotions. For the purposes of this study, the instructions were modified so that participants answered to each question regarding "craving" and not "emotions in general" (Szasz et al., 2012).

ASQ was used to ensure that there were no differences between groups regarding emotion regulation of craving, before the experimental manipulation. ASQ has shown good validity and internal consistency (*a* for Concealing=0.84, Adjusting=0.82 and Tolerating=0.68; Hofmann & Kashdan, 2010). Moreover, ASQ has been highly correlated with other measures of emotion regulation (Hofmann & Kashdan, 2010) such as Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) and Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011). The specific questionnaire was translated and validated (Paraskeva-Siamata, Michael, & Karekla, 2018) for use in the present study and have shown good internal consistency (Concealing *a*=.84, Adjusting *a*=.83, Tolerating *a*=.66). The ASQ showed adequate internal consistency in the present sample (Concealing α=.83; Adjusting α=.77; Tolerating α=.60).

Self-reported craving.

Questionnaire on Smoking Urges-Brief (QSU-Brief; Cox, Tiffany, & Christen, 2001) is a 10-item self-reported questionnaire assessing craving rated on a 7-point scale ranging from "strongly disagree" to "strongly agree" (Toll, Katulak, & McKee, 2006), with higher total scores indicating higher urge to smoke. QSU-Brief consists of two underlying factors: desire and intention to smoke with a rewarding perception of smoking and relief

from negative affect/withdrawal symptoms with an urgent desire to smoke (Cappelleri et al., 2007; Cox et al., 2001). The two subscales have shown excellent internal consistency (α=0.97 and 0.92 respectively: Cox et al., 2001; α=0.93 and 0.91 respectively: Szasz et al., 2012) and are supported to be a valid measure of smoking urge (Cappelleri et al., 2007). For the purposes of this study, the Greek validated version of the questionnaire was used (Karekla, Panayiotou, & Collins, 2017) which has shown excellent internal consistency (α for all items = 0.94). In the current sample, the scale showed excellent internal consistency too (First Factor α=.94; Second Factor α=.90; Overall α=.95).

Negative affect.

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item self-report questionnaire assessing positive and negative affect. Individuals score on a Likert scale in which 1 means "never" and 5 "always" the degree to which 20 adjectives (10 positive and 10 negative) describe how they generally feel. For the purposes of the specific study only the negative affect scale was used and instructions were modified to ask participants to rate the objectives based on how they feel "right now, i.e. at the present moment", as the interest was their mood at the present moment and not their general mood (Cameron et al., 2013). The scale was also changed so that 1 means "very slightly or not at all" and 5 "extremely". PANAS is a well-used questionnaire and it has been found to be a valid tool with good internal consistency (α for positive affect=0.89 and for negative affect=0.85; Crawford & Henry, 2004; Schmukle, Egloff, & Burns, 2002). The Greek validated version of the questionnaire which was used (Karekla et al., 2017), has shown good internal consistency (α=0.81). Based on a previous study by our laboratory (Karekla et al., 2017), 5 of the 10 items were selected to be used (distressed, upset, irritable, nervous, jittery) as these items seem to be more sensitive to changes while experiencing craving. The modified PANAS – Negative Affect subscale showed very good internal consistency in the current sample (α=.91).

Manipulation check and plans on using the emotion regulation strategy in the future for coping with cravings.

To confirm that the reappraisal and acceptance groups used the instructed emotion regulation strategy while the control group used their commonly used strategy, participants had to write, at the end of the experimental session a detailed description of the emotion regulation strategy which they used. These descriptions together with the brief description (2-3 sentences) of the learned strategy written during the emotion regulation

strategy training (see below) were checked by two independent researchers who were blind to the group allocation to confirm the correct use of the strategies based on the group in which individuals were included (Barnes-Holmes & Hayes, 2003). Percentage of agreement among assessors was 93.67%. For the cases where assessment diverged, agreement was reached through discussion and another assessment by a third assessor was solicited. Three participants (one from the cognitive reappraisal group and two from the acceptance group) whose descriptions did not approximate the learned emotion regulation strategy were excluded from the analyses.

Moreover, individuals had to answer the following questions: a) "How much did you use cognitive reappraisal/acceptance/your commonly used emotion regulation strategy regarding craving during the experiment when you had a craving to smoke?" and b) "How useful did you find cognitive reappraisal/acceptance/your commonly used emotion regulation strategy regarding craving to cope with smoking craving?" with answers ranging from "never/not at all" (0) to "all the time/extremely" (10). To examine their plans for possibly using the strategy in the future, participants answered one more question: "How possible is that you are going to reuse cognitive reappraisal/acceptance/your commonly used strategy during future smoking cravings?" with answers ranging from "never" (0) to "extremely possible" (10).

Physiological measures of craving.

Biopac MP150 (BIOPAC Systems, Inc., Goleta, CA), amplifiers and transducers were used to monitor the physiological reactions to smoking-related cues (videos and in vivo). The resulting data were analysed using Acknowledge 3.9.0 software (Biopac Systems, Goleta, CA). Eprime 2.0 software (2.0.10.356 version; Psychology Software Tools, Pittsburgh, PA, USA) was used for the timing of events and stimulus presentation. Heart rate and skin conductance were used as measures of autonomic arousal. For heart rate, disposable Ag/AgCl electrodes filled with electrode gel were placed on participants' left and right inner forearms. Raw ECG was filtered by a BIOPAC ECG100C bioamplifier, set to record beats per minute in milliseconds. Skin conductance level was recorded continuously using a BIOPAC GSR100C transducer amplifier. The BIOPAC TSD203 skin conductance transducer was placed to participants' intermediate phalanges of the index and middle fingers of the non-dominant hand. Mean scores for heart rate and skin conductance level were computed for the 3 last minutes of the 5-minute relaxation period (baseline), for the 3 minutes of the video exposure and for the 3 minutes of the in vivo exposure. Physiological data were inspected for "noisy" data (i.e., greater than 20 microsiemens for skin conductance

level and higher than 140 beats per minute). No participants showed problematic signals, so all were included in the analyses.

Experimental tasks

Emotion regulation strategies.

The instructions for the training of the emotion regulation strategies were presented on a computer as a pre-recorded audio recording, to avoid any confounding experimenter effects (Beadman et al., 2015). For around 20 seconds during the audio recording, participants of cognitive reappraisal and acceptance groups were presented with an on-screen graph regarding the relationship between thoughts, emotions and behaviour (to graphically see what was presented to them orally) while the control group had a graph related to their presented material (see below). Based on the suggestions from Barnes-Holmes and Hayes (2003), the instructions of the cognitive reappraisal and acceptance groups were matched for the number of smoking-related cues and the instructions of all the groups were matched as much as possible for length and complexity. This procedure comes in contrast with the only study which compared cognitive reappraisal vs. acceptance in smoking craving (i.e. Szasz et al., 2012), where instructions were not matched for any the above (or other) characteristics.

For the development of the cognitive reappraisal and acceptance instructions, previous studies that examined CBT and ACT components were taken into account (e.g., Beadman et al, 2015; Bowen & Marlatt, 2009; Jenkins & Tapper, 2014; Szasz et al., 2012). Reappraisal and acceptance instructions included a clinical and theoretical rationale for the use of each emotion regulation strategy and an experiential exercise to better understand how to use the strategy. The inclusion of these components has been suggested to be highly important for increasing the effective use of therapeutic components–strategies in laboratory studies (Barnes-Holmes & Hayes, 2003; Levin, Hildebrandt, Lillis, & Hayes, 2012). Two experts (one for the CBT and one for the ACT approach) went through the instructions to ensure that each one was representative to its therapeutic approach (suggested procedure in Barnes-Holmes & Hayes, 2003).

Specifically, instructions for both reappraisal and acceptance: a) explained the connection between thoughts, feelings and behaviour, b) explained what cognitive reappraisal / acceptance is and how it works and c) included an experiential exercise to better understand strategy's use regarding craving. Cognitive reappraisal instructions invited participants to approach with more rationality, any smoking-related thoughts, feelings and

somatic symptoms, while acceptance invited them to accept their smoking-related thoughts feelings and somatic reactions without judging them. Cognitive reappraisal instructions were based on a "court" metaphor, as individuals took over investigator's role, trying to collect as much evidence as possible against smoking (modified by Beadman et al., 2015). Acceptance instructions were based on "urge surfing" metaphor as individuals had to imagine that craving is a wave which would reach a peak and then recede, so they just had to identify and accept their craving rather than act on it (Marlatt, Bowen, Chawla, & Witkiewitz, 2008; Marlatt & Gordon, 1985; Marlatt & Kristeller, 1999). Instructions of both groups intended to provide individuals with the expectation that the learned emotion regulation strategy would produce beneficial effects regarding craving management (Beadman et al., 2015). Participats in the control group were presented an article regarding the beneficial impact of animals in our lives (Pagratis, 2018; this method has been used in other studies; e.g., Levitt, Brown, Orsillo, & Barlow, 2004; Litvin et al., 2012) and an experiential exercise regarding their usual emotion regulation strategy when confronting smoking craving followed.

During the experiential exercise, participants were asked to close their eyes and spend 3 minutes imagining that their favourite cigarette brand and their smoking paraphernalia are in front of them on the table. They had to notice their feelings and thoughts regarding smoking and try to cope with them by using cognitive reappraisal, acceptance or the emotion regulation strategy which they usually use while confronting craving. Specifically, the control group was instructed to deal with smoking-related thoughts and feelings in whatever way they usually use and find useful (e.g., Bowen & Marlatt, 2009; Hooper, Sandoz, Ashton, Clarke, & McHugh, 2012). At the end of the presentation and experiential exercise participants were informed that if they had any cravings while completing the tasks that would follow, they should deal with any smoking-related thoughts and feelings by using the learned emotion regulation strategy/usual strategy. To confirm the correct understanding of the learned strategies, after the experimental strategy, individuals summarized in 2-3 sentences the learned strategy while the control group briefly mentioned the strategy used during the exercise. The researcher checked the answers, and in cases where the participant had not correctly understood or used the learned strategy, further instructions were provided (based on the experimental manual) to ensure correct understanding and use, before proceeding to the next task. The duration of this procedure was around 20 minutes.

At the end of the experimental session (completion of all the tasks), participants completed the manipulation question and answered to the three questions regarding the usefulness of the emotion regulation strategy and their plans for using it in the future.

Cue-induced craving.

Participants were next exposed to smoking-related cues by viewing a number of videos and by in vivo exposure to their paraphernalia. The exposure to both videos including smoking-related cues and in vivo exposure was decided in order to have a more conclusive picture of the effect of emotion regulation strategies on cue-induced craving. The order of video exposure and in vivo exposure was counter-balanced, and participants had to indicate their craving level by completing the QSU-Brief before and after the first exposure procedure and after the second exposure. A set of 6 videos of 30 seconds duration each, depicting actors of both genders and of a variety of ages and ethnicities smoking cigarettes in a number of settings, were used to induce urge for smoking. These videos were selected from a set of 12 standardized videos previously found to successfully induce craving (Tong, Bovbjerg, & Erblich, 2007) which have been used in other studies too (e.g., Beadman et al., 2015; Szasz et al., 2012). For the selection of the 6 most-relevant videos, pilot testing took place before the Study 1 commenced. Twenty smokers (50% men; *M*age=30.60, *M* number of cigarettes smoked per day=5.95) completed an online questionnaire assessing the effectiveness of each video in order to induce craving to smoke. The presentation of the 6 selected videos during the task was counterbalanced based on the on the gender of the actor of the first video.

Regarding in vivo exposure, participants were exposed to personalized smoking cues (e.g., Beadman et al., 2015; Bowen & Marlatt, 2009; Du, Nides, Borders, Selmani, & Waverczak, 2014; Sayette & Dimoff, 2016; Wray, Godleski, & Tiffany, 2011). Their own cigarettes (or hand rolling tobacco pack, filters and rolling papers) and lighter were presented for 180 seconds to induce craving to participants by using also their own smoking-related objects. Instructions were delivered to participants via a pre-recorded audio recording. An opaque green box was placed in front of the participants that included the forenamed smoking-related objects and a white ashtray. The audio recording provided the following instructions: a) “Open the green box and place the box cap next to it (5 seconds); b) Observe the content of the box” (25 seconds); c) “Pick the pack of cigarettes or the hand rolling tobacco pack and examine it” (20 seconds); d) “Leave the pack of cigarettes or the hand rolling tobacco pack to the box” (5 seconds); e) “Take your cigarette from the box” (in case of rolling tobacco, they would have prepared a cigarette prior to the experiment); (5 seconds); f) “Hold the cigarette in your hand and look at it while you rotate it” (20 seconds); g) “Place the cigarette near your nose and smell it” (20 seconds); h) “Place the cigarette in your mouth and keep it there” (20 seconds); i) “Now pick up the lighter and bring it to the cigarette as if you are going to light it. Keep it there without lighting the cigarette” (20

seconds); j) “Put the cigarette and the lighter back in the box” (10 seconds); k) “Observe for a few more seconds the objects which are in the box in front of you” (25 seconds) and l) “Close the green box with its cover” (5 seconds).

Smoking topography.

Smoking topography measurements were obtained from analyses of the videos that were taken while participants were smoking a cigarette before and after the experimental session. Video-taped smoking behaviour has been used in previous studies (e.g. Blank, Disharoom, & Eissenberg, 2009; Frederiksen, Miller, & Peterson, 1977; Payne et al., 1991). The recent years there was a turn on mouthpiece-based computerized devices, however as there are studies showing that the mouthpiece affects smoking behaviour (e.g. Evans, 2003; Höfer, Nil, & Bättig, 1991), the more traditional form of videos was preferred to ensure that smoking behaviour will not be affected due to the smoking equipment. For the video recording, a SONY HDR-CX240E video camera on a tripod was used. Two independent researchers analysed the video-tapes and random checks were conducted to ensure that data were analysed correctly. Measures of smoking topography included number of puffs, puff duration and inter-puff interval (Appendix H). Duration from the time the tip of the cigarette lit until the time the fire went down was calculated as puff duration. As inter-puff interval, the time from the removal of the cigarette from the individual’s lips until the repositioning of the cigarette to the lips for the next puff, was calculated.

Procedure

Table 2-1 shows in detail the steps of the experiment together with the average duration of each. Individuals who were interested in participating completed a “SurveyMonkey” online questionnaire to confirm their eligibility to be included in the study. Participants had to answer some questions regarding their demographics, smoking behaviour, FTCD and motivation to quit smoking (Appendix A). Eligible individuals were invited to come to the laboratory and their visit was scheduled. They were asked to bring to the session their own cigarette packet (or hand rolling tobacco pack, filters and rolling papers) and their lighter. As soon as they arrived at the laboratory, they were informed about the study, provided their written informed consent (Appendix B) and handed over to the researcher their smoking paraphernalia. Then, CO level was measured and they were transferred out of the laboratory building in order to smoke one of their cigarettes while being video-recorded. Then, they returned to the laboratory and the ASQ was completed to examine their general use of emotion regulation strategies (Appendix C). After that,

participants were comfortably seated in front of a computer and psychophysiological measurement devices were connected based on protocol. Physiological monitors were attached and tested. Participants were seated quietly for 5 minutes to establish a stable psychophysiological baseline (e.g. Bordnick, Graap, Copp, Brooks, & Ferrer, 2005) while listening to relaxation music. After the relaxation period, breathanalyzer test was repeated to assess CO level after smoking and the QSU-Brief and the PANAS – Negative affect subscale were completed to measure baseline craving level and affect status (Appendix D). Then, participants were randomly assigned to one of the three groups (cognitive reappraisal, acceptance, control). Participants listeded to the pre-recorded audio recording explaining to them the cognitive reappraisal or acceptance, or they heard about the beneficial impact of animals on our lives. During the audio recording all groups were invited to complete an experiential exercise regarding smoking craving (Appendix E). After the assessment regarding the correct understanding of the provided information (Appendix F), participants again completed the QSU-Brief and the PANAS -Negative affect subscale.

Next, during the cue-induced craving procedure participants had to view a set of six 30 seconds videos in which three male and three female actors were smoking and were exposed to their own cigarette, lighter and ashtray for another 180 seconds. Participants then completed the QSU-Brief and the PANAS – Negative affect subscale. A few more tasks (i.e. the modified Stroop task and the PASAT-C task) and questionnaires were completed, but they are upon the purposes of the specific Chapter- Study 1. Before each task, participants were reminded shortly (Barnes-Holmes & Hayes, 2003) to use the learned strategy (or to use their usual emotion regulation strategy for coping with cravings) when they confront smoking-related thoughts and feelings. At the end, participants provided a detailed qualitative description of the used strategy together with answering to the 3 Likert scale questions regarding the used strategy (Appendix G). Finally, participants were transferred again outside of the building to smoke one more cigarette while being video-recorded (Appendix H). Then, they were debriefed, thanked for their participation, paid the indicative amount of €10 for their time. The whole experimental session had a duration of 2 hours.

Table 2-1. Order of task administration during the experiment.

Time (in minutes)	**Tasks, procedures and measures**
10	Information sheet, written consent, breathalyser test and delivery of personal smoking paraphernalia
5	Smoking while being video-recorded
10	Completion of a set of questionnaires
10	Placement of physiological monitors and technical problems check
5	Relaxation
5	Breathanalyzer test and completion of QSU-Brief and PANAS – Negative affect subscale
20	Presentation of emotion regulation strategies or neutral article, experiential exercise, check of understanding, QSU-Brief and PANAS – Negative affect subscale completion
10	Cue-induced craving (videos and in vivo) Completion of QSU-Brief and PANAS – Negative affect subscale (pre- and post-first exposure procedure and post-second exposure)
15	Modified Stroop task
20	PASAT-C task and completion of dysphoria scale
10	Completion of QSU-Brief, manipulation check (detailed description and one-item questions), smoking of cigarette while being video-recorded, debriefing
Total time: 120 minutes	End of the whole experimental procedure

Statistical analyses

In order to check for baseline differences between the three groups (cognitive reappraisal, acceptance, control) on demographics and smoking characteristics, one-way Analyses of Variance (ANOVAs) were run for parametric data. Non-parametric data were

analysed with Kruskal–Wallis test and Logistic Regression was used to examine for differences in cigarette preference between the three groups.

To examine the impact of the three emotion regulation strategies (cognitive reappraisal, acceptance, usual strategy) on self-reported craving, we conducted a 3 (Condition: post-emotion regulation training, post-video exposure, post-in vivo exposure) X 3 (Strategy) mixed ANOVA with the QSU-Brief scores as the dependent variable. To investigate for differences in self-reported craving due to the type of exposure (video vs. in vivo), the post hoc tests using Bonferroni correction from the mixed ANOVA were used. A 3 (Condition: post emotion regulation training, post-video exposure and post-in vivo exposure) X 3 (Strategy) mixed ANOVA was conducted to examine the impact of the three strategies on negative affect (measured by the modified PANAS Negative Affect subscale).

To examine for different impact of the three emotion regulation strategies on psychophysiological measures (heart rate and skin conductance level) during exposure conditions, we calculated the difference scores (video exposure – baseline; in vivo exposure – baseline) of the heart rate mean and skin conductance level mean, as used in previous studies (e.g., de Young, Kenardy, & Spence, 2007; Martin et al., 2010). We conducted between groups ANOVAs with the difference scores on mean heart rate and mean skin conductance level as the dependent variables.

Regarding smoking topography, we conducted a 2 (Time: pre-experiment, post-experiment) X 3 (Strategy) mixed ANOVA with the number of puffs as the dependent variable. The same analysis was used to examine differences in inter-puff interval and puff duration between the three groups. As the majority of the participants in the control group used distraction as their usual strategy to cope with smoking cravings, we also ran the forenamed analyses by including only these participants for the control group. The results were in accordance with the presented and they are not reported here.

Prior to analyses, data were inspected for outliers in box-plots and by calculation of Z-scores. As Z-scores larger than 2.5 are suggested to exert the undue influence upon the mean (Stevens, 2009), all identified outliers were replaced with the group mean of the variable plus 2.5 standard deviations (Field, 2009). Regarding the puff duration measure, as the first puff was found problematic due to the fact that some participants did not manage to light their cigarette easily, it was measured in the total number of puffs, but it was excluded from the calculation of mean puff duration.

Results

Demographic and smoking-related characteristics

Table 2-2 provides a summary of the key demographic characteristics and Table 2-3 of the smoking-related characteristics of the three groups. There were no significant between-group differences in demographic characteristics (age, educational level and occupational status). No significant baseline differences were found between the groups in any of the reported smoking characteristics. Moreover, no significant differences were found between groups on baseline emotion regulation strategies as they were measured by ASQ (Concealing subscale: F (2.76) = 0.08, p>.05; Adjusting subscale: F (2, 76) = 0.65, p>.05; Tolerating subscale: F (2, 76) = 1.00, p>.05), on baseline self-reported craving level as it was measured by the QSU-Brief, H(2)=1.14, p>.05, and on baseline negative affect as it was measured by the modified PANAS Negative Affect subscale, H(2)=5.57, p>.05.

Table 2-2. Participants' descriptives by emotion regulation group.

		Cognitive Reappraisal (n=26)	Acceptance (n=24)	Control (n=26)
		M (SD)	*M* (SD)	*M* SD)
Age		25.12(5.91)	24.58 (5.99)	25.56 (6.71)
		N (%)	N (%)	N (%)
Gender	Female	14 (53.8)	10 (41.7)	12 (46.2)
	Male	12 (46.2)	14 (58.3)	14 (53.8)
Educational level	Finished Primary/Secondary School		2 (8.4)	1 (3.8)
	Finished High-school	1 (3.8)	3 (12.5)	6 (23.1)
	Undergraduate student	16 (61.5)	17 (70.8)	16 (61.5)
	Received Bachelor/Diploma	6 (23.1)	2 (8.3)	
	M.Sc. students or graduates	3 (11.5)		3 (11.5)
Occupational status	Full-time job	7 (26.9)	6 (25)	4 (15.4)
	Part-time job	5 (19.2)	1 (4.2)	3 (11.5)
	Student	14 (53.8)	17 (70.8)	19 (73.1)

Table 2-3. Smoking characteristics by emotion regulation group.

		Cognitive Reappraisal	Acceptance	Control
		M (SD)	*M* (SD)	*M* (SD)
Estimated number of cigarettes per day		14.52 (6.66)	13.69 (4.71)	15.48 (6.42)
Years of smoking		7.69 (4.45)	8.08 (1.21)	7.55 (6.74)
FTCD Score		3.69 (2.43)	3.63 (1.95)	3.46 (1.92)
Motivation to quit smoking		3.64 (1.89)	3.37 (1.47)	3.15 (1.83)
CO Pre		14.19 (7.90)	14.46 (9.42)	14.58 (7.37)
CO Post		15.35 (6.99)	16.67 (9.28)	16.23 (6.61)
Past quit attempts		2.73 (1.31)	2.67 (1.13)	2.46 (1.21)
		N (%)	N (%)	N (%)
Cigarette preference	Pre-rolled	5 (19.2)	4 (16.7)	5 (19.2)
	Hand rolled	21 (80.8)	20 (83.3)	21 (80.8)

Emotion regulation strategies

Regarding the strategies used by the control group, based on raters' assessment of participants' qualitative descriptions, 54.55% used distraction, 18.18% used suppression, 13.64% used postponement, 9.08% used a strategy close to reappraisal (but not as it is used in CBT as it included components such as attention re-orientation) and 4.55% used rumination. None of the participants in the control group used cognitive reappraisal or acceptance as their usual strategy in order to cope with smoking craving.

Table 2-4 shows the percentage of participants in the cognitive reappraisal and the acceptance group who needed further explanation from the experimenter after the emotion regulation training to better understand how to apply the strategy. Based on the self-reports which were completed after the modified Stroop task, the three groups did not differ on the utilization level of the assigned strategy during the experiment, $F(2, 72)=0.77$, $p>.05$, $\omega=0.08$, on the reported level of usefulness of the assigned strategy to cope with cravings, $F(2, 73)=2.68$, $p>.05$, $\omega=0.15$, and on their plans to use the strategy in the future to cope with smoking cravings, $F(2, 73)=0.28$, $p>.05$, $\omega=0.14$. Table 2-4 shows the answers of the participants on these three questions based on their group. Results showed that participants

used the strategies during the experimental procedure when they felt smoking craving, and on average they were happy with all the strategies and planned to use them in the future.

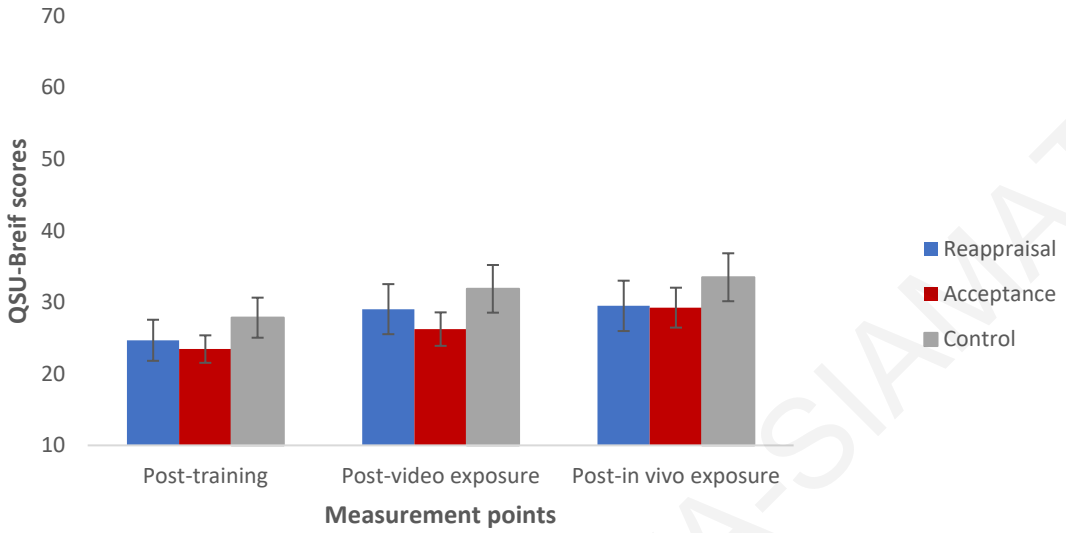
Table 2-4. Need of help to understand the strategy based on group, and participants' scoring regarding utilization, usefulness and future use of each emotion regulation strategy.

	Cognitive Reappraisal	Acceptance	Control
	N (%)	N (%)	-
Need help for understanding the strategy	8 (30.77)	3 (12.5)	-
	M (SD)	*M* (SD)	*M* (SD)
Level of use during the experiment	8.14 (1.20)	6.95 (2.06)	7.22 (2.63)
Level of usefulness	7.82 (1.50)	6.71 (1.93)	7.04 (2.27)
Intention to use it in the future	7.27 (2.10)	7.14 (2.37)	7.70 (2.34)

Effects of emotion regulation strategies on self-reported craving

The Condition (post-emotion regulation training, post-video exposure, post-in vivo exposure) X Strategy (cognitive reappraisal, acceptance, usual strategy) interaction effect was non-significant, $F(4, 146)=0.31$, $p>.05$, $\eta_p^2=0.01$. As we were interested to see if our experimental procedures (i.e., exposure) produced any changes in general, we inspected the main effects too. There was a significant main effect of Condition on self-reported craving, $F(2, 146)=16.74$, $p<.001$, $\eta_p^2=0.19$. The main effect of Strategy on self-reported craving was not significant, $F(1, 73)=0.73$, $p>.001$, $\eta_p^2=0.02$. Post hoc tests of the significant main effect of Condition, using the Bonferroni corrections, suggested that self-reported craving increased from post-emotion regulation training to post-video exposure by an average of 3.73 points ($p<.05$) and to post-in vivo exposure by an average of 5.42 points ($p<.001$). Self-reported craving significantly increased from post-video exposure to post-in vivo exposure by an average of 1.69 points ($p<.05$). As the craving data were not normally distributed for the cognitive reappraisal group, the analysis was conducted also with logarithmic transformation. The results of this analysis agreed with the presented findings and for this reason they are not reported here. Figure 2-2 depicts the mean self-reported craving scores of the three experimental groups at post-emotion regulation training, post-video exposure and post-in vivo exposure.

Figure 2-2. Self-reported craving mean (*SE*) by strategy at post-emotion regulation training, post-video exposure and post-in vivo exposure.



Differences in craving between video exposure and in vivo exposure

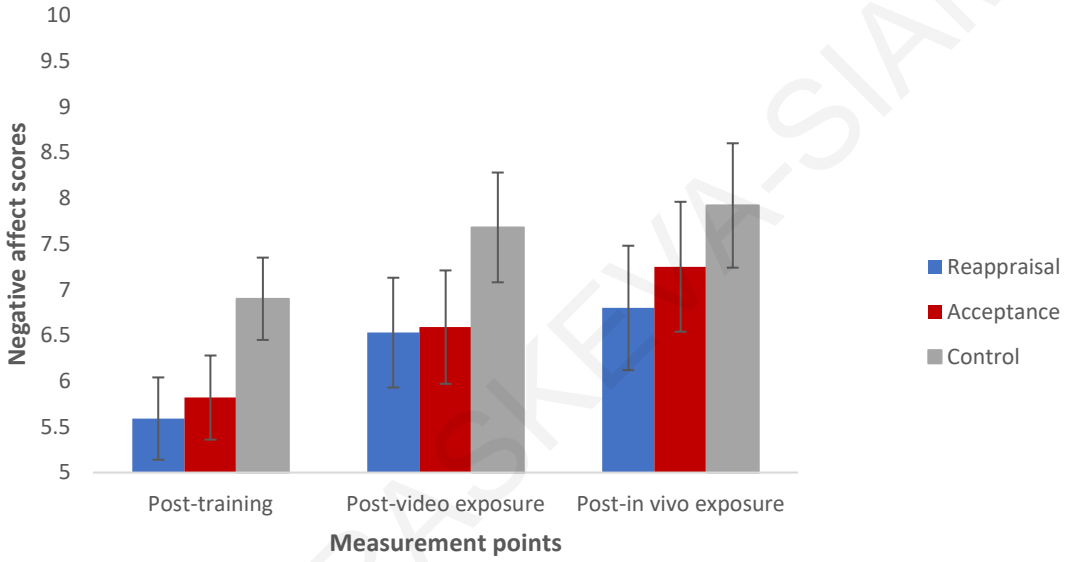
Post hoc analysis using Bonferroni correction showed that participants reported significantly higher levels of craving after in vivo exposure to smoking-related cues (M=30.75, SE=1.89) than after video exposure to smoking-related cues (M=29.06, SE=1.81), p<.05. In general, participants reacted with higher levels of craving, as measured with QSU-Brief, at the in vivo exposure to their personal smoking paraphernalia compared to the video exposure to smoking-related cues.

Effects of emotion regulation strategies on negative affect

The mixed Condition (post-emotion regulation training, post-video exposure, post-in vivo exposure) by Strategy (cognitive reappraisal, acceptance, usual strategy) interaction on negative affect was non-significant, $F(4, 146)=0.15$, $p>.05$, $\eta_p^2=0.004$. Again, inspection of the main effects showed that there was a significant main effect of Condition on self-reported negative affect as measured by the modified PANAS–Negative affect subscale, $F(2, 146)=10.15$, $p<.001$, $\eta_p^2=0.12$. The main effect of Strategy on negative affect was not significant, $F(2, 73)=1.50$, $p>.05$, $\eta_p^2=0.04$. Post hoc tests of the significant main effect of Condition, using the Bonferroni correction, suggested that self-reported negative affect increased from post-emotion regulation training to post-video exposure by an average of .82 points ($p<.05$) and to post-in vivo exposure by an average of 1.22 points ($p<.05$). Self-

reported negative affect was not significantly increased from post-video exposure to post-in vivo exposure (p>.05). As data were not normally distributed, the analysis was conducted also with log-transformation. The results of this analysis agreed with the presented findings and for this reason they are not reported here. Figure 2-3 depicts the self-reported negative affect mean of the three experimental groups at post-emotion regulation training, post-video exposure and post-in vivo exposure.

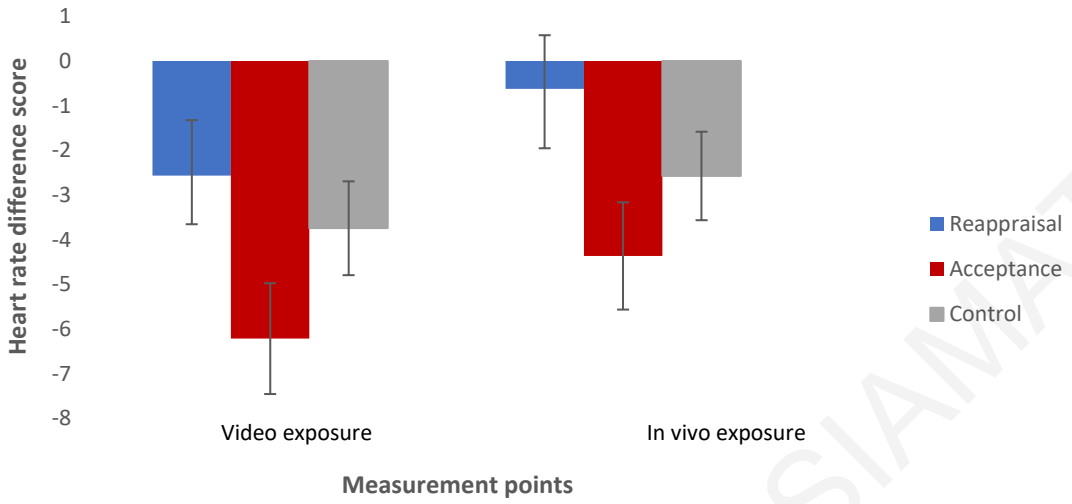
Figure 2-3. Self-reported negative affect mean (*SE*) by strategy at post-emotion regulation training, post-video exposure and post-in vivo exposure.



Effects of emotion regulation strategies on heart rate

The between-groups ANOVA showed that there was not a significant difference between the three groups on difference scores of heart rate mean during video exposure (F(2,73)=2.69, p>.05, ω=0.21). A non- significant difference between the three groups on difference scores of heart rate mean was also found for in-vivo exposure (F(2,73)=2.52, p>.05, ω=0.30). These results showed that the three groups did not have significant differences in difference score of heart rate mean during both exposures. Figure 2-4 depicts the difference scores in heart rate mean of the three experimental groups at video exposure and in vivo exposure.

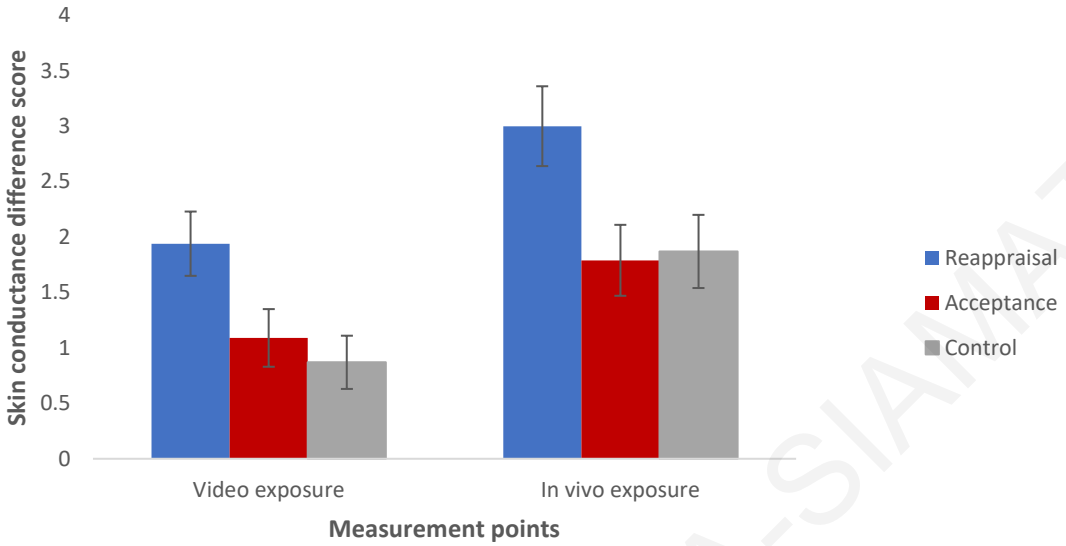
Figure 2-4. Difference score of heart rate mean (*SE*) by strategy at video exposure and in vivo exposure.



Effects of emotion regulation strategies on skin conductance

The between-groups ANOVA showed that there was a significant difference between the three groups on difference score of skin conductance mean during the video exposure ($F(2,73)=4.57$, $p<.05$, $\omega=0.29$). Planned contrasts suggested that the cognitive reappraisal group showed significantly higher mean skin conductance level during video exposure compared to the acceptance ($t(73)=2.24$, $p<.05$, $r=0.25$) and the control group ($t(73)=2.87$, $p<.05$, $r=0.32$), while the other two groups did not significantly differ ($t(73)=0.57$, $p>.05$, $r=0.07$). Regarding in vivo exposure, there was a significant difference between the groups on difference scores of skin conductance mean, $F(2,73)=4.01$, $p<.05$, $\omega=0.27$. Planned contrasts suggested that the cognitive reappraisal group showed significantly higher mean skin conductance level during in vivo exposure compared to the acceptance ($t(73)=2.50$, $p<.05$, $r=0.28$) and the control group ($t(73)=2.38$, $p<.05$, $r=0.27$), while the other two groups did not significantly differ ($t(73) = -0.17$, $p>.05$, $r = 0.20$). Figure 2-5 depicts the difference scores in skin conductance level mean of the three experimental groups at video exposure and in vivo exposure.

Figure 2-5. Difference score of skin conductance mean (*SE*) by strategy at post-emotion regulation training, post-video exposure and post-in vivo exposure.

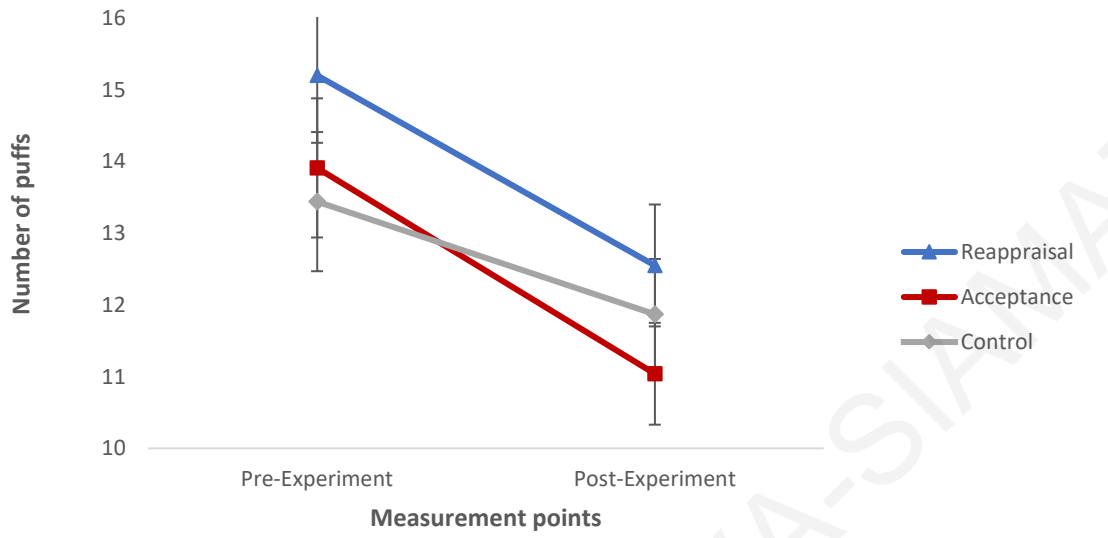


Effects of emotion regulation strategies on smoking behaviour

Number of Puffs

The mixed Time (pre-experiment, post-experiment) by Strategy (cognitive reappraisal, acceptance, control) interaction on number of puffs was non-significant, $F(2, 72)=0.08$, $p>.05$, $\eta_p^2=0.002$. Inspection of the main effects showed that there was not a significant main effect of Time on number of puffs, $F(1, 72)=0.51$, $p>.05$, $\eta_p^2=0.01$. The main effect of Strategy on number of puffs was also not significant, $F(1, 72)=2.64$, $p>.05$, $\eta_p^2=0.07$. Figure 2-6 depicts the mean number of puffs of the three experimental groups at pre- and post-experiment.

Figure 2-6. Number of puffs (*SE*) by strategy at pre-experiment and post-experiment.

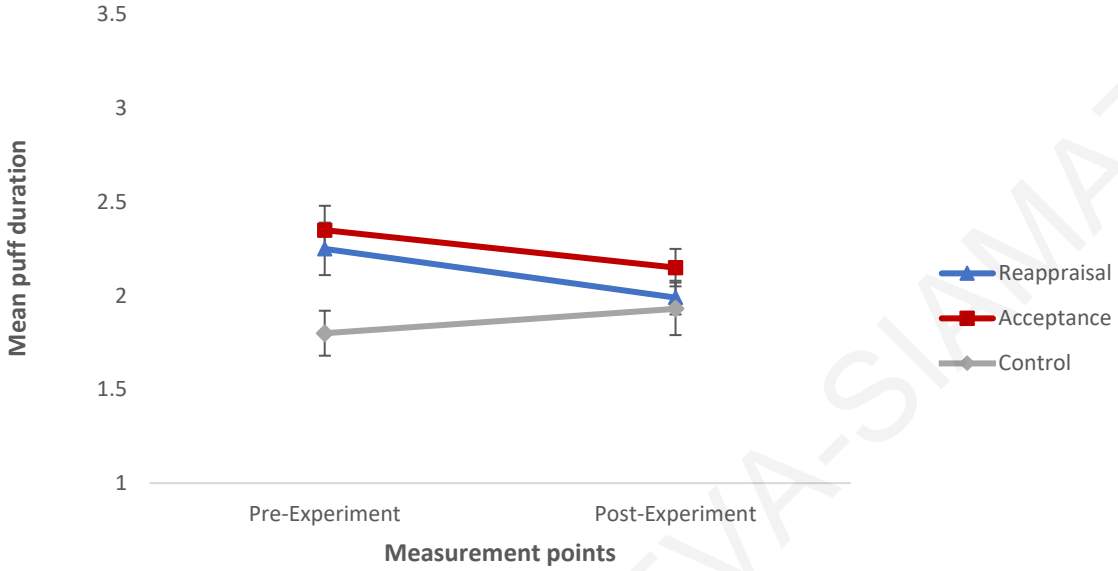


Duration of puffs

The mixed Time (pre-experiment, post-experiment) by Strategy (cognitive reappraisal, acceptance, control) interaction on duration of puffs was significant, $F(2, 72)=8.14$, $p<.05$, $\eta_p^2=0.18$. There was also a significant Time main effect for mean puff duration, $F(1, 72)=7.00$, $p<.05$, $\eta_p^2=0.09$. The main effect of Strategy on mean puff duration was non-significant, $F(1, 72)=2.69$, $p>.05$, $\eta_p^2=0.07$. Post hoc comparisons across time-points within groups, with Bonferroni correction, showed that participants in the cognitive reappraisal group had significantly lower mean puff duration at post-experiment compared to pre-experiment ($t(72)=12.21$, $p<.05$, $\eta_p^2=0.14$). Similarly, the acceptance group showed significantly lower mean puff duration at post-experiment compared to pre-experiment ($t(72)=7.51$, $p<.05$, $\eta_p^2=0.09$). The control group did not show significant differences from pre- to post-treatment on mean puff duration ($t(72)=3.03$, $p>.05$, $\eta_p^2=0.04$). Figure 2-7 depicts the mean puff duration of the three experimental groups at pre- and post-experiment. Comparisons of groups at each time point showed that at pre-experiment, mean puff duration of the cognitive reappraisal group ($M=2.25$, $SE=0.13$) and the acceptance group ($M=2.35$, $SE=0.13$) was significantly higher compared to the control group ($M=1.81$, $SE=0.13$; $p<.05$). These results support that due to random chance there were baseline differences in puff duration between the control and the other two groups. The cognitive reappraisal and acceptance groups did not differ in mean puff duration at pre-experiment ($p>.05$). The

cognitive reappraisal (*M*=1.99, *SE*=0.12), acceptance (*M*=2.15, *SE*=0.12) and control groups (*M*=1.93, *SE*=0.12) did not differ on puff duration mean at post experiment (*p*>.05).

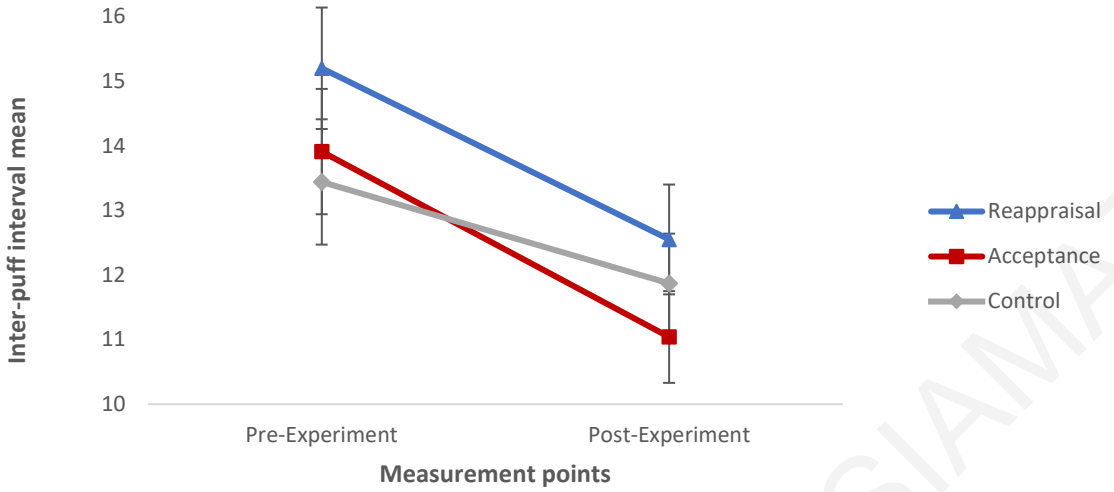
Figure 2-7. Puff duration mean (*SE*) by strategy at pre-experiment and post-experiment.



Inter-puff interval

The interaction between Time (pre-experiment, post-experiment) and Strategy (cognitive reappraisal, acceptance, control) on inter-puff interval mean was non-significant, $F(2, 72)=1.81$, $p>.05$, $\eta_p^2=0.05$. The main effect of Time on inter-puff interval mean was non-significant, $F(1, 72)=0.42$, $p>.05$, $\eta_p^2=0.01$. The main effect of Strategy on inter-puff interval mean was also non-significant, $F(1, 72)=1.81$, $p>.05$, $\eta_p^2=0.05$. Figure 2-8 depicts inter-puff interval means of the three experimental groups at pre-and post-experiment.

Figure 2-8. Inter-puff interval mean (*SE*) by strategy at pre-experiment and post-experiment.



Discussion

The aim of Study 1 was to examine the effects of different emotion regulation strategies (cognitive reappraisal, acceptance and usual emotion regulation strategy for cravings) on a number of smoking-related processes including self-reported craving and negative affect, physiological reactions, and smoking behaviour. To start with, in general, in vivo exposure to personal smoking paraphernalia showed to lead to higher increases in self-reported craving compared to video exposure. This result supports our hypothesis that exposure to personalized smoking cues is more useful to examine cue-induced craving compared to other types of exposure (such as videos, imaginary; e.g., Balter et al., 2015; Hutchison et al., 1999).

Regarding self-reported craving, the three strategies were examined as to their effect on subjective craving during cue exposure (videos and in vivo). The acceptance and control groups did not significantly differ on self-reported craving and negative affect during both exposure conditions. This finding supported our hypothesis. Acceptance places emphasis in tolerating unpleasant internal experiences, and its use during smoking cue-exposure indeed does not appear to lead to acute changes in self-reported craving and negative affect (Beadman et al., 2015), especially as compared to individuals' usual emotion regulation strategy for cravings. Moreover, this finding is in accordance with studies comparing acceptance with a usual coping strategy (e.g. Bowen & Marlatt, 2009) and with suppression (e.g. Litvin et al., 2012; Palfai, Colby, Monti, & Rohsenow, 1997; Marlatt & Bowen, 2009). However, against our hypotheses, the cognitive reappraisal group did not differ from the

other two groups on the subjective measures of craving experience (i.e., self-reported craving and negative affect). These results are in disagreement with the only published study which examined the effect of cognitive reappraisal vs. acceptance and showed that cognitive reappraisal led to lower levels of self-reported craving and negative affect compared to acceptance.

One possible explanation for this inconsistency may have to do with methodological differences between our study and previous studies. Most of the studies trying to examine the impact of cognitive reappraisal on craving experience and which are based on the Process Model of emotion regulation (e.g. Szasz et al., 2012), tend to use fixed instructions which ask participants to think specifically about the negative consequences of smoking on their health (e.g. Kober, Mende-Siedlecki et al., 2010; Meule, Kübler, & Blechert, 2013; Siep et al., 2012; Szasz et al., 2012). However, in real life individuals find their own functional alternative ways of thinking when experiencing smoking craving. Moreover, in CBT and as part of the cognitive reappraisal technique, therapists do not provide a fixed alternative thought to cope with smoking cravings, as every person and every craving experience are unique and so clients are instead taught the technique and learn to apply it to their own thoughts. For these reasons, our instructions tried to train individuals to identify their unrealistic thoughts regarding smoking and replace them with, personally relevant, more functional ones (Beck, 2011).

Based on the data, individuals in the cognitive reappraisal group found it harder to enact the strategy compared to the acceptance group (30.77% vs. 12.5% needed help to understand and apply the learned strategy). For the control group, the procedure was easy as they already had the strategy in their repertoire. The acceptance group had to think alternatively but the way of thinking was more straightforward (i.e., accept any thoughts and feelings as they will come and go on their own). Therefore, these findings may show that, at least at the beginning of using cognitive reappraisal, the specific emotion regulation strategy does not lead to immediate reductions in craving experience. The pre-occupation with craving thoughts and feelings to find an alternative and more helpful way of thinking may lead, at least at first, to increases rather than decreases in subjective craving. Cognitive reappraisal has been suggested to be an antecedent-focused emotion regulation strategy (Gross, 1998b) and it is expected to change the trajectory of the entire emotional response. Present findings may suggest that, this strategy may not intervene early in the emotion generation. So, it is probable that cognitive reappraisal acts as a response-focused emotion

regulation strategy similarly to acceptance (Herbert & Forman, 2013), at least at the first few times of its use. This finding should be explored further for more conclusive results.

Apart from the above, participants in the control group had to use their commonly used emotion regulation strategy to cope with cravings. Based on the assessment of their qualitative descriptions, it was found that more than half of the control group (52.17%) was using distraction during the experiment when they had cravings. As distraction has been found not to have significant differences from reappraisal (rational thinking) in coping with smoking cues (Littel & Franken, 2011), the non-significant differences in the Study 1 between the cognitive reappraisal and the control group may be explained by the use of distraction from the majority of the control group.

Additionally, in Study 1 we investigated the behavioural aspect of smoking craving (i.e., smoking behavior). Participants were asked to smoke a cigarette before and after the experimental session while they were video-recorded to assess tobacco topography and if it is affected by the learned emotion regulation strategy. In several studies comparing emotion regulation strategies, abstinence from smoking prior to the experimental session was a common requirement which means that emotion regulation strategies were applied while participants were experiencing significant levels of withdrawal craving symptoms (Serfaty et al., 2018). In Szasz et al.'s study (2012) participants did not have to abstain from smoking but they found that their participants smoked their last cigarette at least almost an hour before the experiment. In our study, participants smoked immediately before the experimental session. This may have affected the episodic craving effects (Serfaty et al., 2018), and subsequently participants' need to actually use the emotion regulation strategies to cope with cravings.

Physiological reactions to smoking-related cues is a complex topic as there are inconsistencies in the literature regarding smokers' reactions to such cues (Balter et al., 2015; Niaura et al., 1989), with some studies showing increases in heart rate and skin conductance level during cue-exposure (e.g., Balter et al., 2015; Grady, 2011), while others show decreases (e.g., Niaura et al., 1989) or no changes (e.g., Elash, Tiffany, & Vrana, 1995; LaRowe et al., 2007). Our study was among the first to investigate how emotion regulation strategies affect smokers' physiological reactions to smoking-related cues during video vs. in vivo exposure. Results showed that the three groups did not significantly differ on heart rate, in any of the exposure conditions. However, the cognitive reappraisal group showed significantly higher skin conductance levels compared to the other two groups during both exposure conditions. These results are against our hypotheses that the cognitive reappraisal

group would show the biggest decreases in physiological reactions compared to the other two groups. One possible explanation for the increase in skin conductance levels could be that due to the fact that individuals in this group had to try to find an alternative, more rational thought for every thought that their mind brought to them during exposure, this may have led to rumination of the first produced irrational thoughts leading to high levels of physiological reactions, i.e., skin conductance. This could be the case if we take into account the difficulties that a number of participants of this group (i.e., 30.77%) faced in understanding how to apply the strategy. As the other two groups did not have to constantly find new thoughts to cope with the unhelpful thoughts for smoking, this may lead to less rumination of smoking related thoughts compared to the cognitive reappraisal group. The different pattern that followed the heart rate data shows that psychological reactions to smoking-related cues and the effect of emotion regulation strategies on regulating these reactions is not easy to interpret. Further research is needed to better understand how smokers react physiologically while using emotion regulation strategies to cope with cravings, and how they interpret and react to their physiological reactions (i.e., if they interpret them as dysphoria leading them to tobacco use).

One of the most important aspects of smoking craving is actual tobacco use. For this reason, we investigated how the three emotion regulation strategies affected tobacco topography. Results showed that regarding the number of puffs and inter-puff interval from pre-experiment to post-experiment, the three emotion regulation groups did not significantly differ. Nevertheless, our findings showed that the three groups differed on the puff duration mean, with the cognitive reappraisal and acceptance groups showing significantly lower puff duration after the experiment compared to pre-experiment, while the control group did not. Although, brief training in emotion regulation strategies did not seem to affect all aspects of tobacco topography, which is not surprising as smoking is a learned behaviour which individuals perform for years and which is not easy to change (Ferguson et al., 2005), puff duration decreases showed promising results for the impact that cognitive reappraisal and acceptance may have on smoking behaviour. This finding is significant as it shows that the brief emotion regulation training seems to be sufficient in creating significant changes in one of the important aspects of tobacco topography. This is particularly important as how a cigarette is smoked affects the exposure to nicotine and tobacco carcinogens and the risk for smoking-related health problems (Djordjevic et al., 2000). Thus, this change is promising as the continuation of the use of cognitive reappraisal and acceptance may affect further this and the other aspects of tobacco topography leading at least in smoking reduction. This result

is in accordance with the Process Model of emotion regulation which suggests that cognitive reappraisal and acceptance affect behaviour (Gross 1998a, 1998b; Hoffman & Asmundson, 2008). The significant difference between the control group and the other two groups on baseline puff duration is possibly due to random chance as individuals had not received any intervention at this time-point, however replication is needed for more conclusive results. Moreover, although we hypothesized that cognitive reappraisal would lead to significantly larger reductions in puff duration compared to the acceptance, this was not the case. These findings suggest that both strategies are equally effective in affecting smoking puff duration.

To sum up, results showed that the three emotion regulation groups did not differ in the majority of craving aspects (i.e., subjective craving and negative affect, heart rate, number of puffs and inter-puff interval). Several possible explanations have been given, which need to be further investigated. However, these findings may suggest that these emotion regulation techniques are not as different as they are suggested to be. It could be possible that cognitive reappraisal is not part of the antecedent-focused emotion regulation strategies (at least at first) and acts similarly to acceptance which is suggested to be response-focused. Taken into account the increases which were observed in craving and negative affect levels during exposure to cues (which were observed for all groups) and additionally the increases in skin conductance level of the participants in the cognitive reappraisal group, this explanation may seem more possible regarding the non-significant differences from the other groups. Thus, the examined strategies may provide a different perspective for the smoker on how to deal with craving thoughts and emotions and at least in the short-term they seem to have the same effect on most of craving's aspects. The difference on how cognitive reappraisal and acceptance affect smoking behaviour (i.e., puff duration) compared to the usual strategy can be a sign that, although they all work the same on the subjective level of craving, cognitive reappraisal and acceptance may be more promising in changing smoking behaviour. However, how these strategies affect the craving experience on the long term need to be examined to create a more conclusive picture.

Strengths and limitations

Study 1 has several strengths. First of all, this study followed Barnes-Holmes and Hayes (2003) recommendations about the optimal features of ACT laboratory-based component studies. In our opinion, these recommendations should be followed by any experimental study which tries to examine the effect of theoretically based treatment components. Based on these recommendations, the present study included: a) balanced experimental conditions in terms of several relevant attribute variables (such as gender, age,

nicotine dependence, number of cigarettes), b) instructions given to different groups were matched for delivery method, length, complexity, engagement with the material and the instructions received by the cognitive reappraisal and the acceptance groups were also matched for smoking-related words, c) the strategies were connected directly to the experimental challenge which was inducing smoking craving, d) the provided instructions were assessed a priori by independent assessors with theoretical affiliations in each of the strategy under examination to confirm their relevance with the different theoretical approaches, e) participants had to articulate in their own words the learned strategy immediately after training to confirm the correct understanding of the provided material, f) participants' descriptions regarding the learned strategy/usual emotion regulation strategy were assessed by independent assessors to ensure that manipulation was effective, g) participants were briefly reminded before each task to use the learned strategy/usual emotion regulation strategy, h) instructions during emotion regulation training and most tasks' instructions were automated (audio and/or written), i) participants wrote a detailed description of the strategy they used during the tasks and these descriptions were assessed by independent and blind to the group allocation raters, j) questions were included to assess the application of the specific strategies during the experimental session, k) instructions of the two groups (i.e., cognitive reappraisal vs. acceptance) provided the theoretical background (i.e., CBT or ACT) behind the proposed strategy, l) power analysis was conducted prior to recruitment so as to recruit sufficient sample for the analyses, and m) active experiential exercise was included for participants to better understand the strategies. Based on a recent meta-analysis of laboratory-based studies examining acceptance and other related constructs (Serfaty et al., 2018), there is no other laboratory study which performed checks on comprehension prior to asking participants to employ the strategy during experimental tasks. Apart from the above, in our study, cognitive reappraisal and acceptance were compared to an active control group, which is the most stringent comparison if we take into account that the control group had to use their usual emotion regulation strategy for smoking cravings. Moreover, most of the studies relied primarily on self-reports of smoking-related outcomes and no other study included physiological measures of smoking craving or examined tobacco topography (Serfaty et al., 2018). This study significantly differs in several aspects with the only other published study to compare cognitive reappraisal and acceptance. Szasz et al. (2012) did not match their strategy instructions regarding smoking-related words, did not include experiential elements, instructions were not assessed by independent raters for their relevance, participants did not provide a description of the learned strategy to ensure correct understanding nor they describe at the end what they have

exactly apply to cope with cravings, there were no reminders to use the learned emotion regulation strategy and no questions regarding the opinion of participants for the used strategies (Serfaty et al., 2018). Moreover, in their study they did not include an actual control group but they compared the two strategies wish suppression. Apart from these, they used only one type of exposure (i.e., video exposure) although in vivo exposure has been found to be more effective in eliciting craving compared to other types of exposure (such as imaginal; Balter et al., 2015).

We must acknowledge some limitations of the current study. Our sample included mostly university students, who smoked fewer cigarettes, for less years, and were less addicted compared to treatment-seeking individuals. We included participants who differed in their motivation to stop smoking which may have affected the attention that they paid and the effort to use the learned emotion regulation strategies so as to utilize them to quit smoking. However, the groups did not significantly differ on their beliefs about the usefulness of the strategies and to self-reported utilization level of the provided strategies during the experimental session. Moreover, our control group consisted of individuals who used different types of emotion regulation strategies to cope with smoking craving which may complicate the findings. Apart from this, we used and analyzed video-recordings to assess tobacco topography, however the use of tobacco topography devices could give more accuracy to the measurements. Moreover, the use of computer software to analyze the videos would give us more accurate data regarding the tobacco topography measures, especially duration and inter-puff interval which were measured in milliseconds. Last but not least, we investigated only the short-term effects of the examined emotion regulation strategies, but it is possible that the strategies show different short- and long-term effects. The strategies may have a different effectiveness profile if they are practiced more and used repetitively. Indeed, although the minimum duration of psychological treatment for smoking cessation in order to be effective is unknown, it has been found that continued development of cognitive and behavioural strategies for smoking cessation during an extended treatment period helps smokers to be successful in smoking cessation compared to briefer interventions (Killen et al., 2008).

Future studies

Study 1 investigated how cognitive reappraisal and acceptance differ from each other and from smokers' usual strategy in coping with smoking craving. Results showed that the craving experience is a complex phenomenon which needs to be examined further. Future studies which will replicate the study and will include individuals with severe nicotine

dependence, treatment-seeking individuals, larger sample size (in order to minimize chances for Type 2 error), more homogeneous control group (e.g., participants who have distraction as their usual strategy distraction) and longer periods of emotion regulation strategies' assessment to examine for practice effects are needed for more conclusive results to be made.

CHAPTER III – STUDY 2: HOW EMOTION REGULATION STRATEGIES AFFECT ATTENTIONAL BIAS FOR SMOKING-RELATED CUES

Introduction

Cognitive process of cigarette smoking

Cigarette smoking, as with any substance abuse, is characterized from a paradox: the individual continues to smoke despite the knowledge of the health-threatening consequences of tobacco use (Fridland & Wiers, 2017). Several theoretical models try to explain why individuals smoke, giving emphasis to the learning and biological processes of substance use (e.g. Franken, 2003; Robinson & Berridge, 2001). Theoretical models, such as the Incentive-Sensitization theory (Robison & Berridge, 2001), emphasize incentive motivation, the property of stimuli that have been repeatedly related with substance use to produce similar affective and cognitive reactions (Ikemoto & Pansepp, 1999). Based on this theory, through classical conditioning and the association of drug-related stimuli with substance use, the related cues become salient and develop the ability to attract the attention of the user (Robinson & Berringe, 2001). Substance use and abuse is thus affected by biases in the attentional processing of substance-related cues, with cues implicitly capturing and maintaining the attention of the substance user compared to neutral stimuli. This phenomenon is called attentional bias (Franken, 2003; Mogg, Bradley, Field & de Houwer, 2003; Sayette, 1999). This is suggested to happen because stimuli that predict reward disproportionately attract attention compared to more neutral stimuli (Franken, 2003), and substance-related stimuli have powerful motivational properties (Robinson & Berringe, 2001). Individuals with substance dependence, including smokers, tend to experience their environment as filled with substance-related cues which capture their attention (Mogg et al., 2003; Sayette, 1999) and contribute to experiencing high levels of craving (Field & Cox, 2008). Attentional biases for smoking-related cues have been observed across multiple attentional measures, including initial eye movement direction, fixation duration and manual probe reaction time (Mogg et al., 2003). The biased processing of substance-related cues (in contrast to neutral stimuli; e.g., Bradley, Field, Mogg, & de Houwer, 2004; Mogg et al., 2003) and the subsequent production of conditioned responses such as withdrawal and craving symptoms increase the possibilities for tobacco use, leading in lapse and relapse in those who try to quit smoking (Niaura et al., 1989).

Attentional bias and self-reported craving

Attentional bias is related to craving self-reports in the laboratory (Attwood, O'Sullivan, Leonards, Mackintosh, & Munafò. 2008; Field, Munafò, & Franken, 2009; Mogg & Bradley, 2002; Mogg et al., 2003; Mogg, Field, & Bradley, 2005) and in natural settings when using Ecological Momentary analysis (e.g., Waters et al., 2014). Some studies though, do not show a relationship between attentional bias and self-reported craving (e.g., Lubman, Peters, Mogg, Bradley, & Deakin, 2000; Wertz & Sayette, 2001). Low reliability of attentional bias measures, such as poor internal consistency and test-retest reliability of the visual probe task (Ataya et al., 2012) and dot probe task (Schmukle, 2005) measuring attentional bias, has been suggested to create difficulties to the examination of the specific aspect (e.g., Rodebaugh et al., 2016). However, a recent meta-analysis highlights the presence of the forenamed relationship, mentioning that the lack of sufficient statistical power of several studies may be responsible for the inconsistent findings (Field et al., 2009), thus concluding that the specific relationship between attentional bias and craving should be explored further.

Despite the above inconsistency, the majority of the studies suggest the existence of a relationship between attentional bias and craving (e.g., Field et al., 2009) giving thus support to the Elaborated Intrusion Theory of Desire (Kavanagh, Andrade, & May, 2005) and the Extended Incentive-Sensitization Theory (Franken, 2003). These theoretical models postulate that when the individual becomes aware of craving, he/she focuses on craving by ruminating on craving-related thoughts or by focusing on the environmental cues which trigger craving. As the intensity of the experienced craving increases so does attentional bias, as part of an escalating feedback loop (Field & Cox, 2008; Kavanagh et al., 2005) making the individual vulnerable to use the substance.

Attentional bias and smoking lapse and relapse

Attentional bias has been found to be associated with lapse and relapse after a smoker quits (e.g., Field & Cox, 2008). Attentional bias to smoking-related cues has been shown to have a causal effect on relapse and tobacco use during quit attempts (Attwood et al., 2008; Field & Cox, 2008; Field & Eastwood, 2005). Smokers who show higher attentional bias to smoking-related cues during the first day of a quit attempt are at higher risk to relapse during the first week of smoking cessation compared to those who show lower levels of attentional bias (Powell, Dawkins, West, Powell, & Pickering, 2010; Waters et al., 2003). Attentional bias and self-reported craving are important predictors of the time of the first lapse and of

further relapses, even after controlling for other important factors such as years of smoking, smoking history, self-reports of nicotine dependence and measures of cotinine (Waters et al., 2003). Based on this evidence, attentional bias appears to be crucial in maintaining nicotine dependence and tobacco use (Waters et al., 2003).

Attentional bias and smoking cessation

Consistent with its role in maintaining substance dependence, attentional bias to substance-related cues seems to lessen after cessation. In a study comparing current to ex- and never smokers, current smokers showed higher levels of attentional bias to smoking-related cues compared to never smokers, while ex-smokers' attentional bias level was between that of current and never smokers, suggesting that attentional bias to smoking-related cues can be reduced after successful cessation (Ehrman et al., 2002). Similar to smoking studies, heavy social drinkers showed attentional bias to alcohol-related cues compared to occasional drinkers (Townshend & Duka, 2001). However, these findings were not replicated in all smoking studies, with Nestor and colleagues (2011) not finding differences in attentional bias between current, ex- and non-smokers. This lack of significant findings may be associated with small effect to detect differences. Munafò and colleagues (2005) also did not find a difference in attentional bias between current smokers and ex-smokers. They suggested that 5HTT genotype may be responsible for these results as it seems to play a moderating role on attentional bias for smoking-related cues. Munafò and colleagues' (2005) results showed that there was a greater degree of attentional bias among individuals who possess at least one copy of the short allele of the 5HTT gene, although this was the case only for ex-smokers. Further studies are needed to explore more this finding. Although there are some inconcistencies in findings, a number of studies have shown that attentional bias decreases after smoking cessation, proposing that attentional bias is not a stable feature and any difficulties in attention processing diminishes after substance cessation (Munafò, Mogg, Roberts, Bradley, & Murphy, 2003).

Attentional bias and cognitive interventions for smoking cessation

Interventions that specifically target both attentional bias and craving have been proposed as an approach that would result in better smoking cessation outcomes, but most interventions do not specifically target attentional bias and instead target mainly cravings (Piasecki & Baker, 2001; Szasz et al.,2012; Waters et al., 2003). This proposition is based on the idea that the identification and utilization of effective coping strategies when

encountering smoking-related cues is crucial in order to regulate the produced reactions to craving (i.e., smoking when craving is present; Niaura et al., 1989).

The current standard psychological intervention for smoking cessation is Cognitive Behavioural Therapy (CBT; Hernández-López et al., 2009). CBT emphasizes the teaching of skills to effectively cope with internal (i.e., craving feelings and somatic symptoms) and external smoking cues (i.e., environmental cues such as seeing others smoke; Hernández-López et al., 2009). It aims to identify and modify any faulty negative thoughts regarding smoking to change tobacco use behaviour (Field et al., 2009). The main cognitive strategy used to achieve this goal is cognitive reappraisal (Hofmann & Asmundson, 2008). Cognitive reappraisal aims to reduce thoughts' emotional impact by changing maladaptive thinking (Goldin et al., 2012). CBT appears as an effective treatment option for several psychological difficulties, including substance use with small to moderate effect sizes (e.g., Dutra, Stathopoulou, Basden, Leyro, Powers, & Otto, 2008; Hofmann et al., 2012).

A recent innovation in behaviour therapy is Acceptance and Commitment Therapy (Hernández-López et al., 2009) which presents with promising results for a number of psychological difficulties (Hayes et al., 2006; Powers et al., 2009). Based on ACT, smokers learn to be willing to experience any unpleasant thoughts and feelings in order to stop using smoking as a way to control or reduce private aversive events, such as cravings (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). The main strategy employed is acceptance, which refers to the active, with awareness, embracement of any unpleasant private events (e.g., cravings, thoughts, emotions) without attempts to change or control them (Hayes et al., 2006). CBT and ACT thus conceptualize and approach substance use somewhat differently and apply different techniques to achieve smoking cessation.

Attentional bias has been proposed to impact smoking behaviour by negatively affecting the processing and application of other more helpful behavioral options (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004), such as the use of coping strategies to achieve smoking abstinence (Canamar & London, 2012). However, neither CBT nor ACT give clear emphasis on attentional bias and its modification during treatment. Franken (2003) supports that cognitive interventions that target the experience of craving, such as those used in CBT and ACT, may be successful in reducing attentional bias to substance-related cues, although it has not yet been thoroughly investigated. Given that attentional bias is suggested to have better predictive value for smoking cessation success than self-reports of craving (McCusker, 2001; Waters et al., 2003), the question of whether CBT and/or ACT (i.e., cognitive reappraisal vs. acceptance) affect attentional bias is important. However, to date,

only one study to our knowledge examined how CBT and ACT components affect attentional bias to smoking-related cues. Szasz and colleagues (2012) found that cognitive reappraisal of smoking cravings leads to lower attentional bias to smoking cues (as assessed by the modified dot-probe task) compared to acceptance and suppression (a technique suggesting that individuals should suppress, i.e., not think about, any cravings or unpleasant thoughts and feelings). This possibly suggests differences between these techniques on attentional bias and may subsequently impact smoking cravings.

The difference in the effectiveness of the three emotion regulation strategies to affect attentional bias to smoking-related cues may be explained via Gross's Process Model of emotion regulation (Gross, 1998a; 1998b). Based on this model, cognitive reappraisal is considered an antecedent-focused emotion regulation strategy, while acceptance (and suppression) constitute response-focused strategies (Gross, 1998b; Hoffman & Asmundson, 2008; for a more extensive discussion of the specific model see Chapter II). Attentional bias is thought to appear during the initial appraisal of an emotional situation (Joormann & Siemer, 2011), and thus, changing the way someone reappraises a situation may also impact attentional bias. Studies show that antecedent-focused emotion regulation strategies, such as cognitive reappraisal, which act early on in the emotion generation cycle, seem to affect attentional bias to emotional cues compared to response-focused strategies, such as suppression and acceptance (e.g., Fucito, Juliano, & Toll, 2010). However, this hypothesis regarding smoking-related cues was only examined to date by Szasz and colleagues (2012) and their study presents with methodological limitations when compared to the recommendations for conducting laboratory studies as outlined by Barnes-Holmes and Hayes (2003; for an extensive discussion see Chapter II). Thus, further studies, with better methodological designs, need to be conducted to examine how cognitive reappraisal and acceptance affect smokers' attentional bias.

Present study

Study 2 examined how the two widely used strategies for coping with smoking cravings (cognitive reappraisal vs. acceptance) affect attentional bias to smoking-related cues. Based on the Process Model of emotion regulation and the theorising that cognitive reappraisal is an antecedent-focused emotion regulation strategy (Gross, 1998a, 1998b), it was expected that the cognitive reappraisal group would not show significant attentional bias to smoking-related cues. As acceptance is expected to act as a response-focused strategy, it was hypothesized that it would result in significant attentional bias to smoking-related cues. A control group (usual strategy utilized to cope with cravings), was also examined in this

study and it was hypothesized that the cognitive reappraisal group would show significantly lower levels of attentional bias (to words and pictures) compared to the control group while the acceptance and control group will not significantly differ.

To assess attentional bias to smoking-related cues, the modified Stroop task was used (Waters et al., 2003), which is the most widely used task assessing attentional bias in laboratory studies (Cox, Facardi, & Pothos, 2006; Field et al., 2009). In the modified (or addiction specific) Stroop task, individuals are asked to name the colour in which a motivationally salient word (i.e., a smoking-related cue like "cigarette") is presented while ignoring the word's meaning (Cane, Sharma, & Albery, 2009; Cox et al., 2006). During the task, individuals' automatic attentional process of distraction by the emotional content interrupts the voluntary controlled task (i.e., colour naming; Franken, 2003). This automatic attentional process affects reaction times of colour naming, making individuals slower in naming the colour of smoking-related cues (Begh et al., 2016; Franken, 2003; Waters & Feyerabend, 2000). The modified Stroop task measures a behavioural aspect of attention, that of reaction time (Franken, 2003). Stroop is reported as an implicit or automatic task because the individual is not aware of what the measurement outcome reflects, and the outcome which is reaction time is perceived to be uncontrollable (Fridland & Wiers, 2018). Phaf and Kan's (2007) meta-analysis supports that the modified Stroop task probably reflects the delayed disengagement of attention from the smoking-related cues, which subsequently affects smokers' craving experience and ultimately tobacco use behaviour.

This study utilized the modified Stroop task (word version) as a measure of attentional bias, but also aimed to include another variation of this task, a pictorial version. Previous researchers proposed that the Stroop task should be extended to include pictorial distracters apart from words as pictorial stimuli are more closely related to the actual smoking-related stimuli that participants encounter in everyday life (Bruce & Jones, 2004). Given that this has not yet been done, we wanted to extend our investigation of attentional bias to include a smoking-related picture Stroop task. The proposal to use more naturalistic and ecologically-valid substance-related stimuli to assess attentional bias (Lubman et al., 2000; Mansell, Clark, Ehlers, & Chen, 1999) is not new, although no other study regarding smoking included both versions of stimuli. We hypothesized based on the evidence from drug research (Bruce & Jones, 2004; Lubman et al., 2000) that attentional bias would not be restricted only to linguistic representations and that the pictorial presentation would result in greater attentional bias compared to smoking-related words.

Methods

Participants

The Study 2 participants were the same sample as those included in Study 1 (Chapter II). For more information regarding recruitment, inclusion and exclusion criteria and sample's characteristics, see Chapter II.

Measures

Attentional bias.

Attentional bias to smoking-related cues was assessed by a modified Stroop task using two modalities: linguistic and pictorial. Because it has been suggested that semantically-related words increase inter-trial priming of associate concepts (Cox et al., 2006) and because all target words (and pictures) were related to one concept (smoking), all selected neutral words (and pictures) belonged to a single category, household equipment and activities. Words and pictures related to household equipment and activities selected for the neutral word and picture set as: a) they all belong in one semantically-related category and b) these are frequently used words and individuals are exposed to house furniture and activities daily. This selection of neutral words excluded the case of reacting differently to smoking-related words compared to neutral words due to familiarity (Dalgleish, 1995).

For the linguistically-based Stroop, two sets of words were selected: a neutral set which included 10 words unrelated to smoking (i.e., blanket, chair, curtain, bathroom, vase, hallway, bed, sweep, broom and pillow) and a smoking set which consisted of 10 smoking-related words including stimuli and actions associated with nicotine delivery (i.e., tobacco, cigarette, addiction, lighter, nicotine, tart, ashtray, ashes, cancer, smoke). Neutral words matched to smoking-related words, in Greek, for number syllables and were mostly words that have been used in other studies (e.g., Field, Rush, Cole, & Goudie, 2007; Mogg & Bradley, 2002). A few neutral words were created for the purposes of this study to match to smoking-related words based on the forenamed criteria (i.e., number of syllabes). Smoking-related words were selected from a pool of words used in other studies examining attentional bias via Stroop (e.g., Canamar & London, 2012; Cane et al., 2009; Gross, Jarvik, & Rosenblatt, 1993; Waters et al., 2003).

Regarding the pictorial version of Stroop (Appendix I), we used a set of smoking-related and neutral pictures used in other studies (e.g., Bradley et al., 2004; Bradley, Mogg, Wright, & Field, 2003; Mogg et al., 2003). Ten smoking-related and ten neutral pictures

(house furniture and activities) were selected. In addition, we captured some extra pictures, such as roll-up cigarette's equipment and house-keeping activities since the picture sets from other studies did not include enough relevant pictures for the neutral set and they included only pictures of pre-rolled cigarettes. Smoking-related and neutral pictures were matched on complexity, image quality (i.e., pixels) and level of focus on stimuli (size of stimuli in pictures). To select the most relevant neutral and smoking-related stimuli, we conducted pilot testing with 20 smokers (see Chapter II) before Study 2 commenced.

Each word and picture was presented in four different colours (red, blue, green, yellow) to avoid confounding colour X word effects (Fehr, Wiedenmann, & Herrmann, 2006), on a black background (Constantine, McNally, & Horning, 2001). The first block included neutral words and pictures and the second block included smoking-related words and pictures (Canamar & London, 2012), as it has been argued that blocked presentation is preferred compared to randomized presentation to maximize the task's sensitivity (Cox et al., 2006) and avoid carry-over effect from smoking-related words to neutral words (Waters & Feyerabend, 2000; Waters et al., 2003). This experimental manipulation is considered important as the carry-over effect produced by smoking-related words (Waters et al., 2003) affects the neutral stimuli that are presented immediately after exposure to smoking-related stimuli in blocked conditions (Cane et al., 2009). The order of the type of stimuli first presented, pictures or words, was counterbalanced. Two rules applied in stimuli presentation: a) the same colour and b) the same stimuli would not appear consecutively (as in Gross et al., 1993). Smoking-related words followed the order of their matching neutral words (as in Gross et al., 1993). To develop the modified Stroop task for this study, recommendations from Cox and colleagues (2006) meta-analysis were taken into account (such as blocked presentation of stimuli, same number of stimuli in each category, four response choices, medium length of task and inclusion of a pictorial version).

During the Stroop task, participants were seated in front of a computer. They were instructed that a number of words and pictures with one of four colour filters would be presented to them, one at a time. Their task was to indicate as rapidly and accurately as possible the colour in which each word/picture was presented, by pressing the appropriate button on the keyboard as indicated. Participants were instructed to ignore the meaning of the words and the content of the pictures and report the colour in which the words/pictures appeared. At first, they completed a practice block consisting of 5 letter strings, such as AAAA, and 5 shapes, which were presented in the four colours (total: 40 trials). Participants had to habituate and learn the key position for each colour to get used to the task so that there

would not be any effect of learning from repeated trials. After ensuring that participants understood the task and got used to the position of each colour choice, they proceeded to the neutral words or pictures block (40 trials for each type of stimuli) and then to the smoking-related words and picture block (40 trials for each type of stimuli). As it is found that emotional stimuli create responses that persist over half a minute (Garrett & Maddock, 2001), participants had a 40 seconds break between the neutral and smoking block. Each word was presented in bold Arial Black, font size 40 and each picture was 341 (width) X 256 (height) pixels (Bradley et al., 2003). Before the appearance of the stimuli, a fixation cross was presented in the middle of the screen for 2 seconds (Fehr et al., 2006). Stimuli were presented in the middle of the screen where the fixation cross previously appeared and remained on the screen until participants gave an answer with maximum appearance time of 2 seconds (Canamar & London, 2012). In case that after 2 seconds no answer was given, the stimulus disappeared. The next stimulus appeared 2 seconds after the given response or 2 seconds after the 2 seconds of the maximum time of appearance of the stimuli. Neutral and smoking-related words and pictures were presented in all four colours but each of them was presented only one time during the following trial sets: 1-10, 11-20, 21-30 and 31-40 (i.e., one time in every ten presented stimuli). The total time of the test was around 10 minutes and no feedback was provided regarding incorrect responses (same as in Cane et al., 2009; Domier et al., 2007). Reaction time and accuracy was recorded for all trials (Domier et al., 2007).

Procedure

Interested individuals completed an online questionnaire to confirm their eligibility to be included in the study. Eligible individuals were invited to come to the laboratory and their visit was scheduled. Upon arrival, they were informed about the study and provided written informed consent. Then, they were asked to smoke one cigarette to ensure that all of the participants would be at the same craving level while they completed the set of questionnaires. Participants were randomly assigned to one of the three groups (cognitive reappraisal, acceptance, control) and received training in using cognitive reappraisal or acceptance. The control group listened to an unrelated to craving and technique audio recording, regarding the positive aspect of having animals in our life (see Chapter II for more information). Then, participants were exposed in counterbalanced order to videos including people smoking and to their own smoking paraphernalia and their craving level and negative affect was assessed. After that, participants completed the modified Stroop task. Before every task (including the modified Stroop task) participants

were reminded to use the learned strategy or their usual strategy to cope with any smoking cravings. Finally, participants were debriefed and received payment for their participation. Chapter II (Study 1) includes more information regarding the experimental procedure with Table 1-1 showing graphically the whole procedure.

Statistical analyses

For analyses, reaction times from wrong answers were discarded. A total of 5.52% of the data were excluded due to wrong answers. Reaction times below 200ms, and 2SDs below or above the mean were excluded as outliers (Ratcliff, 1993).

To compare the effect of the different types of smoking-related stimuli on attentional bias, two difference scores were calculated: a) the average reaction time (measured in milliseconds) of all smoking-related words minus all neutral words, and b) the average reaction time of all smoking-related pictures minus all neutral pictures. A paired-samples t-test was run with the two difference scores as the within variables.

A 2 (Type of words: neutral, smoking-related) X 3 (Strategies: cognitive reappraisal, acceptance, control) mixed ANOVA was run to examine the effect of emotion regulation strategies on attentional bias to smoking-related words. A 2 (Type of pictures: neutral, smoking-related) X 3 (Strategies: cognitive reappraisal, acceptance, control) mixed ANOVA was run to examine the effect of emotion regulation strategies on attentional bias to smoking-related pictures.

Results

Demographic and smoking-related characteristics

See Chapter II for more information on demographics of the sample.

Attentional bias for smoking-related words and pictures

Paired samples t-test showed that attentional bias to smoking-related words (M=26.87, SE=6.68) significantly differ from attentional bias to smoking-related pictures (M=-9.89, SE=10.53) based on the calculated difference scores between smoking and neutral stimuli, $t(75)=3.53$, $p<.05$, $r=0.38$. Participants, in general, showed higher attentional bias to smoking-related words compared to smoking-related pictures.

Effects of emotion regulation strategies on attentional bias

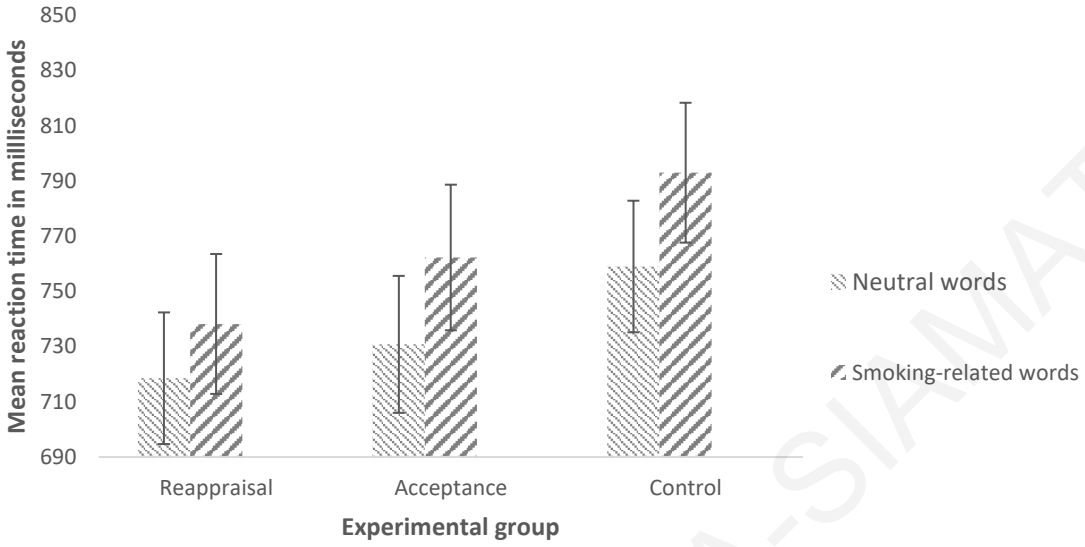
Regarding error rates, between groups ANOVAs showed that there were no significant differences between groups on error rates for neutral words ($F(2.73)=3.03$, $p>.05$,

ω=0.24), smoking-related words (F (2.73) = 0,96, p>.05, ω = 0.03), neutral pictures (F (2.73) = 0,69, p>.05, ω = 0.06) and smoking-related pictures (F (2.73) = 2.02, p>.05, ω = 0.16).

Modified Stroop task–Word version

The Type (neutral words, smoking-related words) by Strategy (cognitive reappraisal, acceptance, control) ANOVA interaction was non-significant for reaction times, F(2, 73)=0.38, p>.05, η_p^2=0.01. The main effect of Type on reaction time was significant, F(1, 73)=15.18, p<.001, η_p^2=0.17, indicating that reaction time to smoking-related words (M=764.48, SE=14.83) was significantly higher compared to neutral words (M=736.12, SE=13.95). The main effect of Strategy on reaction time was not significant, F(2, 73)=1.05, p>.05, η_p^2=0.03. However, given our interest in exploring the effect of each strategy separately on attentional bias for smoking-related words, we ran post hoc tests using the Bonferroni correction. Results suggested that for cognitive reappraisal, mean reaction time to neutral words (M=718.54, SE=23.83) did not significantly differ from mean reaction time to smoking related words (M=738.20, SE=25.33), p>.05. Regarding acceptance, mean reaction time to neutral words (M=730.81, SE=24.80) did significantly differ from mean reaction time to smoking related words (M=762.27, SE=26.37; p<.05), with reaction time to smoking-related words being slower compared to the reaction time to neutral words. The same was the case for the control group. The control group showed significantly higher reaction times to smoking-related words (M=792.97, SE=25.33) compared to neutral words (M=759.00, SE=23.83; p<.05). Figure 3-1 depicts mean reaction times for neutral words and smoking-related words for each group.

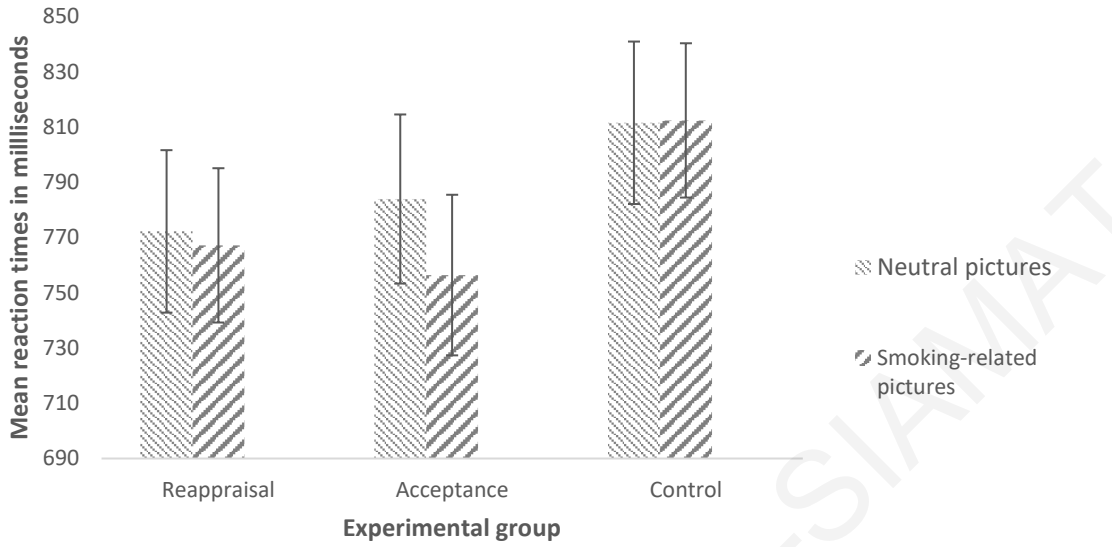
Figure 3-1. Mean reaction times (*SE*) to neutral words and smoking-related words for the three emotion regulation strategies.



Modified Stroop task–Pictorial version

The Type (neutral pictures, smoking-related pictures) by Strategy (cognitive reappraisal, acceptance, control) interaction was non-significant for reaction times, $F(2, 73)=0.61$, $p>.05$, $\eta_p^2=0.02$. The main effect of Type on reaction time was non-significant, $F(1, 73)=0.93$, $p>.05$, $\eta_p^2=0.13$. The main effect of Strategy on reaction time was also non-significant, $F(2, 73)=0.79$, $p>.05$, $\eta_p^2=0.02$. However, given study hypothesis, we examined post hoc tests using the Bonferroni correction of each strategy on attentional bias for smoking-related words. Results showed that none of the three groups showed significant attentional bias to smoking-related pictures. Figure 3-2 depicts mean reaction times for neutral words and smoking-related words for each group.

Figure 3-2. Mean reaction times (*SE*) to neutral pictures and smoking-related pictures for the three emotion regulation strategies.



Discussion

Attentional bias is important in smoking cessation effectiveness as it affects craving (Attwood et al., 2008) and tobacco use (Powell et al., 2010). This study investigated if three emotion regulation strategies (cognitive reappraisal, acceptance and usual coping strategy) differ on attentional bias for smoking-related cues (words and pictures). Moreover, we examined if pictorial stimuli lead to higher levels of attentional bias compared to linguistic stimuli.

Results showed that, in general, linguistic stimuli lead to higher attentional bias for smoking-related cues compared to pictorial stimuli. This finding is against our hypothesis that pictorial stimuli would lead to higher levels of attentional bias as they are suggested to be more ecologically valid (e.g., Lubman et al., 2000). A possible explanation is that linguistic stimuli are more abstract or generalised representations of the emotional stimulus compared to pictorial stimuli which have been suggested to be concrete, specific representations of it (Kindt & Brosschot, 1999). Thus, as words are less circumscript than pictures, they may activate more semantic nodes (Lavy & van den Hout, 1993), while pictures may cause more reality constrains on cognitive processing, leading to less activation of related cognitive schemas (Tesser & Leone, 1977). This potential difference between linguistic and pictorial stimuli may be responsible for the lower attentional bias to pictorial smoking-related cues compared to linguistic. As this is the first study including and

comparing both types of smoking-related stimuli (i.e., linguistic and pictorial), further studies need to replicate Study 2 for more conclusive results.

Results on differences between the three emotion regulation strategies on the modified Stroop task – word version showed that the three groups did not show significant differences on attentional bias to smoking-related words. In general, there was an increase in reaction times to smoking-related words compared to neutral words, and although at post hoc analyses the cognitive reappraisal did not find to show attentional bias to smoking related cues, the comparison with the other two groups did not show significant differences.

Acceptance, as utilized in ACT, does not aim to change the emotional experience of a person but the actual behaviour (Hoffman & Asmundson, 2008). The presented results agree with the forenamed theoretical position as acceptance does not seem to affect the emotion generation early on, based on the Process Model of emotion regulation, and for this reason individuals who used the specific strategy continue to show attentional bias for smoking-related cues.

Based on Gross' model of emotion regulation (Gross, 1998b), cognitive reappraisal is suggested to be an antecedent-focused emotion regulation strategy acting early in the emotion generation process and affecting the whole emotional experience (Gross, 2002). However, cognitive reappraisal is expected to act to the cognitive change stage of the process model which follows the attentional deployment stage (Gross, 1998b). Thus, as based on this model the individual is expected first to pay attention to the stimulus and then proceed the information cognitively, this may be the reason for the absence of a direct change in attentional bias to smoking-related cues due to the use of cognitive reappraisal. Moreover, CBT which incorporates cognitive reappraisal as one of the main emotion regulation strategies does not give emphasis on attentional bias but on dysfunctional thinking and does not explicitly predict decreases in attentional bias due to the use of cognitive reappraisal (e.g., Beck, 2011). The present results supports the forenamed positions showing that cognitive reappraisal does not affect differently attentional bias to smoking-related cues compared to acceptance.

Apart from the above, studies which examined mindfulness-based meditation training (which included acceptance) showed that acceptance and similar emotion regulation strategies need to be extensively practiced for individuals to show decreases in attentional bias measures (Vago & Nakamura, 2011). The same is the case for cognitive reappraisal based on scientific evidence (Oschner, Bunge, Gross, & Gabrieli, 2002). Thus, it is possible

that our study's brief duration of training in cognitive reappraisal and acceptance was not enough to see significant decreases in attentional bias for smoking-related cues. Our study must be replicated with longer periods of training practice to assess cognitive reappraisal's and acceptance's ability to affect attentional bias to smoking cues.

The non-significant differences between cognitive reappraisal and acceptance on attentional bias to smoking related cues found in this study are in opposition to the findings of Szasz and colleagues' study (2012). The two studies have several methodological differences with the most basic being the way participants were trained in using cognitive reappraisal. In our study, a detailed explanation of the strategy and personalized training occurred, which included an experiential exercise for participants to try to identify and change their unhelpful thought with more helpful. This procedure is closer to how cognitive reappraisal is taught to clients during CBT therapy (e.g., Beck, 2011). On the other hand, Szasz and colleagues (2012) did not provide to participants any theoretical background for the use of the strategy and a general specific thought (i.e., negative consequences of smoking) was provided for use to participants. Thus, the differences between the two studies may show that the use of cognitive reappraisal, as it is actually used in therapeutic interventions, did not differ from acceptance on how it affects attentional bias for smoking-related cues.

The fact that the control group was not homogeneous as participants were using different strategies to cope with cravings complicates the comparison of cognitive reappraisal and acceptance with this group. The two mostly used by the control group emotion regulation strategies were: a) distraction which is suggested to be an antecedent-focused emotion regulation strategy (Li et al., 2017) and b) suppression which is suggested to constitute a response-focused strategy (Gross, 1998b). However, the comparison of this group with the cognitive reappraisal and acceptance groups did not show significant differences on how the usual emotion regulation strategy affect attentional bias to smoking-related cues compared to the other groups.

Similar result patterns with the forenamed were found when using the pictorial version of the Stroop. Although further studies need to be conducted to examine smoking pictures' ability to assess attentional bias to smoking related cues, the non-significant differences between the groups is an important finding. This suggests that the examined emotion regulation strategies did not differently affect attentional bias to smoking-related cues.

To sum up, Study 2 showed that linguistic stimuli in contrast to pictorial stimuli lead to increases in reaction times for smoking-related cues compared to neutral cues. Pictorial stimuli did not find to lead to attentional bias for smoking-related cues. Thus, further studies need to be conducted to find which stimuli, or if a combination of different types of stimuli, are more effective to assess attentional bias. Moreover, the three emotion regulation strategies did not find to differ on attentional bias to both types of smoking-related cues, showing that attentional bias is not likely directly impacted by them.

Strengths and limitations

Study 2 had a number of strengths. It was the first study to compare cognitive reappraisal and acceptance following Barnes-Holmes and Hayes' (2003) recommendations on how to conduct experimental studies to assess treatment components. The specific guidelines were not followed from the only study which examined differences in attentional bias for smoking-related cues between cognitive reappraisal and acceptance (Szasz et al., 2012; for a more extensive discussion see Chapter II). Moreover, it is the first study comparing the forenamed strategies to an active control group which have participants using their own strategy to cope with cravings and it is the only study including both linguistic and pictorial stimuli to assess attentional bias to smoking related cues.

However, we have to acknowledge some limitations. We used non-deprived participants despite findings that the strongest effects on attentional bias are observed in participants who are substance-deprived (Field et al., 2009). Our control group was not homogeneous as the usual strategy to cope with smoking cravings is not the same for all smokers. Moreover, the emotion regulation strategies training was brief which may affect strategies' effectiveness. In our study we used the modified Stroop task to assess attentional bias although more objective measures, such as eye movements, have been proposed to be more valid to examine the specific cognitive process (Field et al., 2009). The inclusion of individuals in the control group who used different strategies in their daily life to cope with smoking cravings made the comparison between the groups complicated.

Future studies

Future studies should replicate this study by including nicotine deprived smokers, more nicotine dependent individuals and personalized smoking pictures in the pictorial version of Stroop. Moreover, the comparison of the cognitive reappraisal and acceptance groups with a more homogeneous control group and the use of more direct measures of attentional processes such as eye movement monitoring and event-related potentials (Field

et al., 2009) will throw light on how the specific emotion regulation strategies affect attentional processes and if they affect differently attention's aspects such as initial orienting of attention and delayed disengagement. Moreover, assessment of attentional bias to smoking-related cues pre- and post-emotion regulation strategy training, longer periods of training and exercising in using the techniques, examination of the effectiveness of these strategies in the context of formal CBT and ACT smoking cessation therapies and comparison with non-smokers could aid even more in the investigation of the relationship between the use of emotion regulation strategies for smoking craving and the presence of attentional bias for smoking-related cues.

CHAPTER IV – STUDY 3: HOW EMOTION REGULATION STRATEGIES AFFECT DISTRESS TOLERANCE?

Introduction

Negative affect, distress tolerance and tobacco use

Smokers often claim that they use tobacco to reduce emotional tension (Cooperland, Brandon, & Quinn, 1995; Ikard & Tomkins, 1973; Leventhal & Cleary, 1980). Exposure to substance-related cues often leads to physical and psychological discomfort, which together with withdrawal symptoms, constitute important factors leading to substance use (Brown et al., 2005; Brown et al., 2008; Hughes, Higgins, & Hatsukami, 1990). Although smoking craving and tobacco use has been found to be related to positive affect too (Baker et al., 1986), much more emphasis has been given to the use of tobacco to alleviate negative emotions (e.g., Brandon, 1994; Kassel, Stroud, & Paronis, 2003). Based on negative reinforcement models of addictive behaviours (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Eissenberg, 2004), individuals use their preferred substance to avoid or escape from unpleasant stimuli, such as negative affect, craving and withdrawal symptoms (Baker, Brandon, & Chassin, 2004; Brown et al., 2005). Smoking may be negatively reinforced by the avoidance of distress and negative affect (not exclusively caused from withdrawal), with tobacco use becoming associated with alleviation of unpleasant emotions (Cameron et al., 2013). Indeed, distress and negative affect increases have been noted in the hours before a smoking lapse, suggesting that increases in distress and negative affect predict relapse (Shiffman & Waters, 2004). This observation is important, as rapid increases in distress and negative affect are possible during exposure to smoking-related cues (Brown et al., 2005). Moreover, unpleasant emotions are usual reactions to life's events (Gross, Richards, & John, 2006; Oatley & Duncan, 1994). However, how the individual responds to stress and negative affect and not the actual severity and intensity of nicotine dependence or other symptoms related to physical dependence (Kenford, Fiore, & Jorenby, 1994; Piasecki et al., 2000) play a more crucial role in lapse and relapse (Brown et al., 2005; Kenford et al., 2002). Indeed, successful quitters are those who cope better with negative affect (Abrams et al., 1987), with the difference between successful and unsuccessful quitters being that the successful ones are those who better tolerate distress and negative affect following the quit attempt (Brown et al., 2005).

Distress intolerance has been suggested to increase even more negative emotions and motivation toward escape (Zvolensky & Otto, 2007), with smoking being one of the main

escape options for smokers. In accordance to this statement, Abrantes and colleagues (2008) found that among those smokers who successfully resisted smoking on their selected quit day, individuals low in distress tolerance reported greater negative affect in response to smoking cessation. Smokers low in distress tolerance may be particularly vulnerable to distress and negative affect that occurs during smoking cessation leading to lapse and relapse (Abrantes et al., 2008; Cameron et al., 2013). In accordance to this statement, individuals who, despite completing the initial assessment for inclusion in smoking cessation programs do not appear in any intervention session, show lower levels of psychological and physical distress tolerance compared to smokers who participate in treatment (MacPherson, Stipelman, Duplinsky, Brown, & Lejuez, 2008). For this reason, distress tolerance, the tendency to continue to achieve a goal regardless of negative emotional states, is likely an important factor in smoking cessation effectiveness (Brown et al., 2005).

Distress tolerance in smoking cessation refers to the individual's ability to cope with physical and psychological distress resulting from conditions such as cue-induced craving and nicotine withdrawal. In this case, the smoker elects not to receive immediate negative reinforcement via smoking a cigarette (Baker et al., 2004), but chooses delayed positive reinforcement (i.e., health improvement), which will be achieved in the long-term through smoking cessation (Brown et al., 2005). The dilemma between immediate reinforcement and goal-directed behaviour seems many times to be extremely difficult for smokers, as the reinforcing results of smoking a cigarette are immediate (i.e., nicotine reaches the brain 10-20 seconds after first inhalation; USDHHS, 2014), whereas health improvements due to smoking cessation, such as decrease in shortness of breath and improvement of blood circulation, need hours to days to be achieved and noticed (WHO, 2017).

Distress tolerance and task persistence

Distress tolerance and task persistence are two interrelated terms, with task persistence referring to the behavioural aspect of distress tolerance (Brandon et al., 2003; Brown et al., 2005). Tasks measuring task persistence have been used in laboratory settings to evaluate smoking behaviour (e.g. Abrantes et al., 2008; Brandon et al., 2003) and have been found to predict smoking cessation (Brandon et al., 2003). Indeed, delayed relapsers, individuals who relapse after 3 months of quitting, show higher persistence in challenging psychological and physical tasks and lower levels of distress and craving compared to immediate relapsers (Brown, Lejuez, Kahler, & Strong, 2002). Smokers with lower levels of task persistence have higher levels of negative affect and urges to smoke during the first day of the quit attempt and are more likely to smoke during the first day of their attempt

compared to those with high levels of task persistence (Abrantes et al., 2008). Additionally, task persistence predicts early drop-out from treatment regarding substance abuse and length of abstinence (Daughters, Lejuez, Bornovalova et al., 2005; Daughters, Lejuez, Kahler, Strong, & Brown, 2005). As can be seen, results from experimental studies suggest that distress tolerance, evidenced by persistence to laboratory challenging tasks, is a clinically relevant process (Brown et al., 2009). Underlining the important role of distress tolerance in smoking cessation, effective smoking cessation interventions are in need which will affect not only the experience of unpleasant emotions but also individuals' tolerance to stressful situations.

Distress tolerance and smoking cessation interventions

Low distress tolerance smokers may experience unique challenges (i.e., more affective and withdrawal difficulties) while trying to quit smoking (Abrantes et al., 2008). Thus, it is important for smoking cessation interventions to target, among other, smokers' responses to internal experiences, such as thoughts and feelings regarding smoking (i.e., negative affect and craving) to be more effective (Brown et al., 2008). Emotion regulation skills, specific abilities to effectively cope with unpleasant affective states, help in substance abstinence (Berking et al., 2011). Specifically, teaching individuals not to try to avoid or escape from aversive internal states could help them strengthen their ability to withstand distress, a skill which is needed in smoking cessation (Brown et al., 2008).

Emotion regulation strategies based on Cognitive Behavioural Therapy (CBT) and Acceptance and Commitment therapy (ACT) have been suggested to be useful for teaching participants how to handle unpleasant smoking thoughts, emotions and bodily sensations (Brown et al., 2008). These emotion regulation strategies can help smokers interpret and handle in a healthier way their unpleasant internal experiences (Brown et al., 2008). CBT's basic emotion regulation strategy is cognitive reappraisal, which refers to the process of reframing the meaning of an emotional stimulus to modify its impact (Gross, 1998b). Cognitive reappraisal differs from acceptance, an emotion regulation strategy taught in ACT, on how it approaches unpleasant internal experiences. Cognitive reappraisal gives emphasis on changing any unpleasant, dysfunctional thoughts with more realistic ones (Jenkins & Tapper, 2014). Conversely, acceptance refers to the aware and active embracement of unpleasant thoughts and feelings without making any attempt to change them (Hoffman & Asmundson, 2008). Re-interpretation or acceptance of unpleasant internal cues, such as negative affect and craving, has been suggested that will help smokers to achieve their goal of not smoking (Brown et al., 2009; Brown et al., 2005).

Based on the Process Model of emotion regulation, cognitive reappraisal is an antecedent-focused emotion regulation strategy, while acceptance belongs to response-focused emotion regulation (Gross, 1998b; Hofmann & Asmundson, 2008). Cognitive reappraisal is suggested to affect the entire emotional response by reducing subjective and expressive reactions to negative affect (Gross, 1998b; 2002). Acceptance is suggested, based on this model, to decrease expressive reactions but not the subjective experience of unpleasant stimuli (Gross, 1998b; 2002; for a more detailed discussion see Chapter II). In the case of smoking cessation, cognitive reappraisal is expected to decrease craving and negative affect while increasing distress tolerance. On the other hand, acceptance is expected to increase distress tolerance, while not affecting the subjective experience of craving and negative affect. To our knowledge, there has been only one study to date that compared how cognitive reappraisal and acceptance affect smokers' negative affect, craving and task persistence during a mentally challenging task (Szasz et al., 2012). Smokers who received brief training in cognitive reappraisal showed significantly higher levels of task persistence and lower levels of craving and negative affect compared to the acceptance group. These results support the use of cognitive reappraisal in coping with stressful experiences during smoking abstinence. As this sole study on comparison of the effectiveness of cognitive reappraisal vs. acceptance on distress tolerance has several methodological issues (e.g., did not follow recommendations for conduction of laboratory studies, Barne-Holmes & Hayes, 2003; did not use an actual control group; for a detailed discussion see Chapter II), further studies need to be conducted. Further research will contribute in exploring more the effectiveness of emotion regulation strategies in coping with negative affect, and how they affect smokers' distress tolerance, a significant component of effective smoking cessation attempts.

Present study

The Study 3 aims were: a) to examine how two emotion regulation strategies, cognitive reappraisal and acceptance, affect persistence in a psychologically challenging task compared to an active control group (using usual emotion regulation strategy) and b) to examine how these two strategies affect the emotional aspect of the stress response (i.e., dysphoria and craving) during a mentally challenging task compared to the control group. Our study was planned and conducted by taking into account Barnes-Holmes & Hayes (2003) recommendations regarding increasing quality of laboratory studies examining treatment components (for a detailed discussion see Chapter II). We also included smokers who did not necessarily want to quit smoking, in contrast to the previous study that included

smokers motivated to quit smoking (Szasz et al., 2012), and included an actual active control group. We hypothesized that the cognitive reappraisal and acceptance groups would show significantly higher levels of task persistence compared to the control group. The cognitive reappraisal and the acceptance groups were not expected to show significantly different levels of task persistence, as they both target actual behaviour based on the Process Model of emotion regulation. The cognitive reappraisal group was expected to show significantly lower levels of dysphoria and smoking craving compared to the other two groups (as it was theorised to be antecedent-focused emotion regulation), while the acceptance group was not expected to differ significantly from the control group on emotional responses.

Methods

Participants

Participants included in this study are the same with those included in Chapter II. For more information regarding recruitment, inclusion and exclusion criteria and sample's characteristics please see Chapter II.

Measures

Self-reported craving.

Questionnaire on Smoking Urges-Brief (QSU-Brief; Cox et al., 2001; Greek version: Karekla, Panayiotou, & Collins, 2017): See Chapter II for more information.

Self-reported distress during task persistence task.

As part of Study 3, participants answered a set of self-reported questions regarding a) anxiety, b) irritability, c) difficulty concentrating, d) discomfort and e) frustration using a line ranging from none (0) to extreme (100) to measure self-reported distress. Participants had to create a vertical line at the point which best describes how much they felt each of the above statements (Appendix J). These questions have been used in a number of other studies (e.g. Brown et al., 2002; Brown et al., 2009; Karekla et al., 2017; Szasz et al., 2012) to assess individuals' level of subjective distress. As anxiety, irritability, difficulty concentrating, discomfort, and frustration showed high intercorrelations (all $r > .52$, $p < .001$), they were averaged (Sirota, Rohsenow, Dolan, Martin, & Kahler, 2013) to form the dysphoria scale.

Task persistence.

Task persistence was assessed by the modified Paced Auditory Serial Addition Task (PASAT-C) developed by Lejuez, Kahler and Brown (2003). PASAT, a widely used neuropsychological test (Lejuez et al., 2003), was first developed to examine cognitive impairment due to traumatic brain injury (Grownwall & Sampson, 1974). The PASAT (and PASAT-C) increases discomfort and distress (e.g. Holdwick & Wingenfeld, 1999) and produces physiological arousal (e.g. Al'Absi, Amunrud, & Wittmers, 2002; Brown et al., 2009; Lejuez et al., 2003; Mathias, Stanford, & Houston, 2004). Lejuez and colleagues (2003) developed a modified computer version of PASAT, the PASAT-C, to induce discomfort. The specific task can be used to assess reaction to stress, in other words distress tolerance (Lejuez et al., 2003). In many studies regarding substance use, PASAT and PASAT-C has been successfully used to evaluate distress tolerance and task persistence (e.g. Cameron et al., 2013; Gorka, All, & Daughters, 2012; Sirota, Rohsenow, Dolan, Martin, & Kahler, 2013).

In our study, during the PASAT-C, a series of single digit numbers were presented visually (Mathias et al., 2004). Participants were instructed to add the presented digit with the previous digit and give the sum. Then, they had to ignore the sum and add the next digit to the last previously presented digit providing a new sum. For example, if the numbers '2', '3', '8' and '4' were presented, the correct answers were '5', '11' and '12' (Lejuez et al., 2003). The task consisted of a practice round and three levels which increase in difficulty. PASAT is suggested to increase processing demands by increasing the speed of digit presentation (Spreen & Strauss, 1998), so as inter-digit latency decrease in each level, distress was expected to increase. The practice round lasted for 3 minutes and the inter-digit latency was 5 seconds. After the completion of the practice round, participants had to answer questions about their distress level (dysphoria scale; Appendix J), and then they were informed that Level 1 (i.e., low difficulty level) was about to start. Level 1 lasted for 3 minutes and had a 3-second inter-digit latency. Level 2 (i.e., medium difficulty level) started after Level 1 without notice and lasted for 5 minutes with 1.5 seconds inter-digit latency. Transition from Level 2 to Level 3 was done after presentation of the notification that in this round, individuals had the opportunity to stop their participation whenever they want by saying the word "End". Moreover, between Level 2 and Level 3 there was a 2-minute relaxation period during which participants again completed the dysphoria scale. The self-reports of distress were measured at the end of Level 2 and not at the end of the whole task to prevent confounds due to the early termination option (Daughters, Lejuez, Bornovalova

et al., 2005). Level 3 (i.e., high difficulty level) lasted for up to 10 minutes and the inter-digit latency was 1 second. Duration of digit presentation for the three levels was set to 0.4 seconds (Holdwick & Wingenfeld, 1999; Spreen & Strauss, 1991).

During the task, the digits were presented in bold font in a rectangle that was positioned on the upper middle area of the computer screen. In the lower middle area of the screen, a numerical keyboard ranging from 1 to 20 was presented on which individuals had to select the correct number with the mouse. Individuals' scores were presented on the upper right side of the screen. Participants had to select the right answer before the presentation of the next digit to be accepted (Tombaugh, 2006) and they earned one point for every correct answer. When incorrect or no answer was provided, no point was added to the score and an unpleasant auditory feedback (aversive beep) was provided to increase individuals' distress (Brown et al., 2002; Lejuez et al., 2003; Sirota et al., 2013). Task persistence was calculated as the time until escaping from the task during Level 3, measured in seconds (e.g. Cameron et al., 2013; Gorka et al., 2012; Macpherson et al., 2008; Sirota et al., 2013).

Procedure

Individuals interested in participating in the study completed an online questionnaire to confirm their eligibility. Eligible individuals were contacted, and their laboratory visit was scheduled. Upon arrival, they were informed about the study and the procedures and they provided their written informed consent. Then, they were asked to smoke one cigarette so that all the participants had the same time since their last cigarette and then they completed a set of questionnaires. Participants were randomly assigned to one of the three experimental groups (cognitive reappraisal, acceptance and control) and they received training in using cognitive reappraisal or acceptance. The control group listened to an audio-tape regarding the positive aspect of having animals in our life (for more information see Chapter II). Following, participants were exposed in counterbalanced order to videos including people smoking and to their own smoking paraphernalia and their craving level was assessed. Then, they completed the modified Stroop task and after that they completed the PASAT-C task. Following the PASAT-C, participants completed the QSU-Brief and smoked a cigarette while being video-recorded. At the end, they were debriefed and get paid for their participation. Chapter II and Table 1-1 include the experiment procedure in more detail.

Statistical analyses

From the 76 participants who completed the experimental session and were included in previous studies' analyses, data for one participant were discarded due to problematic files, leaving 75 participants (cognitive reappraisal: 25, acceptance: 24, control: 26) for analyses. To examine the impact of emotion regulation strategies on task persistence, between groups ANOVA was conducted with participants' task persistence score measured in seconds been used as the dependent variable. As there was a large significant correlation between task persistence and task performance (r=0.76, p<.001), an ANCOVA was run to confirm the results of the foremaned analysis with task performance as the covariate.

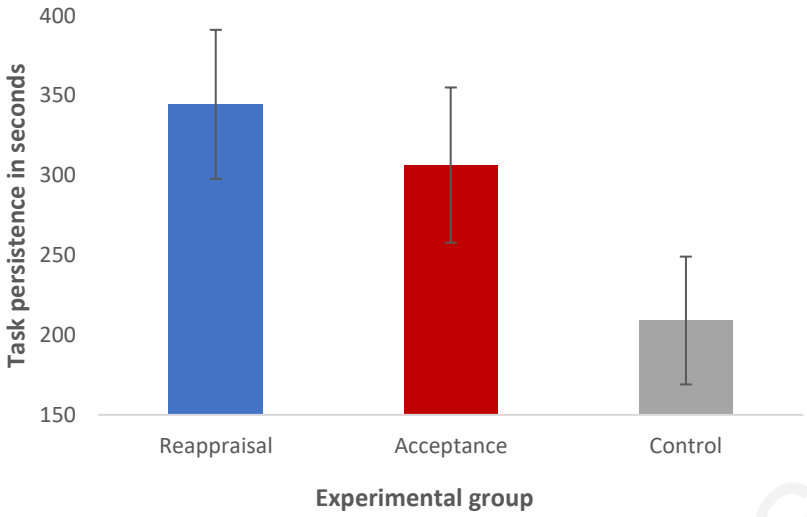
The impact of the three strategies on dysphoria level during the mentally challenging task were examined by conducting a 2 (Time) * 3 (Strategy) mixed ANOVA with dysphoria score as the dependent variable, the three strategies as the between-subjects variable and Time (pre-Level 1, pre-Level 3) as the within-subjects variable. To examine the impact of the three emotion regulation strategies (cognitive reappraisal, acceptance, usual strategy) on craving in conditions of high mental demands, we conducted a 2 (Time) X 3 (Strategy) mixed ANOVA with the QSU-Brief scores as the dependent variable, the three emotion regulation strategies as the between-subjects variable, and Time (pre-PASAT-C and post-PASAT-C) as the within-subjects variable.

Results

Effects of emotion regulation strategies on task persistence

Results showed that task persistence was not significantly different between emotion regulation strategies, F(2,72)=2.46, p>.05, ω=0.30. As the correlation between task persistence and task performance (number of correct responses) was large (r=0.76, p<.001), ANCOVA was also ran with task performance as the covariate. ANCOVA agreed with the results of the between groups ANOVA. The covariate, task performance, was significantly related to task persistence, F(1, 71)=87.74, p<.001, η_p^2=0.55. The effect of emotion regulation strategy on task persistence after controlling for the effect of task performance was not significant, F(2, 71)=0.57, p>.05, η_p^2=0.02. Results showed that, even by keeping PASAT-C performance constant, the three emotion regulation groups did not differ on task persistence. Figure 4-1 depicts the mean of task persistence (measured in seconds) during Level 3 of the PASAT-C task for the three experimental groups.

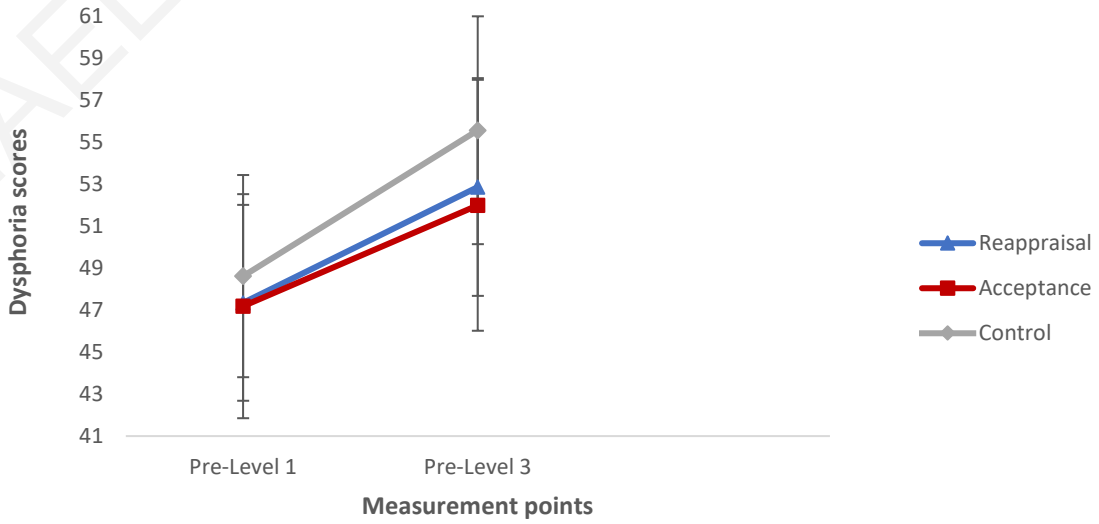
Figure 4-1. Task persistence mean (*SE*) in seconds based on emotion regulation strategy.



Effects of emotion regulation strategies on dysphoria during a mentally challenging task

The mixed ANOVA showed that the interaction between Time (pre-Level 1, pre-Level 3) X Strategy (cognitive reappraisal, acceptance, control) on dysphoria level was not significant, $F(2, 73)=0.11$, $p>.05$, $\eta_p^2=0.001$. There was a significant main effect of Time on dysphoria, $F(1, 73)=8.91$, $p<.05$, $\eta_p^2=0.11$. Dysphoria, in general, was found to be significantly higher pre-Level 3 of the PASAT-C task ($M=53.56$, $SE=3.19$) compared to pre-Level 1 ($M=47.71$, $SE=2.85$). The main effect of Strategy on dysphoria was not significant, $F(2, 73)=0.07$, $p>.05$, $\eta_p^2=0.002$. Figure 4-2 depicts dysphoria means of the three experimental groups at pre-Level 1 of PASAT-C task and pre-Level 3 of the task.

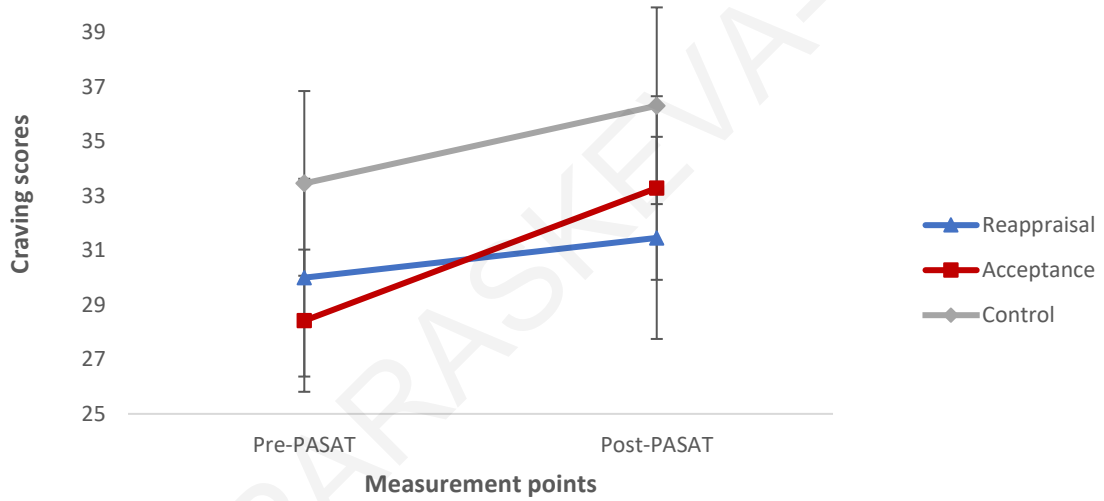
Figure 4-2. Dysphoria mean level (*SE*) by emotion regulation strategy at pre-Level 1 and pre-Level 3 of the PASAT-C task.



Effects of emotion regulation strategies on craving during a mentally challenging task

The mixed ANOVA showed that the interaction between Time (pre-PASAT-C, post-PASAT-C) X Strategy (cognitive reappraisal, acceptance, control) on craving levels was not significant, $F(2, 73)=1.17$, $p>.05$, partial $\eta^2=0.03$. There was a significant main effect of Time on craving, $F(1, 73)=11.34$, $p<.05$, partial $\eta^2=0.13$. Craving was found, in general, to be significantly higher after the PASAT-C task ($M = 33.69$, $SE=2.07$) compared to pre-PASAT ($M=30.63$, $SE=1.89$). The main effect of Strategy on craving was not significant, $F(2, 73)=0.51$, $p>.05$, partial $\eta^2=0.01$. Figure 4-3 depicts the craving mean level of the three experimental groups at pre- PASAT-C and post-PASAT-C.

Figure 4-3. Mean craving level (*SE*) by emotion regulation strategy at pre-PASAT-C and post-PASAT-C.



Discussion

Study 3 aimed to better understand how emotion regulation strategies affect task persistence and emotional reactions to a psychologically challenging task. The results partly supported our hypotheses. Regarding distress tolerance, results showed that the cognitive reappraisal and the acceptance groups did not differ on task persistence. These results are in accordance with our hypothesis and with a previous study that examined the effectiveness of cognitive reappraisal and acceptance on task persistence in major depressive disorder (Ellis, Vanderlind, & Beevers, 2013), and provided support to the idea that both strategies affect actual behaviour in the same way. Counter to our initial hypothesis, the control group (which was instructed to use the usual emotion regulation strategy) did not show significantly lower task persistence compared to the other two groups. These results were confirmed by keeping task performance constant. A reason for not finding significant

differences may be related with the type of the usual emotion regulation strategy. Based on participants' descriptions of the applied strategy (for more details see Chapter II), the most commonly used emotion regulation strategy by the control group was distraction (54.55%). Distraction has been found to significantly improve task persistence in a study which used cold-pressor apparatus (Dahlquist et al., 2007). Moreover, studies including distraction have been found to be effective in increasing distress tolerance (e.g. Powers, 1999; Zelikovsky, Rodrigue, Gidycz, & Davis, 2000). It is important however to mention that these studies examined physically and not mentally challenging situations and were based on behavioural observations.

Regarding dysphoria level and smoking craving, the acceptance and control groups did not significantly differ, providing support to our hypotheses. The non-significant difference of these two groups in dysphoria and craving level compared to the cognitive reappraisal group was against our hypothesis. These unexpected results may be explained by the non-automatic use of the cognitive reappraisal at early stages of learning. Joormann & Siemer (2011) supported that reappraisal, as an antecedent-focused emotion regulation strategy, affect the emotion generation by modifying the very first appraisals of an emotional situation. Early reappraisal is expected to be applied before individuals encounter emotional cues and it is expected to consume fewer cognitive resources than strategies, which modify behaviour after the full generation of emotion (Joormann & Siemer, 2011). Late reappraisal occurs later in the emotion process and changes an existing emotional response (Sheppes & Meiran, 2007). This type of reappraisal seems to be less effective in reducing negative affect and requires more cognitive control compared to early reappraisal (Sheppes & Meiran, 2008). One possibility is that cognitive reappraisal in our study was late reappraisal and because of the required cognitive control, emotional experience could not be significantly affected by the strategy. It is possible that as individuals get used to the strategy, they could use cognitive reappraisal before even entering to the challenging situation, leading to larger reductions in dysphoria and craving.

The inconsistency of our finding with that of Szasz and colleagues' study (2012) may have to do with differences in the training that was provided to the cognitive reappraisal group. In the previous study individuals were explicitly instructed to think a number of negative consequences of smoking. On the other hand, in our study individuals had to be exposed to challenging situations, come in touch with their thoughts and then find alternative ways of thinking. Szasz and colleagues' taught strategy can be suggested to be early reappraisal as participants did not have to notice their thoughts and change them as in our

study, but rather they had to think of a specific thought. Thus, it is probable that when cognitive reappraisal is learned as it is done in actual CBT therapeutic programs, it needs to be practiced to become more of an automatic process and affect the subjective experience of challenging situations. This explanation is also supported by another study which examined cognitive reappraisal by providing to the participants the alternative thought that they had to use and which showed that cognitive reappraisal led to less negative affect and longer task persistence compared to the acceptance group (Szasz, Szentagotai, & Hofmann, 2011).

Another potential explanation of non-significant differences in dysphoria and craving between groups may be the type of measures that were used. As we used multi-item questionnaires this may affect our results as participants might use their response to the initial item to anchor their responses to the rest of the items. Also, as participants completed the same questionnaires within short time intervals, they may remember their previous answers and responded in a similar manner (Field et al., 2009). Moreover, the type of the task which was used may have an effect on the results. A number of participants mentioned to the researchers that during the PASAT-C task they did not manage to adequately use the learned strategy to cope with unpleasant thoughts and emotions as the task was quick. It is probable that the utilization of other tasks which induce distress (such as the mirror tracing persistence task, Quinn, Brandon, & Coperland, 1996; and the cold-pressor apparatus, Vigil, Rowell, Alcock, & Maestes, 2014) can help to better understand the impact of these emotion regulation strategies on distress tolerance. Last but not least, it is important to mention that our emotion regulation training focused on smoking craving. Thus, it may be difficult for participants to apply a newly used strategy to cope with distress caused by a mentally challenging task rather than craving. Examination of all the above possible explanations would help us to better understand if these strategies are different on affecting distress tolerance or if they act with similar ways.

Strengths and limitations

Strengths of Study 3 include the use of an active control group based on actual techniques which are used in everyday life by participants, the multimodal assessment of distress tolerance (i.e., task persistence and self-reported dysphoria), the explicit explanation of the theory behind cognitive reappraisal and acceptance and the manipulation check based on individuals' qualitative descriptions can be seen as some of the strengths of this study. However, the specificity of emotion regulation training on smoking craving, the short period of training, the measurement of short-term effectiveness of the use of emotion regulation

strategies and the assessment of distress tolerance by using only one task are some of the limitations of our study.

Future studies

Further research with longer periods of assessment, inclusion of other types of smokers' usual emotion regulation strategies, measurement of physiological reactions to challenging situations apart from self-reports, assessment of distress tolerance by using other types of tasks (e.g., mentally vs. somatically challenging task) and inclusion of a non-smoking control group could provide a better understanding of if and how cognitive reappraisal and acceptance affect distress tolerance in smokers. This knowledge would be useful for the development of effective intervention programs, as distress intolerance has been suggested to be an important factor leading often to tobacco use and quit failure.

CHAPTER V: GENERAL DISCUSSION

Tobacco use is one of the unhealthiest behaviours, leading to much premature death that could be prevented (WHO, 2016). Although smoking cessation is important to increase life expectancy, the majority of smokers who try to quit smoking relapse (Hughes et al., 1992), even after receiving help from a professional or taking medication (e.g., Ferguson et al., 2005; Kenford et al., 1994). Thus, better understanding of what precedes tobacco use is crucial to develop effective smoking cessation programs.

Craving, and especially episodic craving, has a central role in addiction and substance use (Ferguson & Shiffman, 2009b). Stimuli that become conditioned to smoking lead to craving (e.g., Carpenter et al., 2014), which usually leads to tobacco use, even in individuals who want to quit smoking (Waters et al., 2004). The craving experience is a complex phenomenon with several related aspects. Apart from the self-reported craving symptoms, physiological reactions to smoking-related cues worsen the distress that an individual feels when he/she is exposed to smoking-related cues (Conklin & Tiffany, 2001). Attentional bias to smoking-related cues, together with intolerance to unpleasant situations (such as distress and craving symptoms) worsen even more the craving symptoms (Field & Cox, 2008), leading to smoking to alleviate unpleasant thoughts and feelings (Brown et al., 2002). Psychological therapies such as CBT and ACT try to help individuals stop smoking, however their basic therapeutic components (e.g., cognitive reappraisal for CBT and acceptance for ACT) have not been thoroughly examined on how they affect the correlates of the craving experience.

The presented thesis aimed to examine if cognitive reappraisal and acceptance differ on the way they affect subjective, physiological, cognitive and behavioural aspects of craving. Moreover, it aimed to investigate if these strategies differ on how they affect attentional bias to smoking-related cues and distress tolerance. The two emotion regulation strategies were compared to a control group which used the usual emotion regulation strategy to cope with smoking cravings. The Process Model of emotion regulation suggests that cognitive reappraisal affects emotion early on in the generation cycle, while acceptance exerts its effects after the emotion has been fully generated (Gross, 1998a, 1998b). As a result of these hypothesized differences, cognitive reappraisal was expected to lead to: 1) greater decreases in aspects of the craving experience (i.e., self-reports of craving and negative affect, physiological reactions, attentional bias), and 2) more effect on smoking behaviour and distress tolerance, compared to the acceptance and control groups. The acceptance and control groups were hypothesized that they would not differ in most of the

smoking craving aspects (such as self-reports, physiological reactions and attentional bias). Moreover, in vivo exposure to personal smoking-related objects was expected, in general, to lead to higher levels of self-reported craving compared to video exposure to smoking cues. Last but not least, pictorial stimuli were expected to lead, in general, to higher levels of attentional bias for smoking-related cues compared to linguistic stimuli.

Study 1 (Chapter II) showed that the three emotion regulation strategies did not significantly differ in self-reported craving and negative affect during exposure to smoking-related cues via videos and in vivo. Moreover, the three groups did not differ in their physiological reactions (i.e., heart rate) during the exposure to smoking-related cues, while the cognitive reappraisal group showed significantly higher skin conductance responses compared to the other two groups. Finally, comparison of the three groups regarding changes in tobacco topography after emotion regulation training showed that the three groups did not significantly differ on number of puffs and inter-puff intervals. However, the cognitive reappraisal and acceptance groups showed significant changes from pre- to post-experiment regarding puff duration, while the control group did not show any significant difference in this aspect of tobacco topography. Moreover, the specific study showed that in vivo exposure to personal smoking paraphernalia leads to higher levels of self-reported craving compared to video exposure.

Study 2 (Chapter III) examined the three emotion regulation strategies regarding their impact on attentional bias to smoking-related cues. It showed that these strategies did not significantly differ on how they affect attentional bias to smoking-related cues as it was measured by a modified Stroop task. The non-existence of significant differences between the groups applies not only for linguistic but also for pictorial stimuli. Furthermore, this study showed that linguistic stimuli led to higher levels of attentional bias to smoking-related cues compared to pictorial stimuli.

Study 3 (Chapter IV) examined the three emotion regulation strategies regarding their impact on task persistence during a mentally challenging task (PASAT-C) and on the emotional aspect of the stress response (i.e., dysphoria and craving). Results showed that the three groups did not significantly differ on any of the forenamed aspects.

The results of the forenamed studies suggest that the three emotion regulation strategies (cognitive reappraisal, acceptance and usual emotion regulation strategy for cravings) do not significantly differ on their effect on the subjective, physiological, cognitive and most of the behavioural correlates of craving. These results are important taken into

account that only one study to date has tried to examine the potential differences between cognitive reappraisal and acceptance on smoking craving (Szasz et al., 2012), based on the Process Model of emotion regulation (Gross, 1998b). Interestingly this study did not result in similar findings. Several possible methodological differences may explain the differences in findings between these studies. The major methodological difference refers to the type of cognitive reappraisal that was applied in the study. Studies examining the effectiveness of cognitive reappraisal as an antecedent-focused emotion regulation strategy, provide participants with specific thought(s) to use when reappraising a negative thought or smoking craving. The alternative thought which is usually used is to think about the negative consequences of smoking behaviour (e.g., Kober, Mende-Siedlecki et al., 2010; Siep et al., 2012). This was the case in Szasz and colleagues' (2012) study too. This type of cognitive reappraisal can be considered to be early reappraisal, as individuals had a fixed alternative thought which they could use even before encountering the smoking-related cues and before the full generation of the emotional response (Joormann & Siemer, 2011). Thus, it may be that it is not necessarily the technique of cognitive reappraisal that is an antecedent response but the methodology via which it is applied that makes it an antecedent response.

In CBT smoking cessation interventions, therapists usually do not provide their clients with a specific alternative thought to cope with smoking cravings. Instead, clients are taught how to identify their negative thoughts that lead to craving and how to challenge them by finding their personal, more helpful new thoughts (e.g., Beck, 2011) that will lead to coping more effectively with cravings. Based on what usually happens in treatment, we wanted our instructions to closely resemble those of cognitive restructuring as it happens within CBT and thus, we trained individuals to identify their unrealistic thoughts regarding craving and smoking and generate their own personally relevant new thoughts. Considering that 30.77% of participants in the cognitive reappraisal group needed further assistance to better understand how to apply the newly learned emotion regulation strategy to smoking cravings, it is possible that when participants are just learning the technique, that it acts as a response-focused intervention rather than an antecedent one. Maybe once a person practices enough and automatizes this type of responding, that this may then become more of an antecedent response. This type of cognitive reappraisal that was used in our study is closer to late reappraisal which requires more cognitive control and is less effective in reducing negative affect (e.g., Sheppes & Meiran, 2008). Thus, the non-significant differences between cognitive reappraisal and acceptance on the examined correlates of smoking craving may be due to the non-automatic application of cognitive reappraisal during the early stages

of learning the technique. The above hypothesis regarding the action of cognitive reappraisal as late reappraisal at the first steps of its use needs to be further examined by studies which will compare the forenamed strategies in the long-term, after users get used to the specific strategy, to have more conclusive results.

The non-significant difference between cognitive reappraisal and the control group, in most of craving correlates is not easily explained as the control group was not homogeneous in the way individuals cope with cravings, making findings' interpretation complicated. However, taking into account that the majority of individuals used distraction as their usual strategy (which has been suggested to be an antecedent-focused emotion regulation strategy; Li et al., 2017) showed that, at least in the laboratory context, these two suggested antecedent-focused emotion regulation strategies act similarly on the subjective aspect of craving, on attentional bias to smoking-related cues and on distress tolerance. Thus, taking into account that cognitive reappraisal and the usual strategy (i.e., mostly distraction) which are supposed to be antecedent-focused emotion regulation strategies does not show significant differences from acceptance advocates that these emotion regulation strategies are not as different as originally hypothesized, at least in the short-term and at early technique learning stages (for cognitive reappraisal and acceptance). This finding suggests that emotion regulation is a complex phenomenon and the division of strategies into antecedent- and response-focused based on the Process Model of emotion regulation (Gross, 1998a; 1998b) does not seem to be easily applied, as additional factors may play an important role on how a strategy would work (e.g., technique mastery and practice).

Surprisingly, cognitive reappraisal significantly differed from the other two strategies on skin conductance levels during exposure to smoking-related cues. Although the three groups did not differ on heart rate, the cognitive reappraisal group showed significantly higher skin conductance levels in comparison to both groups. This finding highlights the complicate nature of physiological reactions. It may be that during the first uses of cognitive reappraisal, the preoccupation with craving thoughts and feelings to find a more helpful thought leads to rumination of the unhelpful thoughts and increased physiological reactions. This hypothesis has to be tested and further studies examining the effectiveness of emotion regulation strategies by using psychophysiological measures should be conducted to better understand the effect of cognitive reappraisal on this aspect of smoking craving.

Regarding smoking behaviour, the three strategies did not significantly affect tobacco topography's aspects such as number of puffs and inter-puff interval. However, compared to the usual strategy, the cognitive reappraisal and control groups showed

significant decreases in puff duration from pre- to post-experiment while the usual strategy did not. The fact that two out of three aspects of tobacco topography did not significantly change in general, is not surprising taking into account that smoking is a learned behaviour that is difficult to change. However, the change in one of the tobacco topography's aspects is promising. It may be the fact that learning an emotion regulation strategy to cope with smoking cravings which is based on theoretical background affects smokers' confidence in coping with cravings, having thus impact on their actual behaviour. The specific area needs to be examined further with long-term measurements in order to investigate how different strategies affect smoking behaviour, if their impact on tobacco topography's aspects changes with time and if the changes that emotion regulations strategies produces in coping with cravings can be found mainly in actual behaviour rather than subjective experience.

The core conception of traditional CBT is that cognitive change is necessary for clinical improvement (Hayes et al., 2006). In the case of smoking, a primary assumption is that reduction of craving and negative affect is required before behaviour change occurs (Serfaty et al., 2018). Although this position is the basis of many CBT therapeutic programs, a number of studies did not show support (Hayes et al., 2006). Our study's finding of improvements in tobacco topography (i.e., puff duration) without significant differences in subjective craving between cognitive reappraisal and the usual emotion regulation strategy may show that this is not the case for behaviour change. It may suggest that behaviour change can happen independently of reductions on subjective emotional experiences, however this area needs to be further investigated.

Apart from the above, ACT gives emphasis on the context of psychological phenomena, supporting that the criterion regarding the usefulness of a specific emotion regulation strategy depends on the context in which it is applied (Hayes, 2004). ACT gives emphasis on the construction of broad, flexible and effective behaviour repertoires to cope with emotionally difficult situations. The goal for an individual is to be flexible on how he/she applies the different behaviours-strategies (Hayes, 2004). Based on this idea, it is possible that in the specific context (i.e., laboratory) none of the strategies excels the others in coping with smoking cravings. However, it would be interesting to examine if these strategies differ while being used in different contexts, such as more naturalistic ones. It may be the case that the strategies differ in their effectiveness to cope with cravings based on the context in which they are used. Such findings could help us understand if the emphasis should be given, not on applying a strict and specific way of thinking, but rather developing

a repertoire of behaviours-strategies and train clients on how to be flexible in using them according to the situations they encounter each time.

Based on all the above, we are planning to run the experiment with non-smokers, which will help us to better investigate the possible effect of the examined emotion regulation strategies in areas such as distress tolerance and attentional bias, as we will have an actual control group to compare with. Moreover, steps are taken to examine the effectiveness of cognitive reappraisal and acceptance after long-term use, to better understand if practice time affects their impact on the correlates of smoking craving.

The present set of studies have a number of strengths. First of all, they are among the first to examine the effectiveness of cognitive reappraisal vs. acceptance which followed the Barnes-Holmes and Hayes' (2003) recommendations regarding conducting experimental studies to assess treatment components. The only other study to compare these two strategies had a number of methodological limitations (Serfaty et al., 2018), such as not including an experiential activity for participants to better understand the strategies and not including manipulation checks to examine participants' understanding of the assigned strategy. Thus, our findings has prossibly shown a more accurate and methodologically valid picture regarding the differences between cognitive reappraisal and acceptance on smoking craving related aspects. Moreover, this is the first study which examined the effectiveness of cognitive reappraisal vs. acceptance in coping with smoking cravings not only based on self-reports of craving but by also utilizing psychophysiological measures and assessing smoking behaviour (tobacco topography). Furthermore, it is the first study to compare these two strategies with an active control group, which used the usual emotion regulation strategy to cope with cravings. Last but not least, it is the only study comparing the forenamed strategies on craving coping which included all the main aspects of the craving experience (i.e. subjective, objective, cognitive and behavioural) giving a better understanding on how these emotion regulation strategies affect the entirety of the craving experience.

There were some limitations in the present set of studies. We included mostly university students who may be early in their smoking trajectories, thus smoke fewer cigarettes, for fewer years and are less addicted compared to treatment-seeking individuals. Moreover, we included participants who differed on their motivation to stop smoking, something that may affect the attention paid in learning and applying the emotion regulation strategies. We investigated only the short-term effects of the examined emotion regulation strategies, while their effectiveness may differ in the long-term. The control group was not homogeneous as more than one emotion regulation strategy was used, complicating any

comparisons with the cognitive reappraisal and acceptance groups. Furthermore, the differences in the demanded cognitive resources between the examined strategies (cognitive reappraisal seems to demand more cognitive load compared to acceptance) could also complicate the findings, a hypothesis which needs to be examined further. Last but not least, as participants had to complete a number of tasks after the emotion regulation strategy training, there could be dilution of the training effects for the tasks that were completed later during the experimental procedure.

Future studies which will replicate the study by including more nicotine dependent individuals, treatment-seeking individuals, a non-smoking control group, a more homogeneous group regarding usual emotion regulation strategy, longer periods of emotion regulation strategies' training and assessment, and assessment of attentional bias and distress tolerance by using other types of tasks/measurements (e.g., attentional bias: ERPs; distress tolerance: mentally vs. somatically challenging tasks) could help us to create a more conclusive picture regarding if and how emotion regulation strategies differ in coping with smoking craving. This knowledge will help us to better understand how we should approach smoking craving and develop more effective smoking cessation programs to achieve higher quit rates.

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Appendix A

Screening Questionnaires

Δημογραφικά στοιχεία

Παρακαλώ διάβασε τις πιο κάτω ερωτήσεις προσεκτικά και απάντησε βάσει του τι ισχύει για εσένα. Βάλε √ στο κουτάκι που αντιστοιχεί στην επιλογή σου, κύκλωσε το γράμμα που αντιστοιχεί στην επιλογή σου ή συμπλήρωσε κατάλληλα τα κενά.

1. **Φύλο :**
   - ☐ Θήλυ
   - ☐ Άρρεν

2. **Ηλικία: _____**

3. **Υπηκοότητα: _____**

4. **Επίπεδο Μόρφωσης:**
   - ☐ Ολοκλήρωσα το Δημοτικό
   - ☐ Ολοκλήρωσα το Γυμνάσιο
   - ☐ Ολοκλήρωσα το Λύκειο / Τεχνική Σχολή
   - ☐ Σπουδάζω για τη λήψη Πτυχίου/Διπλώματος σε Πανεπιστήμιο/Κολέγιο
   - ☐ Έχω αποκτήσει Πτυχίο/Δίπλωμα από Πανεπιστήμιο/Κολέγιο
   - ☐ Σπουδάζω για την απόκτηση μεταπτυχιακού τίτλου (Μάστερ ή Διδακτορικό)
   - ☐ Έχω αποκτήσει μεταπτυχιακό τίτλο Μάστερ
   - ☐ Έχω αποκτήσει μεταπτυχιακό τίτλο Διδακτορικού

5. **Οικογενειακή Κατάσταση:**
   - ☐ Ανύπαντρος/η
   - ☐ Δεσμευμένος/η ή Αρραβωνιασμένος/η
   - ☐ Παντρεμένος/η
   - ☐ Διαζευγμένος/η
   - ☐ Χήρος/α

Ιστορικό καπνίσματος

1. Καπνίζεις;

- ☐ Ναι
- ☐ Όχι

Αν απάντησες ναι στην προηγούμενη ερώτηση (δηλαδή εάν καπνίζεις):

2α. Πόσα τσιγάρα καπνίζεις την ημέρα; _____

2β. Πόσα χρόνια καπνίζεις; _____

2γ. Τι είδους τσιγάρα κάπνισες συνήθως;

α) Συσκευασμένα
β) Τυλιχτά

2δ. Μέχρι σήμερα, πόσες φορές δοκίμασες να σταματήσεις το κάπνισμα, έστω και για μια μέρα;

α) Ποτέ
β) Μια φορά
γ) Δύο φορές
δ) Τρεις φορές
ε) Περισσότερες από 3 φορές. Σημείωσε τον αριθμό: _____

Fagerström Test for Cicotine Dependence (FTCD; Fagerström, 2011; Heatherton, Kozlowski, Frecker, & Fagerström, 1991)

Παρακαλώ απάντησε με ειλικρίνεια τις παρακάτω ερωτήσεις κυκλώνοντας τον αριθμό που αντιστοιχεί στην απάντησή σου.

1) Όταν ξυπνάς μετά από πόση ώρα καπνίζεις το πρώτο σου τσιγάρο;

1) Εντός 5 λεπτών
2) Εντός 6 - 30 λεπτών
3) Εντός 31 - 60 λεπτών
4) Μετά από περισσότερα από 60 λεπτά

2) Είναι δύσκολο για σένα να μην καπνίζεις σε χώρους όπου δεν επιτρέπεται το κάπνισμα (π.χ. στην εκκλησία, στη βιβλιοθήκη, στο σινεμά κ.λπ.);

1) Ναι
2) Όχι

3) Ποιο τσιγάρο θα σου ήταν πιο δύσκολο να σταματήσεις;

1) Το πρώτο τσιγάρο το πρωί
2) Όλα τα υπόλοιπα

4) Πόσα τσιγάρα καπνίζεις την ημέρα;

1) 10 ή λιγότερα
2) 11-20
3) 21-30
4) 31 ή περισσότερα

5) Καπνίζεις περισσότερο κατά τις πρώτες ώρες αφού ξυπνήσεις παρά κατά τη διάρκεια της υπόλοιπης ημέρας;

1) Ναι
2) Όχι

6) Καπνίζεις ακόμα και όταν είσαι τόσο άρρωστος που είσαι στο κρεβάτι κατά τις περισσότερες ώρες της μέρας;

1) Ναι
2) Όχι

Motivation To Stop Scale (MTSS; Kotz, Brown, & West, 2013)

Ποια από τις πιο κάτω δηλώσεις σε περιγράφουν; Παρακαλώ κύκλωσε τον αριθμό που αντιστοιχεί στην απάντησή σου.

1) Δε θέλω να σταματήσω το κάπνισμα
2) Νομίζω ότι πρέπει να σταματήσω το κάπνισμα αλλά δεν το θέλω πραγματικά
3) Θέλω να σταματήσω το κάπνισμα αλλά δεν σκέφτηκα το πότε
4) Θέλω ΠΡΑΓΜΑΤΙΚΑ να σταματήσω το κάπνισμα αλλά δεν ξέρω πότε θα το κάνω
5) Θέλω να σταματήσω το κάπνισμα και ελπίζω να γίνει σύντομα
6) Θέλω ΠΡΑΓΜΑΤΙΚΑ να σταματήσω το κάπνισμα και προτίθεμαι να το κάνω εντός των επόμενων 3 μηνών
7) Θέλω ΠΡΑΓΜΑΤΙΚΑ να σταματήσω το κάπνισμα και προτίθεμαι να το κάνω εντός του επόμενου μήνα

<u>Περαιτέρω κριτήρια αξιολόγησης για συμπερίληψη στην έρευνα</u>

1. **Αντιμετωπίζεις οποιαδήποτε από τις πιο κάτω ψυχολογικές δυσκολίες για την/ις οποία/ες έχεις λάβει γνωμάτευση από γιατρό; Εάν ναι, επίλεξε τη/ις δυσκολία/ες που παρουσιάζεις.**
   - ☐ Μείζον καταθλιπτικό επεισόδιο
   - ☐ Ενεργό ψυχωτικό επεισόδιο
   - ☐ Κατάχρηση αλκοόλ

2. **Έχεις διαγνωστεί στην παρούσα φάση με οποιαδήποτε άλλη ψυχολογική διαταραχή;**
   - ☐ Ναι (Διευκρίνισε τη διάγνωση που έχεις λάβει: _____)
   - ☐ Όχι

3. **Κάνεις χρήση παράνομων ουσιών;**
   - ☐ Ναι
   - ☐ Όχι

4. **Λαμβάνεις φαρμακευτική αγωγή για οποιαδήποτε ψυχιατρική διαταραχή;**
   - ☐ Ναι
   - ☐ Όχι

5. **Συμμετέχεις ή έχεις συμμετάσχει στο παρελθόν σε οποιοδήποτε ψυχολογικό θεραπευτικό πρόγραμμα που να ακολουθεί τη Γνωστικο-Συμπεριφορική προσέγγιση ή τη Θεραπεία Αποδοχής και Δέσμευσης;**
   - ☐ Ναι
   - ☐ Όχι

6. **Συμμετέχεις στην παρούσα φάση σε οποιοδήποτε πρόγραμμα διακοπής του καπνίσματος;**
   - ☐ Ναι
   - ☐ Όχι

7. **Χρησιμοποιείς στην παρούσα φάση οποιοδήποτε υποκατάστατο νικοτίνης (π.χ. τσιρότο, τσίχλα, σπρέι);**
   - ☐ Ναι
   - ☐ Όχι

Appendix B

Information Sheet and Consent Form

Αριθμός Συμμετέχοντα: ……

ΕΝΤΥΠΑ ΣΥΓΚΑΤΑΘΕΣΗΣ για συμμετοχή σε πρόγραμμα έρευνας (Τα έντυπα αποτελούνται συνολικά από 5 σελίδες)

Αγαπητή/ε,

Καλείστε να συμμετάσχετε σε ένα ερευνητικό πρόγραμμα. Πιο κάτω (βλ. **«Πληροφορίες για Εθελοντές»**) θα σας δοθούν εξηγήσεις σε απλή γλώσσα σχετικά με το τι θα ζητηθεί από εσάς ή/και τι θα σας συμβεί σε εσάς, εάν συμφωνήσετε να συμμετάσχετε στο πρόγραμμα. Θα σας περιγραφούν οποιοιδήποτε κίνδυνοι μπορεί να υπάρξουν ή ταλαιπωρία που τυχόν θα υποστείτε από την συμμετοχή σας στο πρόγραμμα. Θα σας επεξηγηθεί με κάθε λεπτομέρεια τι θα ζητηθεί από εσάς και ποιος ή ποιοι θα έχουν πρόσβαση στις πληροφορίες ή/και άλλο υλικό που εθελοντικά θα δώσετε για το πρόγραμμα. Θα σας δοθεί η χρονική περίοδος για την οποία οι υπεύθυνοι του προγράμματος θα έχουν πρόσβαση στις πληροφορίες ή/και υλικό που θα δώσετε. Θα σας επεξηγηθεί τι ελπίζουμε να μάθουμε από το πρόγραμμα σαν αποτέλεσμα και της δικής σας συμμετοχής. Επίσης, θα σας δοθεί μία εκτίμηση για το όφελος που μπορεί να υπάρξει για τους ερευνητές ή/και χρηματοδότες αυτού του προγράμματος. **Δεν πρέπει να συμμετάσχετε, εάν δεν επιθυμείτε ή εάν έχετε οποιουσδήποτε ενδοιασμούς που αφορούν την συμμετοχή σας στο πρόγραμμα.** Εάν αποφασίσετε να συμμετάσχετε, πρέπει να αναφέρετε εάν είχατε συμμετάσχει σε οποιοδήποτε άλλο πρόγραμμα έρευνας μέσα στους τελευταίους 12 μήνες. **Είστε ελεύθεροι να αποσύρετε οποιαδήποτε στιγμή εσείς επιθυμείτε την συγκατάθεση για την συμμετοχή σας στο πρόγραμμα.** Έχετε το δικαίωμα να υποβάλετε τυχόν παράπονα ή καταγγελίες, που αφορούν το πρόγραμμα στο οποίο συμμετέχετε, προς την Επιτροπή Βιοηθικής που ενέκρινε το πρόγραμμα ή ακόμη και στην Εθνική Επιτροπή Βιοηθικής Κύπρου.

Πρέπει όλες οι σελίδες των εντύπων συγκατάθεσης να φέρουν το ονοματεπώνυμο και την υπογραφή σας.

Σύντομος Τίτλος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε
Συναισθηματική αυτό-ρύθμιση καπνιστών. Πώς η γνωστική αναδόμηση και η αποδοχή επηρεάζουν τις υποκειμενικές, φυσιολογικές, γνωστικές και συμπεριφορικές πτυχές της έντονης επιθυμίας για κάπνισμα.
Υπεύθυνος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε
Δρ. Μαρία Καρεκλά Επίκουρη Καθηγήτρια, Τμήμα Ψυχολογίας, Πανεπιστήμιο Κύπρου

Επίθετο:	……	Όνομα:	……
Υπογραφή:		Ημερομηνία:	

ΕΝΤΥΠΑ ΣΥΓΚΑΤΑΘΕΣΗΣ για συμμετοχή σε πρόγραμμα έρευνας (Τα έντυπα αποτελούνται συνολικά από 5 σελίδες)
Σύντομος Τίτλος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε
Συναισθηματική αυτό-ρύθμιση καπνιστών. Πώς η γνωστική αναδόμηση και η αποδοχή επηρεάζουν τις υποκειμενικές, φυσιολογικές, γνωστικές και συμπεριφορικές πτυχές της έντονης επιθυμίας για κάπνισμα.

ΠΛΗΡΟΦΟΡΙΕΣ ΓΙΑ ΕΘΕΛΟΝΤΕΣ ΣΥΜΜΕΤΕΧΟΝΤΕΣ

Με την παρούσα επιστολή ζητάμε τη γραπτή σας συγκατάθεση για να λάβετε μέρος στην επιστημονική έρευνα με τίτλο "Συναισθηματική αυτό-ρύθμιση καπνιστών. Πώς η γνωστική αναδόμηση και η αποδοχή επηρεάζουν τις υποκειμενικές, φυσιολογικές, γνωστικές και συμπεριφορικές πτυχές της επιθυμίας για κάπνισμα" που διεξάγεται από το Τμήμα Ψυχολογίας του Πανεπιστημίου Κύπρου με Επιστημονική Υπεύθυνη τη Δρ. Μαρία Καρεκλά, Επίκουρη Καθηγήτρια του Τμήματος Ψυχολογίας του Πανεπιστημίου Κύπρου.

Η συγκεκριμένη έρευνα έχει ως σκοπό την καλύτερη κατανόηση του πώς οι στρατηγικές ρύθμισεις των συναισθημάτων επηρεάζουν διάφορους τομείς που σχετίζονται με την επιθυμία για κάπνισμα. Ακόμη, στοχεύει να εξετάσει το πώς διάφοροι παράγοντες που σχετίζονται με την επιθυμία μας να συμπεριφερθούμε με ένα συγκεκριμένο τρόπο επηρεάζουν την πραγματική μας συμπεριφορά και την επιθυμία για κάπνισμα. Το υπόβαθρο, ο σκοπός και η μεθοδολογία της έρευνας περιγράφονται αναλυτικά στην περίληψη που ακολουθεί.

Για τυχόν ερωτήσεις ή διευκρινίσεις, μη διστάσετε να επικοινωνήσετε μαζί μας στα τηλέφωνα 22-892100, με τη Δρ. Μαρία Καρεκλά ή στην ηλεκτρονική διεύθυνση siamata.michaela@ucy.ac.cy με τη Μιχαέλα Παρασκευά-Σιαματά, διδακτορική φοιτήτρια Κλινικής Ψυχολογίας του Πανεπιστημίου Κύπρου.

Για υποβολή τυχόν παραπόνων και καταγγελιών μπορείτε να αποταθείτε στον Αντιπρύτανη Ακαδημαϊκών Υποθέσεων του Πανεπιστημίου Κύπρου, Δρ. Αθανάσιο Γαγάτση, στο τηλέφωνο 22-894003 ή στην ηλεκτρονική διεύθυνση vrectaa@ucy.ac.cy / gagatsis@ucy.ac.cy, διεύθυνση: Κτήριο Συμβουλίου – Συγκλήτου «Αναστάσιος Γ. Λεβέντης», Γραφείο: 101, Πανεπιστημιούπολη.

Σας ευχαριστούμε εκ των προτέρων για τη συνεργασία σας.

Με εκτίμηση,
Δρ. Μαρία Καρεκλά
Επίκουρη Καθηγήτρια
Επιστημονική Υπεύθυνη του Ερευνητικού Προγράμματος
Τμήμα Ψυχολογίας
Πανεπιστήμιο Κύπρου

Επίθετο:	.....	Όνομα:	.....
Υπογραφή:		Ημερομηνία:	

ΕΝΤΥΠΑ ΣΥΓΚΑΤΑΘΕΣΗΣ

για συμμετοχή σε πρόγραμμα έρευνας

(Τα έντυπα αποτελούνται συνολικά από 5 σελίδες)

Σύντομος Τίτλος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε

Συναισθηματική αυτό-ρύθμιση καπνιστών. Πώς η γνωστική αναδόμηση και η αποδοχή επηρεάζουν τις υποκειμενικές, φυσιολογικές, γνωστικές και συμπεριφορικές πτυχές της έντονης επιθυμίας για κάπνισμα.

ΛΕΠΤΟΜΕΡΗΣ ΠΕΡΙΓΡΑΦΗ ΤΗΣ ΕΡΕΥΝΑΣ

Σκοπός της έρευνας: Η έρευνα μελετά την επίδραση των στρατηγικών ρύθμισης του συναισθήματος (γνωστική αναδόμηση και αποδοχή) στην επιθυμία για κάπνισμα που βιώνουν πολλά άτομα όταν έρχονται σε επαφή με ερεθίσματα που σχετίζονται με το κάπνισμα. Ακόμη στοχεύει να βοηθήσει στην κατανόηση του πώς η γνωστική αναδόμηση και αποδοχή επηρεάζουν τομείς όπως η προσοχή, η ανοχή της δυσφορίας και η συμπεριφορά. Η πρόθεσή μας να συμπεριφερθούμε με έναν συγκεκριμένο τρόπο επηρεάζει την συμπεριφορά μας. Η έρευνα στοχεύει στην κατανόηση του πώς η πρόθεση για διακοπή του καπνίσματος μπορεί να επηρεάσει την επιθυμία για κάπνισμα και πώς τη διαχειριζόμαστε.

Συμμετέχοντες: Στην έρευνα θα συμμετάσχουν άτομα άνω των 18 ετών που καπνίζουν τουλάχιστον 10 τσιγάρα την ημέρα και έχουν δώσει τη συγκατάθεσή τους.

Μεθοδολογία: Η έρευνα θα διεξαχθεί κατά τα έτη 2018-2019. Τα άτομα που θα ενδιαφερθούν να συμμετάσχουν στην έρευνα θα κληθούν να συμπληρώσουν μια σειρά ερωτηματολογίων αναφορικά με τη συνήθεια του καπνίσματος και τον τρόπο του διαχειρίζονται συνήθως τα συναισθήματά τους. Μετέπειτα, τα άτομα που θα δώσουν τη συγκατάθεσή τους για να επικοινωνήσει η ερευνητική ομάδα μαζί τους, θα προσκληθούν να συμμετάσχουν στην πειραματική συνθήκη που θα λάβει χώρα στο εργαστήριο ACT*healthy* του Τμήματος Ψυχολογίας του Πανεπιστημίου Κύπρου. Η πειραματική συνθήκη περιλαμβάνει μια σειρά από έργα. Οι συμμετέχοντες είτε θα εκπαιδευτούν σε κάποια συγκεκριμένη στρατηγική διαχείρισης των συναισθημάτων ή δε θα εκπαιδευτούν αλλά θα κληθούν να χρησιμοποιήσουν την πιο συνηθισμένη στρατηγική τους όσον αφορά τη διαχείριση συναισθημάτων. Εν συνεχεία, θα εκτεθούν σε ερεθίσματα που πολλές φορές σχετίζονται με το κάπνισμα ενώ θα καταγράφονται οι αντιδράσεις του σώματός τους. Οι καταγραφές των αντιδράσεων του σώματος γίνονται με αισθητήρες που τοποθετούνται στο πρόσωπο και στα χέρια με κολλητική ταινία και είναι ακίνδυνοι και ανώδυνοι. Θα κληθούν ακόμη να ολοκληρώσουν δύο γνωστικά έργα (ένα αναφορικά με την ονομασία χρωμάτων και ένα σχετικό με μαθηματικούς συλλογισμούς). Τέλος, θα κληθούν να καπνίσουν ένα από τα τσιγάρα τους πριν ξεκινήσει η πειραματική διαδικασία και ένα με το τέλος της ενώ θα λαμβάνεται βιντεογράφηση μέρους του σώματός τους (χέρια και στοματική περιοχή). Κατά τη διάρκεια της πειραματικής συνθήκης θα καλούνται να συμπληρώνουν σύντομα ερωτηματολόγια αναφορικά με τη διάθεσή τους και την επιθυμία τους για κάπνισμα.

Η συμμετοχή στην έρευνα είναι καθαρά εθελοντική. Αυτό σημαίνει ότι ο/η συμμετέχοντας/ουσα θα έχει το δικαίωμα να σταματήσει τη συμμετοχή όποτε και εφόσον το επιθυμεί χωρίς οποιεσδήποτε επιπτώσεις. Παρόλα αυτά, η συμμετοχή στην έρευνα θα είναι πολύτιμη για τη διεκπεραίωση της έρευνας και για την καλύτερη κατανόηση των παραγόντων που συνδέονται με την επιθυμία για κάπνισμα και ως εκ τούτου με τη συμπεριφορά του καπνίσματος.

Επίθετο:	……………………………………………….	Όνομα:	……………………………………..
Υπογραφή:		Ημερομηνία:	

ΕΝΤΥΠΑ ΣΥΓΚΑΤΑΘΕΣΗΣ για συμμετοχή σε πρόγραμμα έρευνας (Τα έντυπα αποτελούνται συνολικά από 5 σελίδες)
Σύντομος Τίτλος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε
Συναισθηματική αυτό-ρύθμιση καπνιστών. Πώς η γνωστική αναδόμηση και η αποδοχή επηρεάζουν τις υποκειμενικές, φυσιολογικές, γνωστικές και συμπεριφορικές πτυχές της έντονης επιθυμίας για κάπνισμα.

ΛΕΠΤΟΜΕΡΗΣ ΠΕΡΙΓΡΑΦΗ ΤΗΣ ΕΡΕΥΝΑΣ (συνέχεια)

Αποτελέσματα της έρευνας: Τα αποτελέσματα της έρευνας θα τύχουν χειρισμού με πλήρη εχεμύθεια και εμπιστευτικότητα. Καμιά πληροφορία σχετικά με τα προσωπικά στοιχεία δε θα κοινοποιηθεί, και τα δεδομένα δε θα χρησιμοποιηθούν ατομικά, παρά μόνο στο πλαίσιο βάσης δεδομένων που θα περιλαμβάνει τα δεδομένα όλων των συμμετεχόντων στην έρευνα αυτή κωδικοποιημένα. Στα δεδομένα του/ης κάθε συμμετέχοντα/ουσας θα αποδωθεί ένας μοναδικός αριθμός και το όνομά δε θα εμφανίζεται σε κανένα από τα αρχεία, θα είναι δηλαδή ανώνυμες οι πληροφορίες που θα παρέχει. Ο κωδικός θα συνδυάζεται με τα προσωπικά στοιχεία μόνο σε ένα αρχείο το οποίο θα φυλάσσεται σε ασφαλές και κλειδωμένο μέρος από την Επιστημονική Υπεύθυνη του προγράμματος, Δρ. Καρεκλά. Τα αποτελέσματα της έρευνας θα κοινοποιηθούν μέσω δημοσιεύσεων και παρουσιάσεων σε συνέδρια, χωρίς να γίνεται αναφορά σε προσωπικά στοιχεία των συμμετεχόντων.

Αμοιβή για τη συμμετοχή στην έρευνα: Για τη συμμετοχή στην έρευνα οι συμμετέχοντες/ουσες θα λάβουν το συμβολικό ποσό των €10 για το χρόνο αλλά και τα οδοιπορικά τους έξοδα. Ακόμη, θα έχουν την ευκαιρία να λάβουν αξιολόγηση όσον αφορά χαρακτηριστικά της προσωπικότητάς τους στη βάση των εργαλείων που θα συμπληρώσουν. Εν συνεχεία θα μπορούν να λάβουν γραπτή έκθεση αναφορικά με τα θετικά στοιχεία της προσωπικότητάς τους καθώς και τομείς που μπορούν να βελτιώσουν περαιτέρω. Σε περίπτωση που συμμετέχουν σε μάθημα στο πλαίσιο του προγράμματος σπουδών όπου ο/η διδάσκοντας/ουσα προσφέρει επιπλέον μονάδες για τη συμμετοχή σε ερευνητικά προγράμματα, η συμμετοχή στην παρούσα έρευνα θα μπορεί να αξιοποιηθεί για το σκοπό αυτό. Καμία πληροφορία που θα παρέχουν τα άτομα στα πλαίσια της έρευνας και θα αφορά τους σκοπούς του ερευνητικού προγράμματος δεν πρόκειται να κοινοποιηθεί στον/ην διδάσκονα/ουσα.

Επίθετο:	.....	Όνομα:	.....
Υπογραφή:		Ημερομηνία:	

ΕΝΤΥΠΑ ΣΥΓΚΑΤΑΘΕΣΗΣ για συμμετοχή σε πρόγραμμα έρευνας (Τα έντυπα αποτελούνται συνολικά από 5 σελίδες)
Σύντομος Τίτλος του Προγράμματος στο οποίο καλείστε να συμμετάσχετε
Συναισθηματική αυτό-ρύθμιση καπνιστών. Πώς η γνωστική αναδόμηση και η αποδοχή επηρεάζουν τις υποκειμενικές, φυσιολογικές, γνωστικές και συμπεριφορικές πτυχές της έντονης επιθυμίας για κάπνισμα.

Δίδετε συγκατάθεση για τον εαυτό σας ή για κάποιο άλλο άτομο;	
Εάν πιο πάνω απαντήσατε για κάποιον άλλο, τότε δώσετε λεπτομέρειες και το όνομα του.	

Ερώτηση	ΝΑΙ ή ΟΧΙ
Συμπληρώσατε τα έντυπα συγκατάθεσης εσείς προσωπικά;	
Τους τελευταίους 12 μήνες έχετε συμμετάσχει σε οποιοδήποτε άλλο ερευνητικό πρόγραμμα;	
Διαβάσατε και καταλάβατε τις πληροφορίες για ασθενείς ή/και εθελοντές;	
Είχατε την ευκαιρία να ρωτήσετε ερωτήσεις και να συζητήσετε το Πρόγραμμα;	
Δόθηκαν ικανοποιητικές απαντήσεις και εξηγήσεις στα τυχόν ερωτήματά σας;	
Καταλαβαίνετε ότι μπορείτε να αποσυρθείτε από το πρόγραμμα, όποτε θέλετε;	
Καταλαβαίνετε ότι, εάν αποσυρθείτε, δεν είναι αναγκαίο να δώσετε οποιεσδήποτε εξηγήσεις για την απόφαση που πήρατε;	
Συμφωνείτε να συμμετάσχετε στο πρόγραμμα;	
Με ποιόν υπεύθυνο μιλήσατε;	

Επίθετο:	.....	Όνομα:	.....
Υπογραφή:		Ημερομηνία:	

Appendix C

Questionnaire which was given at the beginning of the experimental session

Affective Style Questionnaire (ASQ; Hofmann& Kashdan, 2010)

Ενδιαφερόμαστε για το πώς βιώνεις και διαχειρίζεσαι τα συναισθήματά σου. Προφανώς, διαφορετικές καταστάσεις προκαλούν κάπως διαφορετικές αντιδράσεις, αλλά σκέψου αναφορικά με το τι κάνεις *συνήθως.* Παρακαλούμε προσπάθησε να απαντάς στην κάθε δήλωση *ξεχωρίζοντας στο μυαλό του τη μια δήλωση από την άλλη.* Μη δηλώνεις ότι συμφωνείς με πράγματα που νομίζεις ότι θα έπρεπε να κάνεις ή εύχεσαι να κάνεις. Αντ'αυτού, επίλεξε τις απαντήσεις σου κατόπιν σκέψης, και απάντησε βάσει του τι είναι αλήθεια ΓΙΑ ΣΕΝΑ. Παρακαλούμε απάντησε σε *κάθε* δήλωση. Δεν υπάρχουν «σωστές» ή «λάθος» απαντήσεις, έτσι επίλεξε την πιο κατάλληλη δήλωση για ΣΕΝΑ – όχι το τι νομίζεις ότι «τα περισσότερα άτομα» θα έλεγαν ή θα έκαναν. Χρησιμοποίησε την πιο κάτω κλίμακα για να απαντήσεις σε κάθε δήλωση κυκλώνοντας τον αντίστοιχο αριθμό.

		Καθόλου αληθές για εμένα	**Λίγο αληθές για εμένα**	**Μετρίως αληθές για εμένα**	**Αρκετά αληθές για εμένα**	**Υπερβολικά αληθές για εμένα.**
1	Οι άνθρωποι συνήθως δεν μπορούν να πουν πώς νιώθω μέσα μου.	**1**	**2**	**3**	**4**	**5**
2	Έχω τα συναισθήματά μου καλά υπό έλεγχο.	**1**	**2**	**3**	**4**	**5**
3	Μπορώ να αντέχω να έχω έντονα συναισθήματα.	**1**	**2**	**3**	**4**	**5**
4	Μπορώ να αποφύγω να αναστατωθώ με το να υιοθετήσω διαφορετική οπτική γωνιά απέναντι στα πράγματα.	**1**	**2**	**3**	**4**	**5**
5	Συχνά καταπιέζω τις συναισθηματικές μου αντιδράσεις απέναντι σε πράγματα.	**1**	**2**	**3**	**4**	**5**
6	Είναι εντάξει εάν με δουν άλλα άτομα αναστατωμένο/η.	**1**	**2**	**3**	**4**	**5**
7	Μπορώ να ηρεμήσω πολύ γρήγορα.	**1**	**2**	**3**	**4**	**5**
8	Είμαι ικανός/η να απελευθερωθώ από τα συναισθήματά μου.	**1**	**2**	**3**	**4**	**5**
9	Είμαι καλός/η στο να κρύβω τα συναισθήματά μου.	**1**	**2**	**3**	**4**	**5**

10	Τα άλλα άτομα συνήθως δεν μπορούν να πουν πότε είμαι αναστατωμένος/η.	**1**	**2**	**3**	**4**	**5**
11	Είναι εντάξει να αισθάνομαι κάποιες φορές αρνητικά.	**1**	**2**	**3**	**4**	**5**
12	Μπορώ να βγω από μια άσχημη διάθεση πολύ γρήγορα.	1	2	3	4	5
13	Τα άλλα άτομα συνήθως δεν μπορούν να πουν πότε είμαι λυπημένος/η.	**1**	**2**	**3**	**4**	**5**
14	Μπορώ να αντέξω το να είμαι αναστατωμένος/η.	**1**	**2**	**3**	**4**	**5**
15	Μπορώ να δρω/ συμπεριφέρομαι με τρόπο που τα άλλα άτομα να μη βλέπουν ότι είμαι αναστατωμένος/η.	**1**	**2**	**3**	**4**	**5**
16	Ξέρω ακριβώς τι να κάνω για να νιώσω καλύτερα.	**1**	**2**	**3**	**4**	**5**
17	Δεν είναι λάθος το να νιώθω πολύ συναισθηματικός.	**1**	**2**	**3**	**4**	**5**
18	Θα μπορούσα εύκολα να προσποιηθώ συναισθήματα (άλλα από αυτά που πραγματικά νιώθω).	**1**	**2**	**3**	**4**	**5**
19	Μπορώ να αλλάξω τη διάθεσή μου προς το καλύτερο αρκετά εύκολα.	**1**	**2**	**3**	**4**	**5**
20	Μπορώ να κρύψω καλά το θυμό μου εάν πρέπει να το κάνω.	**1**	**2**	**3**	**4**	**5**

Appendix D

Questionnaires given during the experimental session

Questionnaire of Smoking Urges Brief (QSU-Brief; Cox et al., 2001)

Διάβασε προσεκτικά τις πιο κάτω δηλώσεις και επίλεξε για κάθε μια πόσο ισχύει για σένα **αυτήν τη στιγμή** κυκλώνοντας τον κατάλληλο αριθμό**.**

	Διαφωνώ απόλυτα	**Διαφωνώ αρκετά**	**Διαφωνώ λίγο**	**Ούτε συμφωνώ, ούτε διαφωνώ**	**Συμφωνώ λίγο**	**Συμφωνώ αρκετά**	**Συμφωνώ απόλυτα**
Έχω επιθυμία για ένα τσιγάρο αυτήν τη στιγμή.	1	2	3	4	5	6	**7**
Τίποτα δε θα ήταν καλύτερο από το να κάπνιζα ένα τσιγάρο τώρα.	1	2	3	4	5	6	**7**
Εάν ήταν δυνατό, πιθανότατα θα κάπνιζα τώρα.	1	2	3	4	5	6	**7**
Θα μπορούσα να ελέγξω καλύτερα τα πράγματα τώρα εάν μπορούσα να καπνίσω.	1	2	3	4	5	6	**7**
Όλα όσα χρειάζομαι αυτήν τη στιγμή είναι ένα τσιγάρο.	1	2	3	4	5	6	**7**
Έχω μια έντονη επιθυμία για τσιγάρο.	1	2	3	4	5	6	**7**
Ένα τσιγάρο τώρα θα είχε ωραία γεύση.	1	2	3	4	5	6	**7**
Θα έκανα σχεδόν οτιδήποτε τώρα για ένα τσιγάρο.	1	2	3	4	5	6	**7**

Το κάπνισμα θα με έκανε λιγότερο θλιμμένο/η.	1	2	3	4	5	6	**7**
Θα καπνίσω το συντομότερο δυνατόν.	1	2	3	4	5	6	**7**

Modified Negative Affect Schedule (modified PANAS; Watson, Clark, & Tellegen, 1988)

Η κλίμακα αυτή αποτελείται από έναν αριθμό λέξεων που περιγράφουν διαφορετικά συναισθήματα. Διάβασε την κάθε έκφραση και σημείωσε την κατάλληλη απάντηση (αριθμό) στο κενό που βρίσκεται δίπλα στη λέξη. Επίδειξε σε ποιο βαθμό νιώθεις κάθε ένα από αυτά τα συναισθήματα **ΤΩΡΑ, ΑΥΤΗΝ ΤΗ ΣΤΙΓΜΗ.** Χρησιμοποίησε την ακόλουθη κλίμακα για τις απαντήσεις σου.

1	**2**	**3**	**4**	**5**
Ελάχιστα ή Καθόλου	**Λίγο**	**Μέτρια**	**Αρκετά**	**Υπερβολικά**

_____	Συντετριμμένος/η
_____	Αναστατωμένος/η
_____	Εκνευρισμένος/η
_____	Νευρικός/η
_____	Ταραγμένος/η

Appendix E

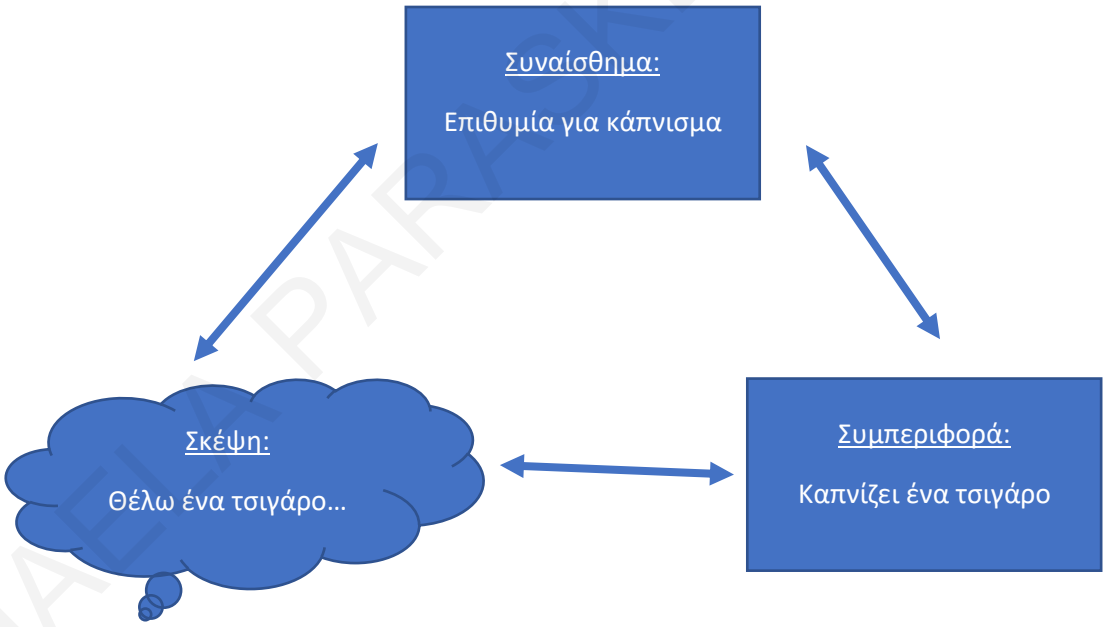
Emotion regulation training scripts/neutral script

Γνωστική αναδόμηση

Γενική εισαγωγή:

Συχνά αναφέρεται ότι η πηγή της συναισθηματικής και ψυχολογικής μας δυσφορίας είναι οι αυτόματες μας σκέψεις, όπως είναι οι αρνητικές σκέψεις για τον εαυτό μας, τους άλλους, το παρελθόν και το μέλλον μας. Σύμφωνα μ'αυτήν την ιδέα, οι αυτόματες σκέψεις προκαλούν ανεπιθύμητα συναισθήματα και μη βοηθητικές συμπεριφορές.

Για παράδειγμα, ένα άτομο που ενδιαφέρεται να μειώσει το κάπνισμα μπορεί να σκεφτεί: «Ξέρω ότι θα έπρεπε να δοκιμάσω να το μειώσω, αλλά θέλω τόσο πολύ τώρα ένα τσιγάρο που δεν αντέχω να μην καπνίσω» και τότε καπνίζει ένα τσιγάρο.



Όταν αυτός ο κύκλος επαναλαμβάνεται, δημιουργεί ένα μοτίβο για το κάπνισμα. Βλέπεις αυτό το μοτίβο; Συνήθως έχουμε μια σκέψη για κάπνισμα που πολλές φορές ακολουθείται από σχετικά συναισθήματα αλλά και από τη συμπεριφορά του καπνίσματος.

Πολύ συχνά άτομα που καπνίζουν μπορεί να έχουν σκέψεις όπως: «Ένα τσιγάρο θα είχε ωραία γεύση αυτήν τη στιγμή» ή «Εάν κάπνιζα τώρα θα μπορούσα να σκεφτώ πιο καθαρά» ή «Το κάπνισμα θα με έκανε να αισθανθώ καλύτερα». Έτυχε να έχεις και εσύ τέτοιες σκέψεις; Τι έγινε σε αυτές τις περιπτώσεις;

Συνήθως οι σκέψεις αυτές κάνουν πιο πιθανό το να καπνίσει το άτομο ένα τσιγάρο. Αυτό συμβαίνει γιατί *αυτές οι αυτόματες, καταστροφικές και μη ορθές σκέψεις, μας οδηγούν στο να βιώσουμε διάφορα ανεπιθύμητα συναισθήματα. Οι αυτόματες σκέψεις και τα ανεπιθύμητα συναισθήματα μπορεί στη συνέχεια να μας οδηγήσουν στο να καπνίσουμε.*

Πόσο όμως ανταποκρίνονται στην πραγματικότητα αυτές οι σκέψεις; Οι αυτόματες σκέψεις δεν είναι τις πλείστες φορές βοηθητικές γιατί δε βασίζονται σε αντικειμενικά δεδομένα. Πολλές φορές θα δούμε ότι στις σκέψεις μας τείνουμε να καταστροφολογούμε ή να μεγαλοποιούμε τις καταστάσεις κ.λπ. Δεν έρχονται πολλές φορές αυτόματα στο μυαλό μας σκέψεις όπως: «Αν δεν καπνίσω, δε θα αντέξω»; Συνηθίζουμε όμως να πιστεύουμε τις αυτόματές μας σκέψεις χωρίς να τις αξιολογούμε. Τότε τα πράγματα είναι ακόμη πιο δύσκολα.

Ένας τρόπος για να αποτρέψουμε αυτό το μοτίβο συμπεριφοράς και να αντιμετωπίσουμε τις σκέψεις μας είναι να χρησιμοποιήσουμε τη **γνωστική αναδόμηση**.

Τι είναι η γνωστική αναδόμηση;

Η **γνωστική αναδόμηση** αναφέρεται σε μια στρατηγική για ηθελημένη αλλαγή των αυτόματων και λανθασμένων σκέψεων. Ο στόχος είναι παρά να υποφέρουμε από τις αρνητικές συνέπειες των αυτόματων σκέψεών μας, να προσπαθήσουμε να αλλάξουμε τις σκέψεις μας ώστε να είναι πιο ορθές και βοηθητικές. Γνωστική αναδόμηση σημαίνει ότι μπορούμε να αναγνωρίσουμε τα λάθη στις σκέψεις μας και να τις αναδομήσουμε κανοντάς τες πιο ρεαλιστικές. Ο νέος τρόπος σκέψης θα μας επιτρέψει να διαχειριζόμαστε τις διάφορες καταστάσεις πιο αποτελεσματικά.

Πώς λειτουργεί η γνωστική αναδόμηση;

Με το να χρησιμοποιήσουμε τη γνωστική αναδόμηση μπορούμε να τροποποιήσουμε τις σκέψεις μας όταν είναι ανακριβείς και δεν ανταποκρίνονται στην πραγματικότητα. Η γνωστική αναδόμηση μας βοηθά να ξεκινήσουμε να σκεφτόμαστε για την κατάσταση διαφορετικά και πιο αντικειμενικά.

Στην περίπτωση του καπνίσματος, εάν θέλουμε να σταματήσουμε ή να μειώσουμε το κάπνισμα αλλά βιώνουμε ένα επεισόδιο έντονης επιθυμίας, το καλύτερο που μπορούμε να κάνουμε είναι να αποκτήσουμε επίγνωση και να αντικαταστήσουμε τις όποιες αυτοκαταστροφικές σκέψεις με πιο αντικειμενικές, με βάση τα πραγματικά δεδομένα.

Μπορούμε να σπάσουμε το αυτόματο των σκέψεων και να χρησιμοποιήσουμε τη λογική ψάχνοντας για τα αληθινά τεκμήρια, για να αντικαταστήσουμε τις εσφαλμένες σκέψεις με πιο ακριβείς. Με αυτόν τον τρόπο μπορούμε να αλλάξουμε το τι σκεφτόμαστε όσον αφορά την έντονη επιθυμία για κάπνισμα και τις καταστροφικές σκέψεις για κάπνισμα. Έτσι θα μπορούμε να μείνουμε καθαροί από καπνό.

Εμπειρική άσκηση:

Ένας τρόπος για να κατανοήσεις καλύτερα όλα αυτά είναι να κάνουμε μια μικρή άσκηση. Δώσε προσοχή στις πιο κάτω οδηγίες καθώς στη συνέχεια θα σου ζητηθεί να τις εφαρμόσεις.

Θυμήσου την τελευταία φορά που πραγματικά ήθελες ένα τσιγάρο αλλά δεν μπορούσες να το έχεις. Μπορεί να ήσουν κάπου που δεν επιτρεπόταν το κάπνισμα (π.χ. εξέταση, αεροπλάνο, κ.λπ.). Τι σκέφτηκες τότε; Σε περίπτωση που δεν είσαι σίγουρος/η για το τι είχες σκεφτεί, μερικές σκέψεις που πολύ συχνά έχουν τα άτομα που καπνίζουν είναι: «Εάν

κάπνιζα τώρα θα μπορούσα να σκεφτώ πιο καθαρά», ή «Ένα τσιγάρο θα είχε ωραία γεύση τώρα» ή «Ένα τσιγάρο είναι αυτό που χρειάζομαι τώρα».

Μόλις θυμηθείς τι είχες σκεφτεί κατάγραψε τη σκέψη σου στη σελίδα που σου δόθηκε και ενημέρωσε την ερευνήτρια ότι την έχεις καταγράψει.

Θέλουμε να συγκεντρωθείς πραγματικά σε όποια σκέψη είχες κάνει στη συγκεκριμένη κατάσταση, να της δώσεις την πλήρη προσοχή σου και να εστιαστείς στο να την πιστέψεις όσο περισσότερο μπορείς.

Τώρα θέλουμε να φανταστείς ότι είσαι σε δικαστήριο. Έχεις κάτσει ποτέ στο δικαστήριο για να παρακολουθήσεις μια δίκη ή έχεις παρακολουθήσει ποτέ πλάνα από την τηλεόραση; Πρόσεξες ποτέ πώς οι δικαστές ζητούν αντικειμενικά δεδομένα και αποδείξεις για να αξιολογήσουν την υπόθεση; Πολλές φορές μπορεί κάποιοι ισχυρισμοί να φαίνονται αληθείς αλλά μετά την εξέταση και των τεκμηρίων να φανεί ότι ήταν ψευδείς. Το ίδιο συμβαίνει και με τις σκέψεις μας και τις σωματικές μας αντιδράσεις. Εμφανίζονται αυτόματα και μπορεί να φαίνονται ότι αληθεύουν όμως αν εξετάσουμε τα πραγματικά δεδομένα θα δούμε ότι μπορεί να μην αληθεύουν τελικά.

Αυτό είναι όπως όταν παλεύουμε με τις παρορμήσεις μας. Αν αναγνωρίσουμε ότι οι αυτόματες σκέψεις μας μπορεί να μην είναι ορθές και τις αντικαταστήσουμε με άλλες πιο αντικειμενικές, τότε μπορούμε να δούμε ότι η επιθυμία μας για κάπνισμα δεν είναι τόσο ισχυρή.

Έτσι, αυτό που θέλουμε να κάνεις είναι να προσπαθήσεις να αναγνωρίσεις τις αυτόματες σκέψεις όσον αφορά την επιθυμία σου για κάπνισμα και τις σωματικές σου αντιδράσεις και να ξεκινήσεις να αξιολογείς αν ανταποκρίνονται στην πραγματικότητα.

Τώρα, για τα επόμενα δύο λεπτά κλείσε τα μάτια σου και φαντάσου ότι στο τραπέζι μπροστά σου υπάρχει το τασάκι, ο αναπτήρας και τα τσιγάρα σου. Νιώσε ελεύθερα την επιθυμία να καπνίσεις. Άφησε τον εαυτό σου να κατακλυστεί από αυτήν την επιθυμία. Πρόσεξε τις αυτόματες σκέψεις που εμφανίζονται στο μυαλό σου.

Τώρα προσπάθησε να αξιολογήσεις την ορθότητα των αυτόματων σκέψεων που εμφανίστηκαν αναφορικά με το κάπνισμα.

- Ποιες είναι οι αποδείξεις ότι η συγκεκριμένη σκέψη είναι ορθή; Ποιες αποδείξεις υπάρχουν διαθέσιμες για το ότι δεν ισχύει;
- Πράγματι δε θα άντεχες την επιθυμία αν δεν κάπνιζες εκείνο το τσιγάρο;
  Τι θα ήταν το χειρότερο που θα μπορούσε να σου συμβεί, αντικειμενικά;
- Πραγματικά πιστεύεις ότι αν δεν καπνίσεις δε θα αντέξεις; Ή μήπως παρασύρθηκες από το αίσθημα της στιγμής στο να συμπεράνεις πως πρέπει να καπνίσεις;
- Αν κάποιος/α φίλος/η ή συγγενικό σου πρόσωπο ήθελε να μειώσει ή να σταματήσει το κάπνισμα και είχε την ίδια αυτόματη σκέψη με εσένα, τι συμβουλή θα του/ης έδινες;

Μόλις ρωτήσεις τον εαυτό σου αυτές τις ερωτήσεις θα θέλαμε να σκεφτείς το κατά πόσον υπάρχει επομένως μια διαφορετική, πιο βοηθητική και αντικειμενική σκέψη που θα μπορούσες να χρησιμοποιήσεις για να αλλάξεις το πώς σκέφτεσαι όσον αφορά την επιθυμία σου να καπνίσεις. Εντόπισε μέσα από τις πιο πάνω ερωτήσεις τη/τις σκέψη/εις που είναι πιο βοηθητική/ες για σένα.

Συνέχισε για λίγο να χρησιμοποιείς τον νέο τρόπο που έμαθες ώστε να διαχειριστείς την όποια επιθυμία ή σκέψη σου για κάπνισμα.

Περίληψη:

Η γνωστική αναδόμηση σου επιτρέπει να αλλάξεις τη σημασία των σκέψεών σου ή της έντονης επιθυμίας σου για κάπνισμα σε κάτι άλλο πιο ρεαλιστικό. Με το να αλλάξεις τον τρόπο με τον οποίο σκέφτεσαι, βάσει πιο αντικειμενικών δεδομένων, για την έντονη επιθυμία για κάπνισμα, αλλάζει και το πώς αισθάνεσαι αλλά και το πώς δρας.

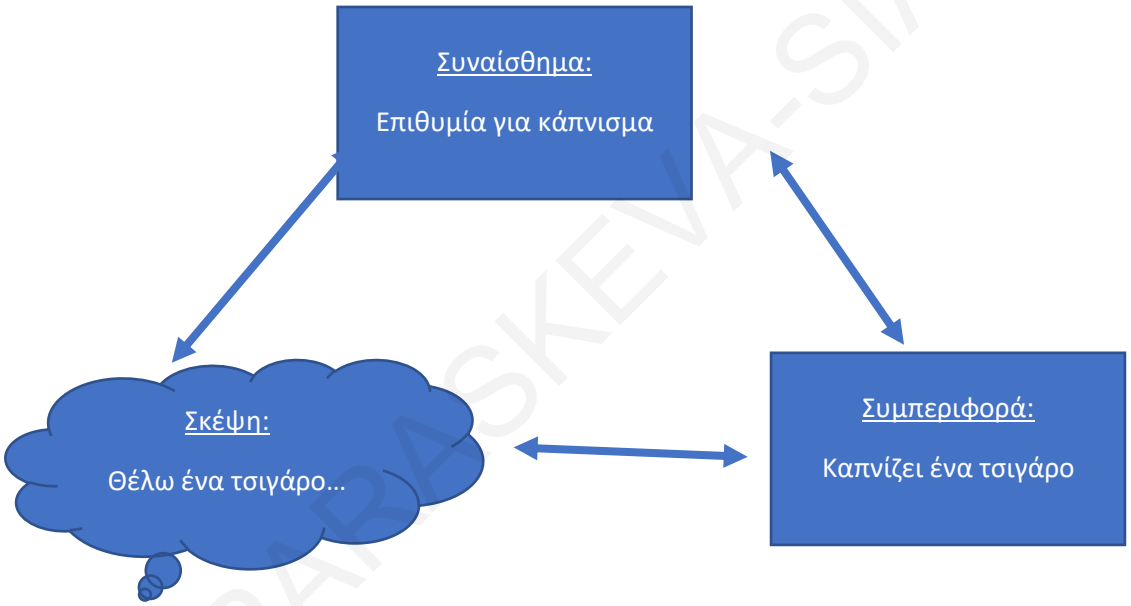
Επομένως, εάν θέλεις να μην καπνίσεις αλλά βιώνεις έντονη επιθυμία για κάπνισμα ή κατακλύζεσαι από σκέψεις σχετικά με το κάπνισμα, το καλύτερο που έχεις να κάνεις είναι να συνειδητοποιήσεις και να αλλάξεις την όποια αυτοκαταστροφική σκέψη σε μια διαφορετική, πιο ρεαλιστική σκέψη ώστε να αλλάξεις την επιθυμία για κάπνισμα και τη συμπεριφορά του καπνίσματος. Είναι καλύτερο να φαντάζεσαι ότι χρειάζεσαι να βρίσκεις δεδομένα που να στηρίζουν τις σκέψεις σου και αν αυτά τα δεδομένα δεν υπάρχουν τότε να αναδομείς τις σκέψεις σου σε πιο ρεαλιστικές.

Αποδοχή

Γενική εισαγωγή:

Συχνά αναφέρεται ότι η πηγή της συναισθηματικής και ψυχολογικής μας δυσφορίας είναι οι αυτόματες μας σκέψεις, όπως είναι οι αρνητικές σκέψεις για τον εαυτό μας, τους άλλους, το παρελθόν και το μέλλον μας. Σύμφωνα μ'αυτήν την ιδέα, οι αυτόματες σκέψεις προκαλούν ανεπιθύμητα συναισθήματα και μη βοηθητικές συμπεριφορές.

Για παράδειγμα, ένα άτομο που ενδιαφέρεται να μειώσει το κάπνισμα μπορεί να σκεφτεί: «Ξέρω ότι θα έπρεπε να δοκιμάσω να το μειώσω, αλλά θέλω τόσο πολύ τώρα ένα τσιγάρο που δεν αντέχω να μην καπνίσω» και τότε καπνίζει ένα τσιγάρο.



Όταν αυτός ο κύκλος επαναλαμβάνεται, δημιουργεί ένα μοτίβο για το κάπνισμα. Βλέπεις αυτό το μοτίβο; Συνήθως έχουμε μια σκέψη για κάπνισμα που πολλές φορές ακολουθείται από σχετικά συναισθήματα αλλά και από τη συμπεριφορά του καπνίσματος.

Πολύ συχνά άτομα που καπνίζουν μπορεί να έχουν σκέψεις όπως: «Ένα τσιγάρο θα είχε ωραία γεύση αυτήν τη στιγμή» ή «Εάν κάπνιζα τώρα θα μπορούσα να σκεφτώ πιο καθαρά» ή «Το κάπνισμα θα με έκανε να αισθανθώ καλύτερα». Έτυχε να έχεις και εσύ τέτοιες σκέψεις; Τι έγινε σε αυτές τις περιπτώσεις;

Συνήθως οι σκέψεις αυτές κάνουν πιο πιθανό το να καπνίσει το άτομο ένα τσιγάρο. Αυτό συμβαίνει γιατί *τείνουμε να δρούμε σύμφωνα με τις σκέψεις που πετάγονται αυτόματα στο μυαλό μας και τα συναισθήματα που μας γεννούν.*

Όταν προσπαθούμε να μειώσουμε ή να διακόψουμε το κάπνισμα, πιστεύουμε ότι θα έπρεπε πρώτα να διαχειριστούμε, να αλλάξουμε ή να διώξουμε, τις σκέψεις μας για το κάπνισμα. Πόσο εφικτό είναι όμως να ελέγξουμε, να αλλάξουμε τις σκέψεις μας; Μόλις δεις ή μυρίσεις ένα τσιγάρο δε θα έρθει αμέσως η σκέψη «Θα ήθελα να καπνίσω»; Άρα το να απαλλαγούμε από τις μη βοηθητικές σκέψεις είναι δύσκολο. Μάλιστα θα προσέξουμε ότι αν παλεύουμε

με τις σκέψεις αυτές όχι μόνο δεν μειώνονται αλλά μπορεί να αυξηθούν. Τότε τα πράγματα είναι ακόμη πιο δύσκολα και μπορεί τότε να ενδώσουμε στο τι μας λένε οι σκέψεις μας.

Ένας τρόπος για να αποτρέψουμε αυτό το μοτίβο συμπεριφοράς, όχι τις ίδιες τις σκέψεις, είναι να χρησιμοποιήσουμε την **αποδοχή**.

Τι είναι η αποδοχή;

Αποδοχή είναι πρώτα η αναγνώριση του πιο πάνω μοτίβου, ότι οι σκέψεις, τα συναισθήματα και οι συμπεριφορές επηρεάζονται το ένα από το άλλο. Επίσης, είναι η κατανόηση ότι οι σκέψεις και τα συναισθήματα εμφανίζονται ως ανταπόκριση σε εσωτερικά και εξωτερικά ερεθίσματα και δεν έχουμε έλεγχο πάνω τους. Έλεγχο έχουμε μόνο πάνω στη συμπεριφορά μας. Αποδοχή σημαίνει ότι μπορούμε να έχουμε ανεπιθύμητες σκέψεις και συναισθήματα και να επιλέξουμε να δράσουμε όχι με βάση του τι μας λέει το μυαλό μας αλλά βάσει των επιλογών που θέλουμε να έχουμε. Άρα η αποδοχή είναι μια ενεργή διαδικασία.

Πώς λειτουργεί η αποδοχή;

Με το να χρησιμοποιήσουμε την αποδοχή σταματάμε την ανώφελη πάλη με τις μη βοηθητικές σκέψεις. Η αποδοχή μας βοηθά να ξεκινήσουμε να βλέπουμε την κατάσταση διαφορετικά και να επενδύουμε την ενέργειά μας στο τι κάνουμε.

Στην περίπτωση του καπνίσματος, εάν θέλουμε να σταματήσουμε ή να μειώσουμε το κάπνισμα και βιώνουμε ένα επεισόδιο έντονης επιθυμίας, το καλύτερο που μπορούμε να κάνουμε είναι να αναγνωρίσουμε ότι είναι φυσιολογικό να έχουμε σκέψεις αναφορικά με το κάπνισμα καθώς και να νιώθουμε στο σώμα μας έντονα την επιθυμία για κάπνισμα.

Μπορούμε όμως αντί να κάνουμε ότι μας λένε οι σκέψεις μας, ή να προσπαθήσουμε να μη σκεφτόμαστε την επιθυμία μας για κάπνισμα, να επιλέξουμε να δράσουμε βάσει του στόχου μας που είναι το να μην καπνίσουμε. Με αυτόν τον τρόπο θα παρατηρήσουμε ότι οι σκέψεις μας για την επιθυμία για κάπνισμα έρχονται και φεύγουν και εμείς μπορούμε να μένουμε καθαροί από καπνό.

Εμπειρική άσκηση:

Ένας τρόπος για να κατανοήσουμε καλύτερα όλα αυτά είναι να κάνουμε μια μικρή άσκηση. Δώσε προσοχή τις πιο κάτω οδηγίες καθώς στη συνέχεια θα σου ζητηθεί να τις εφαρμόσεις.

Θυμήσου την τελευταία φορά που πραγματικά ήθελες ένα τσιγάρο αλλά δεν μπορούσες να το έχεις. Μπορεί να ήσουν κάπου που δεν επιτρεπόταν το κάπνισμα (π.χ. εξέταση, αεροπλάνο, κ.λπ.). Τι σκέφτηκες τότε; Σε περίπτωση που δεν είσαι σίγουρος/η για το τι είχες σκεφτεί, μερικές σκέψεις που πολύ συχνά έχουν τα άτομα που καπνίζουν είναι: «Εάν κάπνιζα τώρα θα μπορούσα να σκεφτώ πιο καθαρά», ή «Ένα τσιγάρο θα είχε ωραία γεύση τώρα» ή «Ένα τσιγάρο είναι αυτό που χρειάζομαι τώρα».

Μόλις θυμηθείς τι είχες σκεφτεί κατάγραψε τη σκέψη σου στη σελίδα που σου δόθηκε και ενημέρωσε την ερευνήτρια ότι την έχεις καταγράψει.

Θέλουμε να συγκεντρωθείς πραγματικά σε όποια σκέψη είχες κάνει στη συγκεκριμένη κατάσταση, να της δώσεις την πλήρη προσοχή σου και να εστιαστείς στο να την πιστέψεις όσο περισσότερο μπορείς.

Τώρα θέλουμε να φανταστείς ότι η επιθυμία σου για κάπνισμα είναι όπως τα κύματα. Έχεις κάτσει ποτέ στην παραλία για να παρακολουθήσεις τα κύματα; Τα πρόσεξες ποτέ πώς έρχονται και να φεύγουν; Ένα κύμα ξεκινά μικρό και φουσκώνει σταδιακά. Συνεχίζει να μεγαλώνει και να κινείται μπροστά, μέχρι που να φτάσει στην κορυφή του. Μετά την κορυφή μειώνεται σταδιακά. Το ίδιο συμβαίνει και με τις επιθυμίες στο σώμα μας. Ξεκινούν μικρές και μετά αυξάνουν σταδιακά σε μέγεθος και μετά την αποκορύφωσή τους ξαναμικραίνουν. Τι συμβαίνει όμως αν το κύμα συναντήσει αντίσταση; Σκέψου ένα κύμα να σκάει στα βράχια ή αν έτυχε ποτέ εσύ να του φέρεις αντίσταση. Θα έχεις παρατηρήσει μάλλον πόσο θορυβώδες, ασυμάζευτο, επώδυνο και πιθανώς καταστροφικό είναι!

Αυτό είναι όπως το να παλεύουμε με τις παρορμήσεις μας. Αν αναγνωρίσουμε ότι οι επιθυμίες είναι όπως τα κύματα και αντί να προσπαθούμε να αντισταθούμε ή να τις ελέγξουμε, τις δούμε πιο παιχνιδιάρικα σαν να κάνουμε surfing επιθυμίας, τότε μόνο μπορούμε να προσφέρουμε κύμα αρκετό χώρο ώστε να φτάσει σε μια κορυφή και μετά να καταλαγιάσει.

Έτσι, αυτό που θέλουμε να κάνεις είναι να μην προσπαθήσεις να ελέγξεις τη σκέψη όσον αφορά την επιθυμία σου για κάπνισμα ούτε τις σωματικές σου αντιδράσεις αλλά να σερφάρεις σαν η επιθυμία σου για κάπνισμα να είναι ένα κύμα.

Τώρα, για τα επόμενα δύο λεπτά κλείσε τα μάτια σου και να φαντάσου ότι στο τραπέζι μπροστά σου υπάρχει το τασάκι, ο αναπτήρας και τα τσιγάρα σου. Νιώσε ελεύθερα την επιθυμία να καπνίσεις. Άφησε τον εαυτό σου να κατακλυστεί από αυτήν την επιθυμία.

- Παρατήρησε σε πιο σημείο του σώματος νιώθεις πιο έντονα την επιθυμία. Τι αίσθηση προκαλεί; Τι άλλες σχετικές σκέψεις και εικόνες σου φέρνει στο μυαλό;
- Αναγνώρισε σιωπηλά ότι νιώθεις την επιθυμία να καπνίσεις
- Πάρε μερικές αργές βαθιές αναπνοές, κάνοντας χώρο στην επιθυμία για κάπνισμα και επιτρέποντάς στο κύμα της επιθυμίας να κάνει τον κύκλο του και να συνεχίσει το ταξίδι του
- Παρακολούθησε απλά την επιθυμία για κάπνισμα να υψώνεται και να πέφτει. Κάνε χώρο στην παρόρμηση όσο τεράστια κι αν γίνει.
- Εάν το μυαλό σου αρχίσει να κατακρίνει την επιθυμία σου ή να σου λέει άλλες μη βοηθητικές ιστορίες όπως «Δεν μπορώ να το διαχειριστώ άλλο», αναγνώρισε ότι είναι και αυτές οι ίδιες μη βοηθητικές σκέψεις και σέρφαρε μαζί τους όπως και πιο πάνω
- Συνέχισε για λίγο να χρησιμοποιείς τον νέο τρόπο που έμαθες ώστε να διαχειριστείς την όποια επιθυμία ή σκέψη σου για κάπνισμα.

….

Τώρα μπορείς να ανοίξεις τα μάτια σου

<u>Περίληψη</u>:

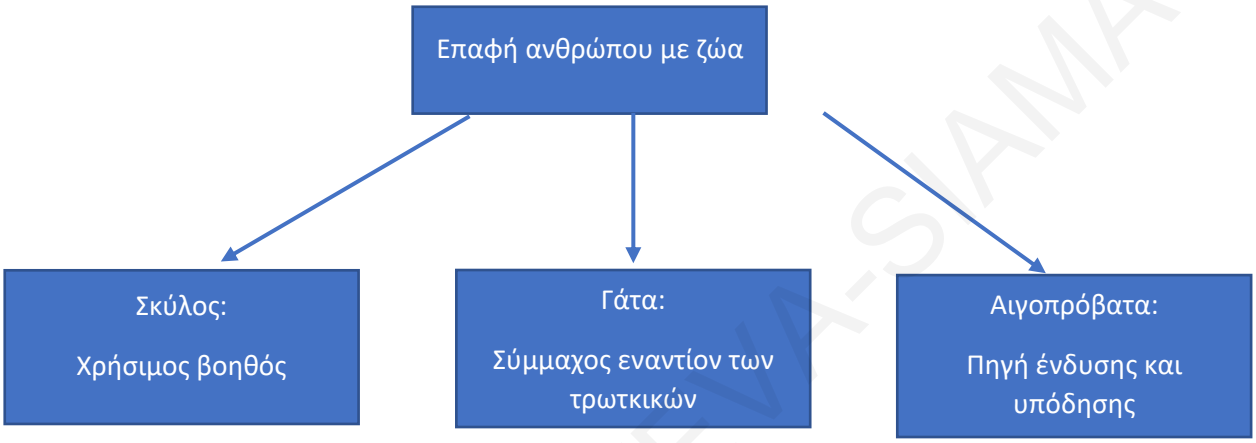
Η αποδοχή σου επιτρέπει να αλλάξεις την εμπειρία σου όσον αφορά την επιθυμία σου για κάπνισμα. Με το να αλλάξεις τον τρόπο με τον οποίο προσεγγίζεις και βιώνεις την έντονη επιθυμία για κάπνισμα, μπορείς να αλλάξεις και το πώς δρας, δηλαδή τη συμπεριφορά του καπνίσματος.

Επομένως, εάν θέλεις να μην καπνίσεις αλλά βιώνεις έντονη επιθυμία για κάπνισμα ή κατακλύζεσαι από σκέψεις σχετικά με το κάπνισμα, το καλύτερο που έχεις να κάνεις είναι να συνειδητοποιήσεις ότι δε χρειάζεται να παλεύεις με τις σκέψεις και τα σωματικά συμπτώματά σου. Απλά δώσε τους χώρο να υπάρχουν και θα παρατηρήσεις ότι όπως το

κύμα θα φτάσουν την αποκορύφωση και μετά η έντασή τους θα μειωθεί. Είναι καλύτερο να κάνεις σέρφινγκ με το κύμα της επιθυμίας παρά να του επιτρέψεις να σε καταστρέψει στο πέρασμά του.

Ομάδα χρήσης συνηθισμένης στρατηγικής

Η σχέση του ανθρώπου με τα ζώα ανάγεται σε πολλά χρόνια πριν, ίσως περισσότερα από 50.000. Αναφερόμενοι στα δημοφιλέστερα κατοικίδια της σύγχρονης εποχής, τα δεδομένα δείχνουν ότι ο σκύλος εξημερώθηκε πριν από περίπου 35.000 χρόνια, ενώ η γάτα πριν από περίπου 9.500 χρόνια. Οι λόγοι που οδήγησαν τον άνθρωπο να επιθυμεί τη συντροφιά των ζώων σχετίζονταν με την επιβίωσή του στη γη. Ο σκύλος ήταν ένας χρήσιμος βοηθός για διάφορες εργασίες, η γάτα ένας απαραίτητος σύμμαχος εναντίον των τρωκτικών, τα αιγοπρόβατα πηγή τροφής και ένδυσης.



Σήμερα τα κατοικίδια μπορεί να έχουν χάσει σε ένα μεγάλο βαθμό την αρχική τους λειτουργία, αλλά αυτό δεν έχει μειώσει την ανάγκη του ανθρώπου να βρίσκεται σε επαφή μαζί τους. Σύμφωνα με έρευνα που διεξήχθει υπολογίζεται ότι συμβιώνουν στο σπίτι μαζί με ανθρώπους 342 εκατομμύρια σκύλοι σε 93 χώρες και 281 εκατομμύρια γάτες σε 81 χώρες. Η αλληλεπίδραση όμως του ανθρώπου με τα ζώα δεν περιορίζεται μόνο στα κατοικίδια. Ένα μεγάλο ποσοστό ανθρώπων εργάζονται με ζώα, αφού παγκοσμίως υπολογίζεται ότι υπάρχουν 1,5 δισεκατομμύρια βοοειδή, 2 δισεκατομμύρια αιγοπρόβατα και 20 δισεκατομμύρια πουλερικά.

Μία από τις σημαντικότερες έννοιες στη μελέτη της σχέσης του ανθρώπου με τα ζώα αποτελεί ο όρος του δεσμού. Η ισχύς του δεσμού επέτρεψε στα ζώα από κατοικίδια, να θεωρούνται μέλη της οικογένειας του ατόμου. Σύμφωνα με την Αμερικανική Κτηνιατρική Εταιρία ο δεσμός μεταξύ ανθρώπου και ζώου είναι μια αμφίδρομα ωφέλιμη και δυναμική σχέση.

Τα ζώα φαίνεται ότι είναι πλέον κάτι περισσότερο από απλοί σύντροφοι. Υπάρχουν άνθρωποι που ζητούν να ‘επιστρέψουν στα βασικά’, να απλοποιήσουν τη ζωή τους και να ξαναποκτήσουν τις παραδοσιακές αξίες. Τα κατοικίδια είναι στενά συνδεδεμένα με τέτοιους στόχους. Έρευνα στην Αυστραλία έδειξε ότι ποσοστό 91% των ιδιοκτητών αναφέρει πως αισθάνεται πολύ κοντά στα ζώα του, σχεδόν όσο κοντά αισθάνεται και με την οικογένειά του.

Όσον αφορά τα οφέλη από την κατοχή και αλληλεπίδραση με τα ζώα θα μπορούσαμε να ταξινομήσουμε τα οφέλη ανάλογα με τις ηλικιακές ομάδες του ανθρώπου.

Η πρώτη ηλικιακή ομάδα είναι τα παιδιά.

Η ανάπτυξη είναι μια διαδικασία που εμπλέκει την απόκτηση γνωστικών, κοινωνικών και συναισθηματικών δεξιοτήτων από το παιδί. Ο δεσμός με τα ζώα και όχι απαραίτητα η κατοχή ενός ζώου, προσφέρει θετικά αποτελέσματα σε διάφορους τομείς. Μερικά θετικά στοιχεία αναφέρονται στη συνέχεια:

- Κατ'αρχάς ο δεσμός με το ζώο σχετίζεται με τη θετική συναισθηματική λειτουργία του παιδιού
- Η κοινωνική και γνωστική ανάπτυξη ενισχύεται από την κατοχή ενός ζώου. Η κατοχή ενός ζώου ενδεχομένως να διευκολύνει τη γλωσσική ανάπτυξη και να ενισχύει την απόκτηση γλωσσικών δεξιοτήτων στο παιδί.
- Η αυτοεκτίμηση του παιδιού ενισχύεται από την κατοχή ενός ζώου. Μαθαίνοντας σε μικρή ηλικία πώς να φροντίζει ένα ζώο και λαμβάνοντας την επιβράβευση από τους γονείς γι' αυτό, ενισχύεται η αίσθηση της επάρκειάς του.
- Τα κατοικίδια παρέχουν επίσης κοινωνική υποστήριξη στα παιδιά, αφού πολλά παιδιά αναφέρουν ότι απευθύνονται στα κατοικίδια τους όταν έχουν να αντιμετωπίσουν κάποιο πρόβλημα.
- Η παρουσία των ζώων αυξάνει την κοινωνική αλληλεπίδραση των παιδιών. Ακόμη, τα παιδιά με ισχυρούς δεσμούς με ζώα είναι σε θέση να αναγνωρίζουν καλύτερα τα συναισθήματα των άλλων ανθρώπων σε σύγκριση με παιδιά χωρίς κατοικίδια. Τα παιδιά αντιλαμβάνονται τα ζώα σαν ειδικούς φίλους, σημαντικά μέλη της οικογένειας και παρόχους στοργής και συναισθηματικής υποστήριξης.
- Λιγότερες αλλεργίες και μικρότερες πιθανότητες εμφάνισης άσθματος παρουσιάζονται σε άτομα που εκτέθηκαν σε κατοικίδια κατά τη διάρκεια της παιδικής τους ηλικίας.

Όσον αφορά παιδιά με ειδικές ανάγκες η παρουσία ζώων σε στρεσογόνες συνθήκες προκαλεί μείωση του καρδιακού παλμού και της αρτηριακής πίεσης. Ακόμη, τα κατοικίδια ζώα αποτελούν χρήσιμη προσθήκη για τους γονείς που μεγαλώνουν παιδιά που ανήκουν στο φάσμα του αυτισμού, ειδικά σε τομείς όπως η κοινωνική αναγνώριση, η ασφάλεια του παιδιού και η συντροφικότητα.

Οι δεύτερη ηλικιακή ομάδα είναι οιι οι φοιτητές.

Μελέτη που πραγματοποιήθηκε στο πανεπιστήμιο του Οχάιο έδειξε ότι οι φοιτητές που ζούσαν με κάποιο ζώο είχαν λιγότερες πιθανότητες να αναφέρουν αισθήματα μοναξιάς ή κατάθλιψη, ενώ συχνά απευθύνονταν στο κατοικίδιό τους αναζητώντας βοήθεια κατά τη διάρκεια περιόδων έντονου στρες.

Η τρίτη ηλικιακή ομάδα είναι οι ενήλικες.

- Η ενασχόληση με τα ζώα δεν έχει θετικά αποτελέσματα μόνο στις μικρές ηλικίες. Οι ενήλικες φαίνεται να ευεργετούνται εξίσου από την ύπαρξη δεσμού με κάποιο ζώο, αφού η επιστημονική έρευνα έχει δείξει ότι σε σύγκριση με άτομα που δεν έχουν υπό την φροντίδα τους ζώο, οι ιδιοκτήτες κατοικίδιων κάνουν λιγότερες επισκέψεις σε ιατρούς. Αξίζει να αναφερθεί ότι τα έξοδα για την υγεία θα αυξάνονταν κατά 7,19% (δηλαδή €2,83 δισεκατομμύρια) στην Αυστραλία, εάν οι κάτοχοι κατοικίδιων πήγαιναν το ίδιο συχνά στον ιατρό όσο εκείνοι που δεν έχουν κάποιο ζώο στην κατοχή τους
- Έχουν χαμηλότερα επίπεδα στρες, ενώ προσαρμόζονται γρηγορότερα στο στρες που σχετίζεται με το πένθος και σε άλλες αντίξοες καταστάσεις όταν συναναστρέφονται ζώα
- Έχουν μεγαλύτερη συναισθηματική σταθερότητα και διατηρούν γενικότερα καλύτερη την κατάσταση της υγείας τους
- Έχουν μεγαλύτερη αυτοεκτίμηση και τείνουν να νιώθουν λιγότερο μόνοι και ανήσυχοι

- Επίσης, υπάρχει θετική σχέση ανάμεσα στην κατοχή κατοικίδιου και στην επιβίωση του ατόμου που πάσχει από στεφανιαίο νόσο ένα έτος μετά την εισαγωγή του σε νοσοκομείο
- Ο δεσμός με ένα ζώο συντροφιάς σχετίζεται με ευεργετικά αποτελέσματα στο καρδιαγγειακό σύστημα του ανθρώπου δηλαδή χαμηλότερη αρτηριακή πίεση και καρδιακοί παλμοί
- Σε άτομα με υπέρταση που βρίσκονταν σε συνθήκες στρες, η αλληλεπίδραση με το κατοικίδιό τους προλαμβάνει την αύξηση της αρτηριακής πίεσης
- Δεδομένα υποστηρίζουν την ενίσχυση της διάθεσης μετά την αλληλεπίδραση με ένα ζώο, ενώ τα άτομα αναφέρουν μικρότερα ποσοστά άγχους και φόβων στη ζωή τους
- Τα ζώα μπορούν να συνεισφέρουν στην εκπλήρωση των κοινωνικών αναγκών του ατόμου αφού μειώνουν τα συναισθήματα μοναξιάς και απομόνωσης, προσφέροντας κοινωνική υποστήριξη
- Η παρουσία ενός ζώου συντροφιάς στο χώρο, ακόμη και δίχως κάποια αλληλεπίδραση από τους παρευρισκόμενους, προκαλεί εγκεφαλική δραστηριότητα που συνδέεται με καταστάσεις χαλάρωσης και μειωμένου στρες

Συμπερασματικά, τα οφέλη από την ύπαρξη ζώων στη ζωή του ανθρώπου είναι πλέον καταγεγραμμένα και κοινά αποδεκτά. Την επόμενη φορά που θα σκεφτείτε την υιοθεσία ενός κατοικίδιου μπορείτε να λάβετε υπόψη σας τα προαναφερθέντα στοιχεία, ώστε να πάρετε την καταλληλότερη για εσάς απόφαση. Να θυμάστε όμως ότι ένα ζώο συντροφιάς θα έχει ανάγκη τη φροντίδα σας για όλη τη ζωή του, κατά τη διάρκεια της οποίας θα σας προσφέρει στιγμές ξεκούρασης, διασκέδασης, ξεγνοιασιάς γεμάτες συναισθήματα όπως χαρά και ανακούφιση.

<u>Εμπειρική άσκηση:</u>

Θυμήσου την τελευταία φορά που πραγματικά ήθελες ένα τσιγάρο αλλά δεν μπορούσες να το έχεις. Μπορεί να ήσουν κάπου που δεν επιτρεπόταν το κάπνισμα (π.χ. εξέταση, αεροπλάνο, κ.λπ.). Τι σκέφτηκες τότε; Σε περίπτωση που δεν είσαι σίγουρος/η για το τι είχες σκεφτεί, μερικές σκέψεις που πολύ συχνά έχουν τα άτομα που καπνίζουν είναι: «Εάν κάπνιζα τώρα θα μπορούσα να σκεφτώ πιο καθαρά», ή «Ένα τσιγάρο θα είχε ωραία γεύση τώρα» ή «Ένα τσιγάρο είναι αυτό που χρειάζομαι τώρα».

Μόλις θυμηθείς τι είχες σκεφτεί κατάγραψε τη σκέψη σου στη σελίδα που σου δόθηκε και ενημέρωσε την ερευνήτρια ότι την έχεις καταγράψει.

….

Τώρα, για τα επόμενα δύο λεπτά κλείσε τα μάτια σου και φαντάσου ότι στο τραπέζι μπροστά σου υπάρχει το τασάκι, ο αναπτήρας και τα τσιγάρα σου. Νιώσε ελεύθερα την επιθυμία να καπνίσεις. Άφησε τον εαυτό σου να κατακλυστεί από αυτήν την επιθυμία. Αντιμετώπισε την όποια επιθυμία για κάπνισμα όπως αντιμετωπίζεις συνήθως την επιθυμία για κάπνισμα στις περιπτώσεις που δεν μπορείς να καπνίσεις.

….

Τώρα μπορείς να ανοίξεις τα μάτια σου.

Appendix F

Questionnaire after emotion regulation strategy training

Παρακαλούμε όπως περιγράψεις-εξηγήσεις πιο κάτω σε 2-3 προτάσεις την τεχνική της **γνωστικής αναδόμησης** που μόλις έμαθες και χρησιμοποίησες κατά την εμπειρική άσκηση με σκοπό την αντιμετώπιση της όποιας επιθυμίας για κάπνισμα.

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Παρακαλούμε όπως περιγράψεις-εξηγήσεις πιο κάτω σε 2-3 προτάσεις την τεχνική της **αποδοχής** που μόλις έμαθες και χρησιμοποίησες κατά την εμπειρική άσκηση με σκοπό την αντιμετώπιση της όποιας επιθυμίας για κάπνισμα.

Παρακαλούμε όπως περιγράψεις-εξηγήσεις πιο κάτω με 2-3 προτάσεις την **συνηθισμένη τεχνική** που εφαρμόζεις στην καθημερινότητά σου όταν επιθυμείς να καπνίσεις αλλά δεν μπορείς, και την οποία χρησιμοποίησες κατά την εμπειρική άσκηση με σκοπό την αντιμετώπιση της όποιας επιθυμίας για κάπνισμα.

Appendix G

Manipulation check

Παρακαλούμε όπως περιγράψεις-εξηγήσεις πιο κάτω όσο πιο αναλυτικά μπορείς την τεχνική που χρησιμοποίησες (τι σκεφτόσουν) κατά τη διάρκεια των διαφόρων δραστηριοτήτων που ολοκλήρωσες ώστε να αντιμετωπίσεις την όποια επιθυμία σου για κάπνισμα.

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Παρακαλούμε όπως απαντήσεις στις πιο κάτω ερωτήσεις κυκλώνοντας των αριθμό που αντιστοιχεί στην απάντησή σου.

Σε ποιο βαθμό χρησιμοποίησες τη **γνωστική αναδόμηση** κατά τη διάρκεια του πειράματος όταν είχες την επιθυμία να καπνίσεις;											
Καθόλου	0	1	2	3	4	5	6	7	8	9	10	**Όλη την ώρα**
Πόσο χρήσιμη βρήκες τη **γνωστική αναδόμηση** όσον αφορά την αντιμετώπιση της επιθυμίας για κάπνισμα;											
Καθόλου	0	1	2	3	4	5	6	7	8	9	10	**Υπερβολικά πολύ**
Πόσο πιθανό είναι να ξαναχρησιμοποιήσεις τη **γνωστική αναδόμηση** σε μελλοντικά επεισόδια έντονης επιθυμίας για κάπνισμα;											
Καθόλου πιθανό	0	1	2	3	4	5	6	7	8	9	10	**Υπερβολικά πιθανό**

Παρακαλούμε όπως περιγράψεις-εξηγήσεις πιο κάτω όσο πιο αναλυτικά μπορείς την τεχνική που χρησιμοποίησες (τι σκεφτόσουν) κατά τη διάρκεια των διαφόρων δραστηριοτήτων που ολοκλήρωσες ώστε να αντιμετωπίσεις την όποια επιθυμία σου για κάπνισμα.

Παρακαλούμε όπως απαντήσεις στις πιο κάτω ερωτήσεις κυκλώνοντας των αριθμό που αντιστοιχεί στην απάντησή σου.

Σε ποιο βαθμό χρησιμοποίησες την **αποδοχή** κατά τη διάρκεια του πειράματος όταν είχες την επιθυμία να καπνίσεις;											
Καθόλου	0	1	2	3	4	5	6	7	8	9	10	**Όλη την ώρα**
Πόσο χρήσιμη βρήκες την **αποδοχή** όσον αφορά την αντιμετώπιση της επιθυμίας για κάπνισμα;											
Καθόλου	0	1	2	3	4	5	6	7	8	9	10	**Υπερβολικά πολύ**
Πόσο πιθανό είναι να ξαναχρησιμοποιήσεις την **αποδοχή** σε μελλοντικά επεισόδια έντονης επιθυμίας για κάπνισμα;											
Καθόλου πιθανό	0	1	2	3	4	5	6	7	8	9	10	**Υπερβολικά πιθανό**

Παρακαλούμε όπως περιγράψεις-εξηγήσεις πιο κάτω όσο πιο αναλυτικά μπορείς την τεχνική που χρησιμοποίησες (τι σκεφτόσουν) κατά τη διάρκεια των διαφόρων δραστηριοτήτων που ολοκλήρωσες ώστε να αντιμετωπίσεις την όποια επιθυμία σου για κάπνισμα.

Παρακαλούμε όπως απαντήσεις στις πιο κάτω ερωτήσεις κυκλώνοντας των αριθμό που αντιστοιχεί στην απάντησή σου.

Σε ποιο βαθμό χρησιμοποίησες τη **συνηθισμένη τεχνική** σου για τη διαχείριση της επιθυμίας για κάπνισμα κατά τη διάρκεια του πειράματος όταν είχες την επιθυμία να καπνίσεις;											
Καθόλου	0	1	2	3	4	5	6	7	8	9	10	**Όλη την ώρα**
Πόσο χρήσιμη βρήκες τη **συνηθισμένη τεχνική** σου για την αντιμετώπιση της επιθυμίας για κάπνισμα όσον αφορά τη διαχείριση της επιθυμίας για κάπνισμα;											
Καθόλου	0	1	2	3	4	5	6	7	8	9	10	**Υπερβολικά πολύ**
Πόσο πιθανό είναι να ξαναχρησιμοποιήσεις τη **συνηθισμένη τεχνική** σου για τη διαχείριση της επιθυμίας για κάπνισμα σε μελλοντικά επεισόδια έντονης επιθυμίας για κάπνισμα;											
Καθόλου πιθανό	0	1	2	3	4	5	6	7	8	9	10	**Υπερβολικά πιθανό**

Appendix H

Tobacco topography scoring form

Order: _____
ID: _____
Name of Researcher: _____

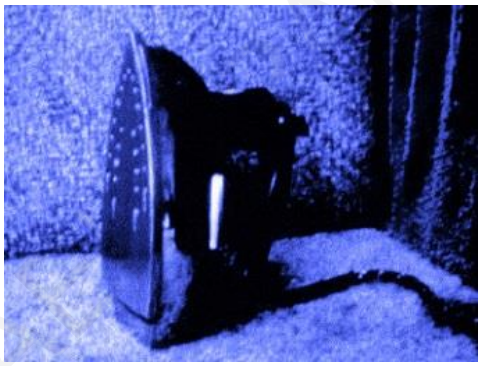
Video PRE: _____	Video POST: _____
Number of puffs:	**Number of puffs:**
Total number of puffs: _____	*Total number of puffs:* _____
Puff duration (time for every puff): 1: _____sec 12: _____sec 2: _____sec 13: _____sec 3: _____sec 14: _____sec 4: _____sec 15: _____sec 5: _____sec 16: _____sec 6: _____sec 17: _____sec 7: _____sec 18: _____sec 8: _____sec 19: _____sec 9: _____sec 20: _____sec 10: _____sec 21: _____sec 11: _____sec 22: _____sec	**Puff duration:** 1: _____sec 12: _____sec 2: _____sec 13: _____sec 3: _____sec 14: _____sec 4: _____sec 15: _____sec 5: _____sec 16: _____sec 6: _____sec 17: _____sec 7: _____sec 18: _____sec 8: _____sec 19: _____sec 9: _____sec 20: _____sec 10: _____sec 21: _____sec 11: _____sec 22: _____sec
Inter-puff interval (time for every interval): 1: _____sec 12: _____sec 2: _____sec 13: _____sec 3: _____sec 14: _____sec 4: _____sec 15: _____sec 5: _____sec 16: _____sec 6: _____sec 17: _____sec 7: _____sec 18: _____sec 8: _____sec 19: _____sec 9: _____sec 20: _____sec 10: _____sec 21: _____sec 11: _____sec 22: _____sec	**Inter-puff interval:** 1: _____sec 12: _____sec 2: _____sec 13: _____sec 3: _____sec 14: _____sec 4: _____sec 15: _____sec 5: _____sec 16: _____sec 6: _____sec 17: _____sec 7: _____sec 18: _____sec 8: _____sec 19: _____sec 9: _____sec 20: _____sec 10: _____sec 21: _____sec 11: _____sec 22: _____sec
FINAL PRE **Number of puffs: _____** **Mean puff duration:: _____sec** **Mean inter-puff interval: _____sec**	**FINAL POST** **Number of puffs: _____** **Mean puff duration: _____sec** **Mean inter-puff interval: _____sec**

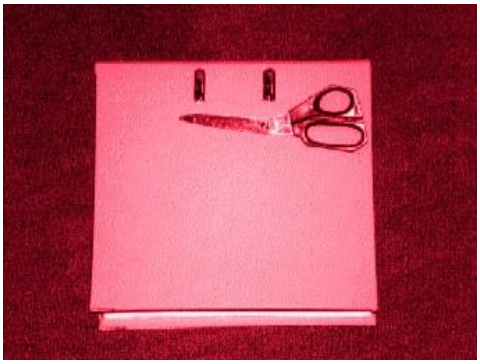
Appendix I

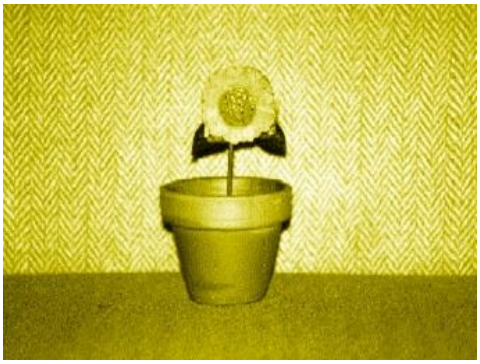
Stroop pictures

Smoking-related pictures

Neutral pictures







Appendix J

Dysphoria scale

Παρακαλούμε όπως διαβάσεις προσεκτικά τις πιο κάτω δηλώσεις και σημειώσεις τραβώντας μια κάθετη γραμμή πόσο ισχύει η κάθε δήλωση για εσένα. Όσο πιο κοντά στο στο «0» κινείται η απάντησή σου τόσο λιγότερο βιώνεις το συγκεκριμένο συναίσθημα **αυτήν τη στιγμή** ενώ όσο πιο κοντά στο «100» είναι η επιλογή σου τόσο περισσότερο βιώνεις το συγκεκριμένο συναίσθημα.

Αυτήν τη στιγμή, τώρα, νιώθω:

Άγχος	**0%** _____ **100%**
Ευερεθιστότητα	**0%** _____ **100%**
Δυσκολία συγκέντρωσης	**0%** _____ **100%**
Δυσφορία	**0%** _____ **100%**
Νευρικότητα	**0%** _____ **100%**