

ABSTRACT

Title of Document: THE EFFECTS OF SOCIAL SUPPORT AND SENSITIVITY TO OSTRACISM ON SMOKING OUTCOMES IN COLLEGE STUDENTS

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Cigarette smoking is a serious public health concern, and is especially prevalent among college students. Although many college smokers try to quit, few are successful. Both peer smoking status and social support have been correlated with smoking initiation and maintenance, but few studies have investigated relapse. Further, personality-level predictors of relapse have rarely been studied. It is important to examine mechanisms underlying relapse in order to usefully modify and individualize smoking cessation interventions. The present study tested the hypotheses that social support would impact college student relapse rates at one-week follow-up during a self-quit, and that this relationship would be moderated by the trait of sensitivity to ostracism. In a sample of 41 college smokers, only best friend smoking status and frequency of modeling behaviors (e.g., offering quitter a cigarette) were found to predict relapse. Additionally, sensitivity to ostracism predicted how helpful/hindering quitters perceived peer support/criticism to be.

THE EFFECTS OF SOCIAL SUPPORT AND SENSITIVITY TO OSTRACISM ON
SMOKING OUTCOMES IN COLLEGE STUDENTS

By

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Chapter 1: Theoretical Rationale

Introduction

Cigarette smoking is a major public health concern in the United States. It is the leading cause of preventable death in the nation, accounting for over 440,000 premature deaths yearly (Center for Disease Control [CDC], 2002). Although about 80% of smokers say they want to quit and 40-50% attempt smoking cessation annually, only 3-5% of smokers remain abstinent for a one year period (Hebert, 2004). A review of the literature pertaining to the success of self-quit attempts by Hughes, Keely, and Naud (2004) indicated that the majority of self-quitters relapse within the first eight days of a quit attempt, and few self-quitters remain abstinent after six months. Results are not much more promising for those seeking treatment, as up to 60% relapse within the first two weeks of a quit attempt (Alessi, Badger, & Higgins, 2004).

The prevalence of smoking among college students is particularly problematic as the rates of smoking in the 1990's declined in all age groups *except* ages 18-24 (Hebert, 2004), and one-third of this age group is comprised of college students (US Bureau of the Census, 1997). Additionally, research thus far does not point to any "successful, consistent, or coherent cessation strategies paired with relapse-prevention strategies specific to an undergraduate population" (Ramsay & Hoffmann, 2004: p.12). Despite the continued high rates of smoking among young adults and limited effectiveness in developing appropriate treatments, more than half of college students say that they want to quit (Murphy-Hoefer et al., 2005). Thus, it is of the utmost importance to explore novel strategies that may be helpful in assisting those students initiate smoking cessation and maintain abstinence once cessation has occurred.

Social Influence and College Smoking

Why do so many college students smoke, despite its widely publicized health risks? Social psychologists have long theorized that the pressure from one's peers and the desire to fit into a group greatly influence behavior (Festinger, 1950; Petraitis, Flay & Miller, 1995). College students may be particularly vulnerable to the effects of peer pressure to smoke, as they may be nervous about establishing new social ties, and adolescents often believe that smoking will make them feel more confident and relaxed (O'Callaghan, 2001, as cited in O'Callaghan & Doyle, 2001). College students also underestimate the risks inherent in smoking (Murphy-Hoefer, Alder & Higbee, 2004) as well as how long they will continue smoking once they start (Weinstein, Slovic, & Gibson, 2004). All of these factors combine to make college students particularly vulnerable to begin and continue smoking.

Only a small number of studies have examined the role of peer influence on smoking initiation in US college students. However, a considerably larger body of literature has explored the role of peer influence on smoking initiation in middle- and high-school populations (e.g. Alexander, Piazza, Mekos, & Valente, 2001; Bauman, Carver, & Gleiter, 2001; Chassin, Presson, & Sherman, 1984; Urberg, Degirmencioglu, & Pilgrim, 1997), and may be relevant to understanding the effect of peer influence on smoking within college students. Generalizing to young adults from adolescents is likely appropriate in the case of peer influence and smoking, supported by research indicating that motivation to comply with peers directly increases with age of the adolescent (from 6th to 11th grade; Chassin, Presson & Sherman, 1984). It can be hypothesized that

although peer-influence eventually begins to have a reduced effect through adulthood, it likely continues to play a major role for college students.

The Effect of Peer Smoking Status on Adolescents' Smoking Behavior

Smoking status of peers has shown differing levels of importance as a predictor of smoking behavior in adolescents across various studies. Many studies have found that a higher proportion of smoking friends predicted smoking initiation in adolescents (e.g. Bauman, Carver, & Gleiter, 2001; Urberg, Degirmencioglu, & Pilgrim, 1997). Often, however, studies defined smoking status of peers differently, using different counts or proportions of peers as indicative of a “smoking peer group.” This approach limits a clear determination of whether or not the relationship closeness or other individual peer characteristics factored into this effect. In contrast, a few studies found that the smoking status of the individual’s best or single closest friend was the best predictor of adolescent smoking (e.g. Alexander, Piazza, Mekos, & Valente, 2001) or of progression through the stages of smoking behavior: non-smoking to experimental smoking to regular smoking (Wang, Fitzhugh, Eddy, Fu, & Turner, 1997). Aloise-Young, Graham, and Hansen (1994) found that adolescents’ smoking behavior was affected by smoking status of peers only when the adolescent sought entrance into a particular friendship group composed of smokers, with no effect found for peer influence between already-established friends. Jones, Schroeder, and Moolchan (2004) found that more time spent with smoking peers was inversely associated with number of quit attempts in adolescents, but the activities during this time (i.e. whether the time consisted of engaging in smoking-related behaviors or not) were not recorded, meaning that the mechanisms through which smoking peers affect desire to quit were not delineated. Ridner (2005) found that fewer smoking friends

predicted status as a “former smoker” (one who did not smoke within the past 30 days) in a college sample. Notwithstanding the variability of these findings (particularly in terms of measurement of peer-related variables) across different studies, there is strong evidence that smoking status of peers and/or best friends have at least some impact on adolescents’ smoking initiation, maintenance and cessation.

Despite the evidence linking one’s smoking to peer smoking status, the divergent results within the literature call into question the validity of using peer smoking status as a main predictor of an adolescent’s likelihood of smoking. Smoking status may not be a viable proxy for social pressure to smoke, although it often has been conceptualized as such. Using this dichotomous variable limits understanding of the mechanisms through which social pressure may operate. In fact, it remains unclear as to whether there is actually any social pressure being exerted on these adolescents to smoke, or if they are merely modeling their behavior on that of their peer group.

Additionally, whereas many adolescent studies examine initiation and maintenance of smoking, little research examines the effects of peers’ smoking status on *relapse* in adolescents. Also, the limited research on smoking among college students tends to focus on either the correlates of smoking initiation and maintenance among college smokers, or on smoking cessation interventions on college campuses, despite the fact that most college cessation programs evidence difficulty in drawing and maintaining participation (Kischuk, Tremblay, Lapierre, Heneman, & O’Loughlin, 2004).

Additionally, most studies are retrospective or cross-sectional in nature. Very few prospective studies of self-quits among college students were found after conducting a

broad literature search. These factors preclude drawing many conclusions about the function of social support in predicting relapse among college students.

Social Support and Relapse in Adults: Mixed Findings

The value of social support has long been documented as facilitating arrival at and adherence to stressful health-related decisions, such as quitting smoking (Janis, 1983). However, there is mixed evidence about the actual value of social support during a quit attempt, and why people often relapse despite obtaining social support. The resulting confusion surrounding the role of social support has led Fisher (1997) to remark that “Social support is probably the most important poorly understood influence in health and health care (p.819).”

Due to the dearth of research on relapse in adolescents and college students, and particularly on social support as a predictor of success in self-quits, research on college smoking should also be guided by the literature on the influence of social support on quit attempts in adults. The adult literature has moved away from examining solely smoking *status* of peers, and instead focuses on the *specific* supportive and unsupportive behaviors in which a smoker’s loved ones engage during a quit attempt. This is an important step toward developing a more precise understanding of the mechanisms through which social support operates to aid (or hinder) cessation. Various studies have examined the impact of positive, supportive behaviors (e.g. complimenting the smoker for staying quit) and of negative, unsupportive behaviors (e.g. expressing doubt in the quitter’s willpower, nagging the quitter to stay quit) on time to relapse within adult smoking cessation programs and self-quits. However, these studies often yield inconclusive results.

Externally adding social support to a smoking cessation program has been shown to have mixed or null results across genders, source of social support, and type of social support (positive or negative). In the studies reporting a significant effect, conclusions varied widely. For example, two studies which increased coworker social support in a worksite smoking cessation intervention showed no significant effect of positive behaviors on cessation, and concluded that only negative behaviors had a significant inverse correlation with length of quit attempt (Glasgow, Klesges, & O'Neill, 1986; Malott, Glasgow, O'Neill, & Klesges, 1984). In contrast, Carlson, Goodey, Bennett, Taenzer, and Koopmans (2002) found a positive effect of supportive partner (or other support person that the quitter chose) behaviors on cessation for both men and women at 3 month follow-up; however, this beneficial effect continued through the 1 year follow-up only for men. Morgan, Ashenberg and Fisher (1988) found direct effects of both positive (helping) and negative (modeling) behaviors on cessation. Murray, Johnston, Dolce, Lee, and O'Hara (1995) found that having a smoker versus having a non-smoker as a support person in the Lung Health Study cessation program decreased one's likelihood of continued abstinence over the course of a year. Unfortunately, this study did not assess specific positive or negative behaviors which may have influenced this relationship.

In addition to the divergent findings discussed above, many studies that added a social support component to smoking cessation interventions found that it had no effect at all. For example, Lichtenstein, Glasgow, and Abrams (1986) reviewed five interventions which used spouses, friends, and coworkers as support people, all of which showed no significant between-group differences in the support-added and no-support-added

conditions. May and West (2000) reached the same conclusion in their review of buddy system approaches, finding no consistent effects of adding social support to smoking cessation interventions. The main conclusion that can be gleaned from the literature on adding social support to a cessation intervention is that social support, at least as it has been studied, has no consistent significant effect on preventing relapse.

The literature on naturally-occurring social support during a self-quit is similarly inconclusive. Some studies show that only positive behaviors correlate with staying quit (e.g. Coppotelli & Orleans, 1985; Mermelstein, Cohen, Lichtenstein, Baer, & Kamarck, 1986; Gulliver, Hughes, Solomon, & Dey, 1995). Other research shows that partner support correlates with initial cessation, but not with maintenance of abstinence (McBride et al., 1998; Mermelstein et al., 1996). The last finding is representative of a significant problem in this literature: even in studies showing that smokers were helped by social support, the beneficial effects of support for many subjects dissipated after one month to one year, leading to an overall lack of significant differences between relapse outcomes for smokers with low and high perceived social support (e.g. Carlson et al., 2002, Mermelstein et al., 1986).

The ambiguity of the findings on both externally-added and naturally-occurring social support are contrary to widely accepted theories in social psychology about the strong influence of social approval on behavior (Festinger, 1950; Petraitis, Flay & Miller, 1995). This contradiction raises the question of why positive and supportive behaviors from loved ones often show no buffering effects on preventing relapse, despite findings on the high premium that people place on social support and acceptance (Janis, 1983; Leary, 2001). Further exploration is warranted to resolve this issue, including a careful

examination of possible flaws within the social support studies that may be responsible for their mixed or null results.

Additionally, Kassel, Stroud, and Paronis (2003) reviewed over twenty studies in the negative affect and smoking literature, and concluded that stress and negative affect are strong predictors of relapse. However, studies in the social support literature have not shown unsupportive and rejecting behaviors from loved ones to be consistently predictive of quicker relapse, even though such behaviors are known to induce stress and negative affect (Leary, 2001; Leary, Springer, Negel, Ansell, & Evans, 1998). Thus, the social support literature seemingly also contradicts the robust association between stress and negative affect and relapse. To resolve these apparent contradictions, it is useful to examine some major impediments to interpreting the research that has been done on social support.

Methodological Issues in the Adult Social Support and Relapse Literature

Measurement

A central issue in interpreting the mixed findings for social support in the literature is inconsistency in how variables have been measured. Some studies consider support from various sources to be interchangeable, such as partner and closest friend (Gulliver et al., 1995), or, in another case, spouses, children, friends, and parents of quitters, any of whom could be a “support person” in the intervention (Carlson et al., 2002). Additionally, support has been measured with various instruments, over disparate ranges of time, and has been corroborated by the partner’s own report of support in some cases (e.g. Pollak et al., 2001; Thomas, Patten, Offord, & Decker, 2004) but not in others

(e.g. Cohen & Lichtenstein, 1990; Coppotelli & Orleans, 1985).

Pro-Smoking Negative Behaviors

Very few studies assess the impact of *pro-smoking* negative behaviors on relapse; specifically, behaviors with the intent of the leading one back to smoking, such as actively encouraging the smoker not to quit or minimizing the health risks of smoking. This may be due to the fact that it is not socially acceptable among adults to encourage an unhealthy behavior in their loved ones, and therefore these behaviors were not expected or asked about by researchers. However, if pro-smoking negative behaviors do in fact occur, they may be related to relapse more than negative anti-smoking behaviors, or they may have more of an impact on relapse than positive, supportive behaviors had on continued cessation. If this is the case, the mixed results found in the literature for the effect of social support on relapse may be due, at least in part, to the absence of these pro-smoking behaviors in the analyses.

Pro-smoking behaviors may abound particularly on college campuses, as per Ramsay and Hoffmann's 2004 finding that behaviors such as blowing smoke in a quitting peer's face were prevalent in a college smoking cessation intervention. Further evidence for the importance of pro-smoking behaviors comes from Morgan, Ashenberg, and Fisher (1988), who found a significant effect of "smoking prompts/models" (a pro-smoking category which was not often targeted in other research) on relapse. Morgan's social support scale is the only social support scale in the literature which includes "hindering" behaviors and "smoking prompt/models" in addition to a category for positive behaviors.

Trait Predictor of Relapse?

Neither externally-added social support within a smoking cessation program nor naturally-occurring support during a self-quit has been shown definitively and consistently to prevent relapse. Aside from the methodological limitations in the adult literature outlined above which may have impacted these findings, there may be another explanation within the area of personality. Trait-based research is exceedingly important in clinical work, as trait-based variables allow clinicians to better identify differences between individuals and create treatments which target different groups (Shadel, Cervone, Niaura, & Abrams, 2004). However, research on smoking has greatly neglected this area, and focused instead on three major areas of correlates and predictors of smoking behavior: biological (e.g. nicotine dependence: Killen et al., 1996), situational (e.g. smoking status of peers, support from loved ones, and stress: Abrams et al., 1987, Aloise-Young, Graham, & Hansen, 1994; Carlson et al., 2002; Cohen & Lichtenstein, 1990), and Axis-I disorders/disordered symptomatology (e.g. depression as a predictor of relapse: Ginsburg, Hall, Reus, & Munoz, 1995; Niaura et al., 1999).

Traditionally, personality traits have only been studied in respect to differentiating smokers from nonsmokers, rather than using aspects of personality to predict likelihood of a successful abstinence attempt. Only lately has the idea of prospectively examining the effect of personality on relapse begun to be explored (Shadel et al., 2004). A recent handful of studies correlating the Big 5 Personality Factors (i.e., extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness) to smoking cessation have had mixed or null results, and no conclusions about the Big 5 as predictors

of smoking cessation success have been able to be drawn (Shadel et al., 2004). However, perhaps other personality-level variables may be explored usefully.

A study done by Abrams et al. (1987) suggests that there may in fact be innate differences between quitters and relapsers involving their response to social stress, which may be considered an innate dimension of personality. In this study, quitters' and relapsers' levels of perceived stress and physiological arousal were measured during audiotaped narrations of stressful smoking-specific situations. After these vignettes, participants were prompted to respond as if they were a smoker experiencing the given stressful situation. Quitters were found to display less self-reported perceived stress and less physiological arousal during this experiment than relapsers. If this task was in fact a viable analogue to real-world situations that arose in the course of their quit attempt, then quitters' lower stress and arousal could perhaps be attributed to an innately lower level of sensitivity to ostracism. This trait would have helped them through the negative, high-pressure situations that they experienced during their quit attempt, and helped them maintain abstinence. Despite the fact that the results of this study, particularly in the physiological domain, may have been confounded by the presence of nicotine in only the systems of the relapsers, interesting questions are raised regarding the possible existence of innate, individual trait-level predictors that promote successful cessation.

Another study by Niaura et al. (2002) found that behavioral social skill during an anxiety induction procedure predicted cessation rates at three-month follow-up. This finding may not be attributed solely to high social skill, but rather to low sensitivity to ostracism. Those who have low levels of sensitivity to ostracism may show greater behavioral skill in anxiety-provoking situations, as they would remain calmer in such

circumstances than those with high sensitivity to ostracism. This study also indicates that a personality-level variable may be at play in determining abstinence, perhaps in the form of individual differences in sensitivity to ostracism.

The most compelling evidence for the existence of a trait-level predictor of social distress comes from a study by Conway, Ward, Vickers, and Rahe (1981). They prospectively examined stress as a predictor of smoking behavior in a high-stress occupation: Navy commanders. All commanders followed the same intensive schedule of training their subordinates, interspersed with breaks and periods of lessened workload. These commanders completed measures of perceived stress each day for eight months; therefore, both their self-reported stress and the actual intensity of the workload on each day were used as predictors of smoking. As Conway et al. hypothesized, on objectively higher-stress work days, there was significantly more smoking. Interestingly, however, this main effect was due to certain commanders skewing the average smoking rates on these days. That is, on days which were known to be very high-stress for the company (i.e. when they first met and began to train their recruits, and similar important points in the process), certain commanders' self-reported stress as well as their smoking rates skyrocketed, whereas other commanders only reported slight increases in both self-reported stress and in smoking frequency. Because Conway et al. followed these men for eight months, they concluded that these consistent observed individual differences could be viewed as "trait-like tendencies." Conway et al. therefore concluded that "individual differences must be incorporated into models of the relationship between stress and behavior... [One basis] for individual differences in correlations between stress and substance consumption [is that] individuals may differ in sensitivity to stress, more

sensitive persons producing stronger correlations. Such differences could include differential sensitivity to specific types of stress (pp.160-161).” One such specific type of stress that may be particularly important to study in a college population is sensitivity to social stress, particularly to unsupportive social behaviors that may be done by one’s peer group during a quit attempt.

Chapter 2: The Current Study

Social Support Behaviors and Relapse

The current study utilized a set of ANOVAs and correlational analyses examining indices of smoking outcome as a function of social support scores. Specifically, relationships were examined between helping, critical, and modeling behaviors and two smoking outcome variables: days until relapse and number of cigarettes smoked at follow-up. In line with decades of research on the importance of social support and peer approval in influencing behavior, a significant main effect of this variable was expected for both best friend and friend group, such that helping behaviors would be directly associated with cessation success, and hindering behaviors would be inversely associated with cessation success (Festinger, 1950; Janis, 1983; Petraitis, Flay & Miller, 1995). Both frequency of support behaviors and their perceived valence (participant's rating of how helpful/hindering behaviors were) were theoretically expected to contribute to cessation outcome. However, this distinction between frequency and valence of support behaviors has not been examined in published research, and is therefore exploratory in nature.

Sensitivity to Ostracism as a Moderator of Support Behaviors' Effect on Relapse

In addition to a main effect of social support, a secondary hypothesis was that the trait of sensitivity to ostracism would moderate the effect of positive and negative behaviors that a quitter experiences. This would explain why interventions that increase social support have not always led to higher rates of cessation (even discounting their methodological flaws). Specifically, it was expected that negative social behaviors would be strongly related to relapse for those with high sensitivity to ostracism, and positive

behaviors would be most strongly related with continued cessation in those with low sensitivity to ostracism. Further, the hypothesis about the effect of negative behaviors on quitters with high sensitivity to ostracism is most relevant to early lapse, in accordance with Shiffman and Waters' 2004 finding that negative affect predicts relapse only for the hours immediately preceding the lapse; there is no significant cumulative effect of stress that increases for days and then triggers a lapse. These effects were expected across both peers and best friends.

Construct Validity of Sensitivity to Ostracism

Although sensitivity to ostracism, as operationalized in this study by negative reaction to the cyberostracism task, may be thought to be a proxy variable for rejection sensitivity, it is hypothesized in the current study that this is in fact a unique construct. When comparing sensitivity to rejection sensitivity, differences emerge. Rejection sensitivity is defined as interpreting ambiguous social situations as rejection, and describes those who “anxiously expect, readily perceive, and overreact to rejection” (Downey & Feldman, 1996). However, in the current study, the rejection is objectively occurring; Cyberball is in fact utilized to simulate actual ostracism of participants. High sensitivity to ostracism, as it is conceived of here, is only characterized by a lowered level of Williams' four needs and heightened negativity of affect *at the time* that negative social situations occur, rather than an anticipatory fear.

Gender Differences

A main effect of gender is expected, such that men relapse later than women, in line with previous research (e.g., Ward, Kleges, & Zbikowski, 1997); yet, more interestingly, there also may be a moderating effect of gender on the relationship between

social support and relapse. One consistent effect in the social support literature is that men benefit more than women in interventions that include the support of a spouse (Carlson et al., 2002; Murray et al., 1995), suggesting that the relationship between social support and relapse may be stronger in males compared to females.

In review, specific hypotheses were: (1) social support would have a main effect on length of quit attempt, such that helping behaviors would be associated with an increased time until relapse and fewer cigarettes smoked at follow-up, and negative behaviors (both pro- and anti-smoking) would be inversely associated with duration of quit attempt and directly associated with number of cigarettes smoked at follow-up, (2) the trait-level variable of sensitivity to ostracism would moderate the main effect of social support, such that high sensitivity to ostracism participants would be more likely to relapse or would smoke more in the face of negative peer/best friend behaviors, and quitters with low sensitivity to ostracism would be most affected by positive behaviors, and (3) sensitivity to ostracism is a unique construct, with divergent validity compared to rejection sensitivity.

Chapter 3: Method

Sample Characteristics

Participants were 53.7% female, and ranged in age from 18 to 29 with a mean age of 20.07 years ($SD = 2.21$). The sample included 14 freshmen, 9 sophomores, 9 juniors, 5 seniors, and 4 grad students. On a demographics questionnaire, 65.9% of participants identified as White, 24.4% as Asian/Southeast Asian, 4.9% as Hispanic/Latino, 2.4% as Black/African-American, and 2.4% as “other”. All participants were unmarried; 1 lived with a significant other and the rest did not.

Procedures

Participants were recruited from psychology classes, college newspaper advertisements, and fliers around campus. Advertisements stated: “Do You Want to Quit Smoking? Get Paid to Quit! Free Information on How to Quit + \$50 for participating in our study on how college students quit smoking!” Advertisements listed the experimenter’s email address and laboratory phone number. Potential participants called into the laboratory, and a research assistant provided information about the study including the schedule of assessments and the compensation structure of the study, as outlined in Table 8 in the Appendix.

Prospective participants were pre-screened on the phone for the following smoking-related inclusion criteria: smoking > 1 cigarette per day for the past four months, and a motivation to quit of at least 5 on a 10 point scale. If participants fit our criteria, an appointment was scheduled within the following week for their Pre-Quit Assessment session. Participants were alerted that their self-quit would begin at midnight on the night following their initial assessment session.

Schedule of Assessments

Session 1: Pre-Quit Assessment

Table 1 provides a listing of scheduled events at each session. At this first session, participants read and signed an informed consent form detailing the schedule of the study and associated compensation. To assess any changes in information from the phone screener, participants were screened again at their baseline session on number of cigarettes smoked daily and their motivation to quit.

If the participant was deemed eligible based on these screening criteria, he/she then completed a battery of questionnaires on sociodemographic, personality, and mood variables lasting approximately 20 minutes, played a computer game lasting approximately six minutes (Cyberball), and then completed a post-task questionnaire assessing mood and feelings, lasting approximately ten minutes; see below for detailed descriptions of these measures. A research assistant was in the room at all times to assist with comprehension of the consent form, questionnaires, and computer task.

At the end of the session, participants were reminded that their last cigarette should be smoked no later than midnight that night. The day following their pre-assessment would also serve as their Quit Day. Additionally, at this initial assessment, participants were given a copy of a self-help booklet for smoking cessation prepared by the National Cancer Institute, Clearing the Air (USDHHS, 1994). They were also given a calendar on which to record the number of cigarettes they smoked on each day post-quit.

Session 2: 7-Day Post-Quit Follow-Up Assessment

Participant self-report of smoking was measured by the number of cigarettes on their calendar for the past week. If the calendar was not completed, the experimenter assisted the participant in completing the calendar at the session. Biochemical verification of smoking status was assessed with a breath monitor measuring exhaled carbon monoxide level, and with saliva cotinine level, as described below in “Measures.” Participants also completed the SIQ, described below, which assessed the social support that they received during their quit attempt over the past week.¹

Measures

All measures are in the Appendix. The Cyberball task and its accompanying questionnaire were always completed at the end of the pre-assessment session so that any negative mood which the task induced did not artificially inflate scores on other mood measures.

Demographic Variables

Participants provided basic demographic information including age, year in college, gender, occupation, marital status, socioeconomic status, and race/ethnicity.

¹ Students were followed for one month, based on evidence that smoking status within the first few days or weeks of a quit attempt is the strongest predictor of eventual success in quitting smoking (Alessi, Badger, & Higgins, 2004). However, no significant correlations were found between any of the variables of interest past the first follow-up, which may have been due to the fact that 84.6% of the sample had relapsed by this point. Therefore, the SIQ, which comprised the primary independent variable in this study, was no longer applicable to most participants past the first follow-up, so data was not included from the last three follow-up sessions in my analyses.

The procedure at each follow-up was identical, with the exception of the final follow-up. At this session, after completing the SIQ and abstinence verification measures, participants were verbally debriefed by the experimenter and given a paper synopsis of the goals of the study, with the experimenter's and her mentor's contact information in case of further questions. Participants were also given contact information for the University Mental Health Clinic's free smoking treatment program.

Drug-use questionnaire

Participants answered questions about their frequency of alcohol and other substance use within the past year. This is in line with past findings that current marijuana use and binge drinking are highly correlated with smoking among college students (Emmons, Wechsler, Dowdall, & Abraham, 1998; Jackson, Sher, Cooper, & Wood, 2002). This information was gathered in order to control for frequency/amount of alcohol and drug use.

Smoking Related Measures

Fagerström Test for Nicotine Dependence (Revised FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991). The FTND is a short self-report measure that assesses and controls for nicotine dependence. It consists of six multiple-choice questions. The FTND has shown good internal consistency, a single dimension factor structure, and positive relationships with degree of nicotine intake as assessed by saliva cotinine (Heatherton et al., 1991). The alpha coefficient for the revised FTND has been shown to be adequate (0.61).

Quit attempt history. This is a short questionnaire assessing characteristics (e.g., number and length) of previous quit attempts. A greater number of 24-hour quits and a greater number of days in each quit attempt have been shown to be correlated with greater likelihood of quitting smoking (Farkas et al., 1996).

Ostracism Measures

Ostracism has been shown to threaten four fundamental human needs (belonging, self-esteem, control, and meaningful existence) and to increase negative affect (Warburton, Williams, & Cairns, 2006; Williams & Sommer, 1997). Interestingly,

remote ostracism has been found to cause equivalent distress and lowered four needs in participants as does real-world ostracism. Remote ostracism has been studied using cell phones (Smith & Williams, 2004), Internet chat rooms (Williams et al., 2002), and an Internet ball tossing game (*Cyberball*; Williams, Cheung, & Choi, 2000). In the current study, the last method of remote ostracism, *Cyberball*, was utilized as an analogue of real-world ostracism due to evidence that both cyberostracism and real-world ostracism cause identical negative effects across individuals.

Williams (1997) explained ostracism's threatening effects on each of the four needs individually. He proposed that ostracism threatens the need for belonging because it separates the individual from the group, it threatens self-esteem because individuals assume that others are ignoring them because they are unlikable, and it threatens the need for control because an individual cannot change the situation by responding. Lastly, Case and Williams (2004) propose that ostracism threatens the need for meaningful existence in that it prevents recognition by others and acts as a metaphor of death; they point out that ostracism can also serve as an actual cause of death for organisms under certain conditions.

Numerous experiments have been conducted that provide support for the hypothesis that real-world and remote ostracism threaten these fundamental four needs. For example, evidence for the fact that *Cyberball* lowers belongingness comes from the finding that, after *Cyberball*, subjects are likelier to conform to their peers on an Asch-like perception task (Williams et al, 2002). Another line of compelling evidence that speaks to both the significant deleterious effects of ostracism and the ability of *Cyberball* to simulate real-world ostracism comes from a functional magnetic resonance imaging

(fMRI) study of ostracized Cyberball participants (Eisenberger, Lieberman, & Williams, 2003). Here, fMRI was used to examine the brain activity of individuals excluded during Cyberball, and findings indicated that the region of the brain (the dorsal anterior cingulate cortex) that was activated during cyberostracism is the same region implicated in the experience of physical pain.

Cyberball Task. The Cyberball procedure which was followed is outlined in Zadro, Williams and Richardson (2004). (A downloadable version of this game is available at <http://www.psy.mq.edu.au/staff/kip/Announce/cyberball>.) Participants were told that this portion of the study involved the effects of mental visualization on ability to stay off cigarettes, because people who can more effectively imagine the adverse health consequences of smoking often have an easier time staying quit. Participants were told that, to help them practice mental visualization, they would be playing an Internet ball-toss game on the computer. The experimenter stated that performance in the game was unimportant, and the game was merely a way for participants to practice their mental visualization skills. Participants were asked to visualize the situation, themselves, and the other players.

Participants were told that the game was accessed via the Internet, and that they were playing against two other students in other laboratories at the University of Maryland; however, in reality, they were playing alone. To make the cover story more realistic, the experimenter staged phone calls to other experimenters making sure that their participants were ready to begin.

The game depicts three ball-tossers, the middle one representing the participant. The game is animated and shows one player's icon throwing a ball to one of the other

two player's icons. When the ball was tossed to the participant, he/she was instructed to click on one of the other two icons to choose a recipient, and the ball then moved toward that icon. The game was set for 30 total throws and lasted for approximately six minutes. Once the instructions were read by the participants, they clicked the "Next" link and began the game. To simulate ostracism, the participants received the ball three times at the beginning of the game and never received the ball again.

Williams' Need-Threat Questionnaire (Williams, Cheung & Choi, 2000). This questionnaire was developed uniquely for use with the Cyberball task. It was given to participants immediately after the Cyberball task, to examine how the game threatened their levels of four needs which are fundamental to human motivation, efficacy, and survival, and to examine the task's effect on their levels of positive and negative affect (Williams, Cheung & Choi, 2000). Scores on the Four Needs scale and the affect scales were used to operationalize sensitivity to ostracism. The needs, and examples of the items associated with each, are: *belonging* (i.e. "I felt disconnected," "I felt rejected," "I felt like an outsider"), *control* (i.e. "I felt powerful," "I felt superior," "I felt I had control over the course of the game"), *self-esteem* (i.e. "I felt good about myself," "My self-esteem was high," "I felt liked"), and *meaningful existence* (i.e. "I felt invisible," "I felt non-existent," "I felt meaningless"). Respondents were instructed to rate each item on how well it represented their feelings during the Cyberball game. There were 15 items, and ratings are made on a five-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*). This measure has demonstrated high internal consistency, with an alpha reliability of .90 (Williams, personal correspondence, 2004).

The WNTQ also included a mood measure, which presented eight mood-related adjectives (good, bad, happy, sad, friendly, unfriendly, tense, relaxed). Participants were instructed to rate the applicability of each word to their current mood on a Likert scale ranging from 1 (*lowest*) to 7 (*highest*).

Finally, the measure included a manipulation check on perceived ostracism, which asked, “Assuming that the ball should be thrown to each person equally (33% if three people; 25% if four people), what percentage of throws was directed to you?” The correct answer was 10%.

Mood Measures

Negative affect as well as baseline symptoms of depression, anxiety, and social anxiety have each been shown to affect cessation success. Therefore, they were assessed in order to be controlled for in our analyses.

Affect: Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a 20-item self-report scale measuring positive and negative affect during the current day. Negative and positive affect reflect dispositional dimensions, with high negative affect characterized by high subjective distress and high positive affect characterized by pleasurable engagement with the environment (Crawford & Henry, 2004). The PANAS contains 10 one-word items representative of different dimensions of positive affect (e.g., “interested,” “excited”) and 10 items representative of negative affect (e.g., “distressed,” “jittery”). Participants rate these words on a five-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely) depending on the extent to which they feel that the word accurately reflects their mood. The internal reliability for the positive and negative affect scales of the PANAS are .90 and .87 respectively, and

the positive and negative affect scales are independent.

Anxiety: State Trait Anxiety Inventory- Trait and -State (STAI-T and STAI-S; Spielberger, Gorsuch & Lushene, 1970). Trait anxiety has been seen to correlate with nicotine dependence and smoking status (DiFranza et al., 2004), so it will be controlled for using the STAI-T. State anxiety at the baseline session will also be controlled for using the STAI-S. Each of these scales contains 20 items and uses a four-point Likert rating format. Test-retest reliabilities of the STAI-T and the STAI-S range from .73 to .86 and .16 to .62 respectively (Spielberger et al., 1983). In high school and college students, alpha estimates of internal consistency on the STAI-T range from .86 to .92, and from .83 to .92 on the STAI-S (Spielberger, et al., 1983). Barnes, Harp, and Jung (2002) conducted a meta-analysis of 816 articles found using Psyc-Info that utilized the STAI. Across these studies, the authors found that in “low-stimulus contexts,” or situations which were not specifically presumed to provoke stress in participants, the mean level of state anxiety as measured by the STAI-S was 36.56 (Cohen’s $d = 1.26$), and the mean level of trait anxiety as measured by the STAI-T was 39.19 (Cohen’s $d = .91$).

Depressive Symptoms: CES-D (Radloff, 1977). It has been shown that the presence of depressive symptoms correlates with lessened likelihood of staying quit (e.g. Ginsburg, et al., 1995). Therefore, baseline depressive symptoms were controlled for by administering the CES-D at the Pre-Quit assessment session. This scale was designed for use in non-psychiatric settings and is therefore appropriate for use with this population. The CES-D is a 20 item self report measure which assesses the presence of depressive symptoms experienced by the participant within the past week. Items are rated on a four-point frequency scale ranging from 0 (rarely or none of the time) to 3 (most or all of the

time). Alpha reliabilities for the CES-D are .80 or higher depending on the sample (Radloff, 1977). Scores of 16 and above indicate high depressive symptoms (Carpenter et al., 1998).

Social Anxiety: Social Avoidance and Distress Scale (SAD; Watson & Friend, 1969). Social anxiety has been shown to correlate with nicotine dependence in adolescents and young adults (Sonntag, Wittchen, Hofler, Kessler, & Stein, 2000; Wittchen, Stein & Kessler, 1999). Further, Zadro, Boland, and Richardson (2006) found evidence for a moderating effect of social anxiety in sensitivity to ostracism. Findings indicated that high socially anxious participants recovered their primary needs more slowly than did controls. Therefore, baseline symptoms of social anxiety were assessed by administering the SAD at the baseline assessment session. The correlation between the SAD and the WNTQ was also examined in order to control for social anxiety when analyzing sensitivity to ostracism. The SAD is a 28 item self report measure which assesses the presence of social anxiety symptoms. Items are rated True and False. The inter-item correlation coefficient of the SAD items is .77.

Trait Measure

Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996). This measure was used to establish divergent validity for the construct of sensitivity to ostracism, and to examine whether it demonstrates convergent validity with the related measure of Rejection Sensitivity. The RSQ is an 18 item self report measure assessing how likely a person thinks that he/she will be rejected in various scenarios. The measure is tailored to and has been validated on a college student population and refers to incidents that would arise in a college setting. The measure includes situations involving

parents, peers, and significant others, and all scenarios are ambiguous in that they do not explicitly lead the participant to assume that either approval or rejection is imminent. Each item is rated on a six-point Likert scale of how concerned the participant would be that he/she would be rejected in each scenario, and also how likely such a rejection would be. Alpha reliabilities are .81 for internal consistency and .83 for test-retest reliability.

Measures of Post-Cessation Smoking Status

Self-reports of smoking status were collected from participants at follow-up. Participant reports of abstinence were verified by expired carbon monoxide and saliva cotinine. Self-report was overridden by objective verification in the conservative direction, in accordance with the smoking literature (e.g. Shumaker & Grunberg, 1986).

Timeline Follow Back. The timeline follow-back (TLFB) procedure was utilized at follow-up to assess cigarette use since the baseline assessment. Participants were given calendars at their initial assessment to record the number of cigarettes they smoked each day of the coming week. The TLFB procedure has been validated for the assessment of adult cigarette use (Brown et al., 1998), and for cigarette, alcohol, and illicit drug use in a sample of adolescent substance abusers (Donohue et al., 2004).

Biochemical Verification. Cotinine analysis and carbon monoxide analysis have been shown to be the best tools to classify smokers and nonsmokers, with sensitivities (correct classification of smokers) ranging from 81-99% and specificities (correct classification of nonsmokers) ranging from 90% to 100% (Dolcini, Adler, Lee, & Baumann, 2003). Patrick et al. (1994) has recommended biochemical verification of smoking status especially for student populations, due to students' greater likelihood to underreport smoking behavior. In the present study, both types of analyses suggested by

Patrick and colleagues were used.

Carbon Monoxide Analysis. Self-reported smoking on Quit Day and follow-up was assessed by carbon monoxide analysis of breath samples (8ppm cutoff) for stated abstinence of 24 hours to 2 weeks (Jarvis, Tunstall-Pedoe, Feyerabend, Vesey, & Saloojee, 1987). Expired air carbon monoxide levels were assessed with a Vitalograph Breathco carbon monoxide monitor (Jarvis et al., 1987). Detected values above the stated cutoff scores were considered indicative of smoking.

Saliva Cotinine Analysis. Self-reported abstinence was further verified by saliva cotinine (cutoff value of 10 ng/ml) (SRNT Subcommittee on Biochemical Verification, 2002). Saliva samples were obtained via cotton swabs placed in the participants' mouths for three minutes which were then stored in plastic tubes and frozen. The swabs were then shipped to Salimetrics Inc. (State College, PA) for cotinine level determination by radioimmune assay.

Social Support Measure

Social Interaction Questionnaire (SIQ; Morgan, Ashenberg & Fisher 1998). This social support scale is composed of 22 items assessing behaviors that a participant reports were done by his/her spouse, family, and friends during the participant's quit attempt. Reliability for this scale was assessed in a pilot study in which both smokers and their spouses filled out the SIQ for the spouse's actions during the past week; agreement between smokers and spouses was 82% (Morgan, Ashenberg & Fisher 1988). In the current study, this measure was modified to assess social support from peer group and best friend. In line with past research, participants excluded their best friend's social support when filling out the questionnaire about their peer group, so that the impact of the

best friend could be analyzed independently from that of the other friends (Alexander, Piazza, Mekos, & Valente, 2001; Urberg, Degirmencioglu, & Pilgrim, 1997; Wang et al., 1997). Participants who did not consider any of their friends to be a “best friend” only completed items for peer group.

Participants were instructed to consider their five closest friends for the “friends” portion of the questionnaire, excluding best friend. As asking participants to rate each behavior for each friend would be unduly arduous, a general feeling of peer support was measured in this way to provide an aggregate estimate of peer support. This number of friends is consistent with previous work on peer smoking status among adolescents (Chassin, Presson & Sherman, 1984; Rose, Chassin, Presson & Sherman, 1996).

The items on the SIQ are divided into two categories of behaviors: helpful behaviors and hindering behaviors. Participants rated both how many times in the past week each support source had engaged in each type of behavior, as well as how helpful or unhelpful participants found these behaviors to be. Ratings of perceived level of helpful/hindering, hereafter referred to as “valence,” were made on a four-point Likert scale ranging from 0 (*not at all helpful/hindering*) to 3 (*very helpful/hindering*).

In the present study, the SIQ’s negative behaviors were divided into pro- and anti-smoking behaviors, in accordance with the factor analysis done by Morgan (G.D. Morgan, personal communication, May 2, 2005) in which he found these to load on different factors. These two types of hindering behaviors will hereafter be called “modeling” and “criticism” respectively. The two items that Morgan found to cluster together to reflect a modeling dimension are “offered you a cigarette” and “smoked in your presence.” The seven remaining “criticism” items correspond with many of the

negative items on other support scales. Examples of such items are “complained that you are irritable” and “doubted your willpower.”

Data Management

SPSS was used to analyze all data. Descriptive statistics and intercorrelations of all measures were examined to establish normality, and to check for convergent and divergent validity across measures. Missing data for individual items on questionnaires were imputed with the mean item score if at least 80% of the items on the measure were completed. On the SIQ, the frequencies of positive, modeling, and critical behaviors were corrected for normality using a square root transformation.

Chapter 4: Results

Descriptive Statistics

At baseline, participants smoked an average of 6.76 cigarettes per day (SD = 5.23), with a range of 1 to 20 cigarettes per day. They first started smoking cigarettes at a mean age of 15.29 years (SD= 2.49), and began to smoke at least once per day at a mean age of 17.22 years (SD = 1.93). Participants reported smoking regularly for a mean period of 3.41 years (SD= 2.81), and attempted to quit smoking a mean of 2.27 times (SD = 1.76) over this period. Their motivation to quit smoking, as reported at their baseline session, was assessed on a 10 point scale Likert scale ranging from 1 (lowest) to 10 (highest). Their level of motivation to quit ranged from 5-10, with a mean of 8.54 (SD = 1.28). The reported annual income of the households in which participants were raised was \$66,800 (SD = \$37,800). Participants' mean scores on the CES-D, STAI-T, and STAI-S were 18.15, (SD = 9.64), 40.92 (SD= 10.74), and 39.05 (SD= 9.74), respectively.

Self-reported use of ten drugs, including alcohol, was calculated into three indices: current frequency of use, lifetime frequency of use, and lifetime number of drugs used. Frequency was calculated as the average frequency of use across all drugs. For *each* of 10 drugs assessed (including alcohol), drug use frequency was rated as follows: 0 = never used, 1 = used one time, 2 = use monthly or less, 3 = use 2-4 times per month, 4= use 2-3 times per week, 5= use ≥ 4 times per week. Mean current frequency of drug use was .74 (SD = .49), mean lifetime frequency was .97 (SD = .64), and mean lifetime number of drugs used was 3.21 (SD = 1.99).

Analytic Approach

Before examining predictors of smoking outcome within this sample, analyses were conducted to examine factors that impact smoking outcome to identify potential covariates for later analyses. Two dependent variables were used to assess smoking outcome: (1) number of days to relapse, and (2) number of cigarettes smoked between Quit Day and the 7 day follow-up. Initially, smoking relapse data was to be analyzed continuously; however, the average day of relapse was Day 2 of the quit attempt, with 82.1% of the sample smoking by Day 3. Therefore, a median split was used to create two groups for the dependent variable of relapse: early relapsers, who relapsed on Day 0 or 1 of their quit attempt (n = 19), and delayed relapsers, who relapsed on or after Day 2 (n = 20). Number of cigarettes smoked during the week between Quit Day and follow-up was examined as a continuous variable.

Preliminary Analyses

Before moving on to the main smoking outcomes, the intercorrelations between other study variables were examined. In general, mood-related variables were related in the expected directions; negative baseline mood (PANAS), depressive symptoms (CES-D), state- and trait-anxiety (STAI), social anxiety (SAD), and rejection sensitivity (RSQ) were all significantly correlated (see Tables 3 and 4).

Primary Analyses

Time to relapse. First, a series of one-way ANOVAs was conducted using general linear modeling to examine mean differences across demographic, smoking-related, and mood variables (see Table 1) and social support variables (see Table 2) in early versus delayed relapsers. Given the small sample size, effect sizes (η_p^2) accompanying findings are reported for all ANOVA analyses (for reference, an effect size of $\eta_p^2 = .059$ is considered a medium effect and $\eta_p^2 = .138$, a large effect; Cohen, 1988). Categorical variables were analyzed using chi-square tests. The demographic variables examined were age, gender, year in school, parents' annual income, and ethnicity. The smoking-related variables examined were baseline number of cigarettes smoked, age first started smoking cigarettes, age began smoking at least once per day, how long participants reported smoking regularly, number of past quit attempts, motivation to quit smoking, nicotine dependence (FTND), and current and lifetime drug use (number of drugs and frequency of use). The mood variables examined were baseline mood (PANAS), depressive symptoms (CES-D), state and trait anxiety (STAI-T and STAI-S), social anxiety (SAD), rejection sensitivity (RSQ), Four Needs Score post-Cyberball task (WNTQ), and mood post-Cyberball task (WNTQ positive and negative mood scales).

The social support variables examined were smoking status of best friend (“smoker,” “non-smoker,” or “trying to quit smoking”), percent of friend group in each of these smoking categories, and frequency and valence of help, modeling, and criticism for both best friend and friend group.

Significant differences were not found between early and delayed relapsers for any demographic, mood, or personality variables (see Table 1). Significant differences were found between early and delayed relapsers on best friend being a smoker ($\chi^2(1) = 11.00, p < .001$) and best friend frequency of modeling ($F(1,36) = 7.43, p = .01, \eta_p^2 = .17$) (see Table 2). As such, these variables were used throughout as covariates when examining relapse group.

Average number of cigarettes smoked at follow-up. Next, correlational analyses were conducted to examine the relationships between the second smoking outcome variable, the number of cigarettes smoked at follow-up, and the same demographic, smoking-related, mood, personality-level, and social support variables used above (see Tables 3 and 4). Results indicate that number of cigarettes smoked at follow-up was significantly associated with number of cigarettes smoked at baseline ($r = .62, p < .001$), best friend being a smoker ($r = .41, p = .01$) and best friend frequency of modeling ($r = .62, p < .001$). The relationship between smoking outcome and having a best friend engaging in a simultaneous quit attempt was not found to be significant. There were also no significant associations found between smoking status of friend group and smoking outcome, assessed by time to relapse or by number of cigarettes smoked at follow-up.

Of note, the relationship between smoking outcome and having a best friend engaging in a simultaneous quit attempt was not found to be significantly related to either

of the smoking outcome variables. There were also no significant associations found between smoking status of friend group and smoking outcome, as assessed by either time to relapse or by number of cigarettes smoked at follow-up.

Post-task WNTQ variables

The WNTQ includes a manipulation check on perceived ostracism, to assess whether participants' estimate of their inclusion level predicted their post-task distress. Participants' report of the percentage of times they thought they received the ball during the Cyberball task was found to approach significance as a predictor of their lowering of Four Needs on the WNTQ, when controlling for pre-task negative mood using the PANAS ($t = -1.828, p = .08$).

No significant correlations were found between WNTQ variables and smoking outcomes. However, there were many associations found between each of the three WNTQ variables (Four Needs Questions, positive mood scale, and negative mood scale) and social support variables.

Four Needs Questions. Score on the Four Needs Questions, meaning that one's levels of the basic four needs were lowered during Cyberball, was significantly associated with best friend help frequency ($r = .34, p = .04$) and friend help frequency ($r = .33, p = .04$) (see Table 4). Four Needs score was also significantly correlated with valence of friend criticism ($r = .44, p = .01$).

WNTQ positive mood scale. Score on the post-Cyberball positive mood scale was significantly inversely associated with the negative WNTQ mood scale ($r = -.529, p < .001$) and with valence of best friend criticism ($r = -.37, p = .03$).

WNTQ negative mood scale. Score on the post-Cyberball negative mood scale was significantly correlated with frequency and valence of criticism for best friend ($r = .37, p = .03$; $r = .33, p = .05$), as well as valence of friend criticism ($r = .43, p = .01$). Additionally, the correlation between WNTQ negative mood and frequency of friend criticism approached significance ($r = .31, p = .07$).

Relationship of Sensitivity to Ostracism to Rejection Sensitivity

RSQ was found to be significantly correlated with WNTQ Four Needs questions ($r = .42, p = .01$) and WNTQ negative mood questions ($r = .36, p = .02$), and significantly inversely correlated with the WNTQ positive mood questions ($r = -.40, p = .01$). Thus, perhaps the WNTQ is assessing a different construct than rejection sensitivity; however, an increase in negative mood WNTQ score is associated with a higher level of this trait. This is theoretically reasonable, as individuals who exhibit increased rejection sensitivity would likely be predisposed to rate all social interactions as more distressing and would interpret all social situations as more likely to result in rejection.

WNTQ as predictor of perceived support

Analyses were conducted to investigate whether post-Cyberball sensitivity to ostracism would predict how participants perceived helpful, critical, and modeling behaviors done by best friends and friends. As both positive and negative baseline mood, as measured by the PANAS, were significantly correlated with post-task positive and negative mood on the WNTQ (see Table 5: positive scale: $r = .39, p = .02$; WNTQ negative mood scale: $r = .51, p < .001$), the relationship between WNTQ mood and perceived support was analyzed using linear regression to control for pre-Cyberball

mood, as well as rejection sensitivity and social anxiety, due to their possible conceptual overlap with sensitivity to ostracism. Squared semi-partial correlations (sr^2) were again used as indices of effect size (Cohen, 1988).

The relationships between WNTQ negative mood and frequency and valence of criticism for best friend were no longer significant when baseline mood was controlled. However, WNTQ negative mood was found to significantly predict perceived valence of criticism for friends even with number of cigarettes smoked per day at baseline, baseline positive and negative mood (PANAS), rejection sensitivity (RSQ score), and social anxiety (SAD score, which was significantly correlated with WNTQ negative mood) added into the models ($F = 3.21, p = .02, \beta = .26, sr^2 = .03$). Also, controlling for number of cigarettes smoked per day at baseline, baseline positive and negative mood (PANAS), rejection sensitivity (RSQ score), and social anxiety (SAD score), positive mood on the WNTQ was shown to inversely predict perceived valence of best friend criticism ($F = 4.00, p = .01, \beta = -.36, sr^2 = .08$). Finally, controlling for the same variables, WNTQ Four Needs Questions were found to significantly predict friend frequency of help ($F = 2.91, p = .02, \beta = .25, sr^2 = .05$).

Predictors of smoking outcome

To identify the unique predictors of smoking outcome, two hierarchical regression analyses were conducted. A logistic regression analysis was used to examine the effects of smoking-related and social support variables on median split on day of relapse, and a hierarchical regression analysis was used to examine the effects of smoking-related and social support variables on number of cigarettes smoked at follow-up.

Time to relapse. In the first step of the model, smoking status of best friend was entered as an independent variable, as it had previously demonstrated a significant association with relapse using ANOVA analyses. Number of cigarettes smoked at baseline was also entered into the first step; although this variable did not demonstrate a significant association with time to relapse using ANOVA analyses, it demonstrated a medium effect size ($\eta_p^2 = .06$). Further, baseline smoking level is theoretically important in predicting relapse. In the second step of the model, best friend frequency of modeling was entered as an independent variable, as it had been shown to correlate significantly with relapse. The first step of the model (best friend smoking status and number of cigarettes smoked at baseline) was found to be significant due to best friend smoking status ($\chi^2 = 12.03, p < .01$) (see Table 6). Frequency of best friend modeling was not found to significantly improve the model. Therefore, contrary to predictions, only best friend smoking status proved to be a unique predictor of early relapse (see Table 6).

Number of cigarettes smoked at follow-up. In the first step of the model, number of cigarettes smoked at baseline and best friend smoking status were entered, as they had both been previously found to be significantly associated with number of cigarettes smoked at follow-up. In the second step, best friend frequency of modeling was entered, as it had also been found to be significantly correlated with number of cigarettes smoked at follow-up. Squared semi-partial correlations (sr^2) were used as indices of effect size, to show the proportion of the variance in time to relapse accounted for by adding each independent variable to those entered earlier in the regression analysis (Cohen, 1988).

The first step of the model, best friend smoking status and number of cigarettes smoked at baseline, was significant ($F = 14.40, p < .01$), accounting for 45% of the

variance in smoking outcome (see Table 7). Best friend frequency of modeling, entered in the second step, significantly improved the model ($F = 13.70, p < .01$), accounting for an additional 10% of the variance in average cigarettes smoked at follow-up (see Table 7).

Chapter 4: Discussion

The present study adds to the literature on the relationship of social support factors with smoking cessation outcome by examining the impact of various behaviors from one's best friend and peer group on a self-quit attempt. The only type of social behavior found to have some influence on smoking outcome was smoking prompts and modeling behaviors (pro-smoking behaviors), a category not generally included in the literature on social support and smoking cessation. Results also provide preliminary evidence for a relationship between personality-level variables and their impact on the way peer social support behaviors are interpreted by a quitter, despite the absence of a relationship with actual quitting behavior. Specifically, sensitivity to ostracism, as operationalized by post-Cyberball mood, was found to predict how helpful and hindering supportive and critical behaviors were perceived to be. The current findings and their applicability to current theories of smoking cessation are outlined below.

In the present study, smoking status of best friend was found to be significantly associated with relapse, while smoking status of friend group was not predictive. This lends support to the findings of Alexander, Piazza, Mekos, & Valente (2001), who posit that best friend smoking status is a significant predictor of participant smoking status. The current study extends these findings by showing that best friend smoking status is associated with relapse during a quit attempt as well. Additionally, the influence of best

friends remained salient even with older students (Alexander and colleagues were studying 7th-12th grade students). Wang et al (1997) also found that smoking status of best friends were the most consistent predictors of smoking in adolescents, but, again, this study did not examine students attempting to quit. Results indicated that having a best friend engaging in a simultaneous quit attempt was surprisingly not shown to be correlated with smoking outcome. This supports findings that buddy-system quit programs have not been found to be effective (e.g., May & West, 2000).

Results indicated that a best friend engaging in modeling behaviors accounts for variance in number of cigarettes smoked above and beyond that of best friend smoking status alone. This supports the first hypothesis of the current study, that social support behaviors would impact smoking outcome. This finding supports the theory that it is actually modeling behavior in vivo that lowers rates of cessation success, rather than the quitter merely wanting to identify with his smoking friends. Previous studies have found an increased risk of smoking among college students with smoking peers (e.g. Ridner, 2005); however, it has been unclear whether the frequency of direct exposure to peer smoking behaviors accounted for this increased risk of smoking, or whether the risk was attributable to the desire to share the identity of “being a smoker” with one’s peer group. The null or mixed results found by many previous studies attempting to link social support and smoking outcome may be attributable to the fact that only helpful, supportive behaviors and negative, critical behaviors were examined, while modeling behaviors may be the most important factor in determining smoking outcome. Additionally, the current findings lend support to the conclusions of the one study which examined modeling behaviors (Morgan, Ashenberg, & Fisher, 1988), showing that friend modeling behaviors

at eight week follow-up (although not at the start of the quit attempt) predicted relapse in a population of adult smokers enrolled in an eight week smoking cessation group treatment program. However, in this study, best friend and friend group were not differentiated.

The secondary hypothesis of the present study was that post-Cyberball sensitivity to ostracism would moderate the effect of social support behaviors on relapse. This hypothesis was not supported; sensitivity to ostracism was not related to smoking outcomes and did not moderate the relationship between social support and smoking outcomes. However, a relationship between sensitivity to ostracism and responsiveness to social support was found. The correlations between post-Cyberball WNTQ scales and perception of real-world helpful and critical behaviors demonstrate that Cyberball can be used not only to operationalize responsiveness to ostracism, but to operationalize responsiveness to a variety of real-world positive and negative social interactions. Help and criticism were shown to be related to WNTQ Four Needs and negative mood in a variety of ways. Best friend and friend frequency of help and valence of criticism were shown to be significantly associated with Four Needs WNTQ score. Additionally, both frequency and valence of best friend criticism and valence of friend group criticism were found to be significantly associated with WNTQ negative mood score. Further, valence of best friend criticism was negatively associated with WNTQ positive mood score. However, WNTQ variables were not associated with either frequency or valence of modeling behaviors.

These findings suggest that those who are more sensitive to ostracism perceive nagging and critical behavior as more hurtful than smoking prompts and models, and also

perceive helpful behaviors as more helpful; however, it is important to point out that these findings are relevant only when considering emotional distress; valence was not found to impact ability to stay abstinent. In contrast, those who are less sensitive to ostracism, indicated by positive mood post-cyberostracism, are less responsive to social pressure of any kind, either positive or negative, as positive WNTQ mood had no correlation with either help or criticism from either source and was inversely associated with valence of critical behavior (i.e., these participants did not view criticism as very as hindering).

When examining the convergent validity between sensitivity to ostracism and rejection sensitivity, only modest overlap was evidenced. WNTQ Four Needs score and RSQ score were found to only share 17% of their variance, and RSQ score and positive and negative mood WNTQ scales shared even less. Further, the regression model used to explore the relationship between post-Cyberball mood and perceived help and criticism during a quit attempt (WNTQ predicts perception of criticism and help, controlling for RSQ score) also showed that WNTQ scores are not merely proxy variables for rejection sensitivity. These findings provide evidence for the third hypothesis of the study, which was that sensitivity to ostracism, as operationalized by post-Cyberball mood, is a unique construct, which measures an individual trait-level variable of responsiveness to stressful social interactions.

Contrary to hypotheses, no significant effect was found for gender in predicting either early relapse or number of cigarettes smoked at baseline, and gender did not moderate the relationship between social support and smoking outcomes. This provides preliminary evidence that, in a college sample as opposed to an adult sample, gender may

not be a moderator of smoking outcome. It is of note that gender never shared above 5% of the variance with key variables, which suggests that the lack of findings was likely not due to the sample size in the current study.

Of note, 14.6% of the sample reported at the follow-up session that they knew while playing Cyberball that the virtual players in the game were not real people. These participants stated either that they had learned about the task in a psychology course or that they had guessed that the game was not real. After one participant volunteered that he had known about the game, experimenters began to assess for knowledge of Cyberball at the last follow-up session, in the course of debriefing the participants. The experimenters obtained this information from 33 of the 39 participants who completed the study.

However, according to the results of the current study as well as data from the group that created Cyberball, knowledge of the scripted quality of Cyberball does not impact WNTQ score. In the present study, these variables were related in a counterintuitive direction; there was a significant positive correlation between knowing that Cyberball was scripted and score on the WNTQ Four Needs questions. This means that participants' four needs were in fact lowered more if they knew that other Cyberball "participants" were computer generated. There were no significant correlations between the WNTQ mood questions and knowing that Cyberball was not real. Additionally, Zadro and colleagues (2004) report that in one study run in their lab, they "...manipulated whether the participants were told the computer or humans were scripted (or told) what to do in the game. Once again, even after removing all remnants of sinister attributions, ostracism was similarly aversive. These results can be interpreted as strong evidence for a

very primitive and automatic adaptive sensitivity to even the slightest hint of social exclusion.” Thus, there is no evidence that knowing that Cyberball was scripted protected participants from feeling ostracized. Additionally, when analyses were run eliminating participants who knew that Cyberball was not being played against real people, correlational findings between WNTQ and either smoking outcome or perceptions of social support were not changed significantly.

Cyberball was initially created as an analogue for ostracism, not for all hurtful behaviors which may be encountered during a quit attempt, as it was utilized in the current study. However, Leary et al. (1998) categorizes “active dissociation” (which includes ostracism) as one of the main four types of interpersonally hurtful behavior. All interpersonally hurtful behavior is intended to cause “relational devaluation”: giving the impression that you do not value your relationship with someone as much as they value it (Leary et al., 1998). Many other forms of relational devaluation lower Williams’ four needs, and increase negative affect, just as ostracism does (Leary et al., 1998). Additionally, other types of rejection have also been found to induce the conforming, conciliatory response that Williams hypothesizes is done post-ostracism to raise one’s lowered levels of the four needs (Kelly, 2001). Therefore, ostracism can be shown to be highly related to and functionally equivalent to many other forms of relational devaluation, making Cyberball a viable analogue for the interpersonally negative behaviors that one may experience during a quit attempt. Further, Williams, Cheung, and Choi (2000) note that ostracism may work to lower these needs quicker than other forms of relational devaluation, making cyberostracism appropriate for a brief laboratory analogue task. Additionally, a scenario where a confederate or virtual peer insulted or

teased a participant to simulate active dissociation seemed implausible and/or ethically unsound.

Chapter 5: Limitations

Sample Size

In the current study, the small sample size may not have provided enough power to detect differences in how sensitivity to ostracism impacts smoking outcome. In the future, obtaining a larger sample would ensure that there would be sufficient power to examine this relationship as well as other variables of interest. Also, stricter exclusion criteria could be employed, ensuring that the focus of the study would be on smokers with a higher motivation to quit than in our current sample, who might persist beyond the first few days of their quit attempts. Having a larger sample would also grant sufficient power to investigate whether sensitivity to ostracism moderates the impact of helpful and critical behaviors on smoking outcome.

Relapse as Dependent Variable

The extremely short times until relapse displayed by the majority of participants severely limited our ability to examine the changing role of social support over the course of a cessation attempt. It appears that number of cigarettes smoked may be a more useful measure of smoking outcome in a college population than time to relapse. Anecdotally, many participants mentioned that “cutting down” rather than truly quitting was their goal, as this would allow them to continue smoking socially on the weekends. The high prevalence of social smoking in college students has been noted in the literature (e.g., Obermayer, Riley, Asif, & Jean-Mary, 2004). Participants’ desire to continue social

smoking while reducing their overall amount of cigarettes smoked may help account for the fact that the dependent variable of number of cigarettes was found to be associated with more of our variables of interest.

Significant Others

Although supportive behaviors of significant others had originally been measured, data about this source were eliminated from analyses due to insufficient power; only 17 participants (41.5% of the sample) reported having a significant other. However, research points to the fact that significant others' support may be important to a smoker attempting to quit. Further studies with a larger sample should address this question by gathering data for supportive behaviors done by significant others.

Self-reported Social Support

In line with most other research in this area, self-report measures of support were used, rather than asking for corroborating reports from all support sources about how much they supported the quitter, as some later research has done (Neff & Karney 2005; Pollak et al., 2001; Thomas et al., 2004). This would have decreased the response bias inherent in obtaining all data from a single source. Also, this would have elucidated whether high sensitivity to ostracism accounted for individuals' higher perceived valences of support and criticism, rather than these individuals eliciting more actual help and/or criticism from their friends, or a combination of the two. However, the practical limitations inherent in obtaining support forms from all of the sources for each participant made self-report the most feasible choice for this project.

External Validity

Because participants checked in with the project for a follow-up and may therefore have felt that the experimenter supported their quit attempt, this was not a true self-quit and therefore may not be completely applicable to the experience of self-quitters in the natural environment. However, the high self-reported relapse rates make it likely that participants were not concerned about social approval from the experimenter. Even more apparent is the fact that these data may not be applicable to those receiving treatment. Therefore, caution must be exercised in generalizing these findings to either of these types of scenarios.

Chapter 6: Conclusions and Further Directions

These results provide evidence that the key social factors in determining smoking outcome in a college sample of self-quitters are best friend smoking status and best friend smoking prompts and models. These results help to explain the mixed or null results found in social support studies attempting to link supportive and critical behaviors with smoking outcome; it appears that the virtually unexamined category of smoking prompting and modeling behaviors may account for most of the relationship between social variables and cessation success.

Assessing sensitivity to ostracism may allow health care providers to create smoking cessation programs that are idiographically targeted to smokers of different personality types. Despite the fact that we did not obtain significant results for a relationship between sensitivity to ostracism and cessation success, those with high sensitivity to ostracism were found to be more responsive to both help and criticism from

their support sources. Therefore, if future work establishes a link between sensitivity to ostracism and smoking outcomes, assessing for baseline levels of sensitivity to ostracism may be useful for designing and individualizing interventions. For example, it may be the case that, when targeting smokers who are sensitive to ostracism, a program that enlists friends and trains them to be more openly supportive and to limit their critical remarks may be most helpful. However, for those who are not sensitive to ostracism, the most effective program may be one which focuses on finding non-smoking friends and structuring one's schedule to limit contact with smoking prompts and models, particularly by best friends. In future research, it would be useful to conduct a treatment outcome study including both types of interventions and assessing baseline sensitivity to ostracism. It may be that the relationship between sensitivity to ostracism and smoking outcome was not evident in the context of a self-quit with extremely high relapse rates, but this relationship would emerge when social support variables were externally manipulated. Additionally, it may be the case that individuals with high sensitivity to ostracism would be more receptive to cessation interventions overall than would individuals with low sensitivity to ostracism, as they would likely be more responsive to the help given by a treatment provider. They may also be more responsive to group interventions due to the higher aggregate level of help and support received from a group than from a single treatment provider. Such research would help shed light on whether different treatment modalities or foci differentially impact the relationship between personality and smoking outcome.

Additionally, in future work, it may be useful to examine the results of programming Cyberball to use the over-inclusion setting (in which the participant gets

the ball the majority of the time) to investigate whether those whose mood is particularly increased by this show of support would also be more responsive to help and/or hindering during a quit attempt. This would extend the findings of the current study, and provide evidence that sensitivity to social stimuli in general, not merely sensitivity to ostracism, is correlated with perceived support in the social environment during a self-quit, and possibly with smoking cessation outcome as well.

Further, as length of time until relapse proved to be an unsuccessful dependent variable to measure smoking outcome in this population, financial incentives could be provided for abstinence in future studies, thereby increasing the duration of cessation attempts. This technique was used by Correia and Benson (2006) in a population of college smokers and was found to reduce smoking for the weeklong duration of the intervention and would provide a greater range in smoking outcomes to examine the influence of the variables of interest here. It may also be useful to inquire about participants' actual goals for smoking outcome (cessation versus reduction) before the quit attempt begins. More college smokers than adults are social smokers, and college smoking-cessation interventions should take this into account (Obermayer et al., 2004). This desire to continue smoking socially may help account for the fact that many college smoking interventions report more participants who reduced their smoking than participants who completely quit (e.g. Obermayer et al., 2004). If it is evident that the majority of college "quitters" still intend to continue smoking socially, this would impact the choice of outcome variable used, as well as necessitating modification of the content and stated goals of smoking-cessation interventions.

Lastly, although the current study provides evidence that modeling influences

smoking behaviors, it remains unclear why modeling behaviors have such a potent effect on relapse. One possibility is that quitters want to avoid rupturing extant social norms; if the relationship between two smoking best friends is structured around smoke-breaks and smoking-related activities, then the quitter must implement new norms once smoking is no longer an option. Furthermore, the desire to avoid the social distress related to severing existing norms would likely be stronger in quitters with high sensitivity to ostracism. However, this hypothesis is unlikely to fully explain the effect of observing modeling behaviors, as research has found adolescent smoking to increase in the presence of a smoking confederate, even though the participant had never previously met the confederate and therefore could not have pre-established norms for their relationship (Kniskern, 1983). Another possibility is that the quitter still maintains positive associations with smoking, which are activated by the presence of a smoking best friend. This would be in line with the Planned Behavior-Reasoned Action Theory (Montano & Kasprzyk, 2002), which states that individuals' intentions to smoke increase when they believe that smoking is beneficial or positive. In future research, it would be useful to test these theories with self-report measures of perceived benefits associated with smoking and of individuals' need to belong (e.g., The Need to Belong Scale; Leary, Kelly, Cottrell, & Schreindorfer, 2004).

Tables

Table 1

Group Differences between Early and Delayed Relapsers on Demographics, Smoking, and Mood Variables

Variable	Group		Statistic	η_p^2
	Early Relapsers	Delayed Relapsers		
Age	19.74 (1.24)	20.25 (2.86)	$F(1,37) = .52, p = .48$	.01
Gender (female)	52.6%	50%	$\chi^2(1) = .03, p = .87$	
Year in school	2.16 (1.07)	2.65 (1.79)	$F(1,37) = 1.08, p = .31$	.03
Annual income (parents' household)	73,888.89 (32879.26)	71,470.59 (32,004.14)	$F(1,34) = .05, p = .83$	.00
Ethnicity (Caucasian)	75%	58%	$\chi^2(1) = 1.28, p = .26$	
Baseline number cigs smoked/day	7.58 (5.61)	5.28 (3.95)	$F(1,37) = 2.22, p = .15$	.06
Age started smoking	15.37 (2.41)	15.05 (2.61)	$F(1,37) = .16, p = .70$	.00
Age started smoking ≥ 1 cig/day	17.26 (1.76)	17.10 (2.17)	$F(1,37) = .07, p = .80$	.00
Months smoked regularly	33.37 (28.81)	16.37 (24.71)	$F(1,37) = 1.74, p = .20$	.05
Number of past quit attempts	2.21 (2.04)	2.20 (1.31)	$F(1,37) = .00, p = .99$	.00
Motivation to quit	8.82 (1.41)	8.38 (1.12)	$F(1,37) = 1.18, p = .29$	.03
Nicotine dependence (FTND)	19.79 (2.02)	20.00 (1.91)	$F(1,37) = 0.11, p = .74$	.00
Lifetime number of drugs used	3.00 (1.91)	3.60 (2.04)	$F(1,37) = 0.90, p = .35$	.00
Average lifetime freq of drugs	.84 (.57)	1.12 (.68)	$F(1,37) = 1.90, p = .18$	.05
Average current freq of drugs	.71 (.43)	.81 (.54)	$F(1,37) = 0.45, p = .51$	.01
Positive baseline mood(PANAS)	2.85 (.76)	2.65 (.78)	$F(1,37) = 0.26, p = .62$	.01
Negative baseline mood	1.81 (.62)	1.63 (.52)	$F(1,37) = 0.75, p = .39$	.02
Depressive symptoms (CES-D)	19.53 (9.98)	16.70 (9.85)	$F(1,37) = 0.79, p = .38$	.02
State Anxiety (STAI-S)	37.99 (10.45)	40.05 (9.17)	$F(1,37) = 0.43, p = .52$	.01
Trait Anxiety (STAI-T)	40.73 (11.66)	40.34 (10.36)	$F(1,37) = 0.01, p = .91$	.00
Social Anxiety (SAD)	6.88 (6.67)	4.45 (4.74)	$F(1,37) = 1.73, p = .20$	.05
Rejection Sensitivity (RSQ)	10.02 (3.09)	9.80 (3.41)	$F(1,37) = .05, p = .83$	.00
Four Needs Score (WNTQ)	2.97 (.90)	3.27 (.95)	$F(1,37) = 1.02, p = .32$	.03
Post-task Positive Mood (WNTQ)	4.91 (1.18)	5.14 (1.09)	$F(1,37) = 0.37, p = .55$	.01
Post-task Negative Mood (WNTQ)	2.10 (1.70)	1.49 (.72)	$F(1,37) = 1.15, p = .29$	.03

* $p < .05$; ** $p \leq .01$.

Table 2.
Group Differences between Early and Delayed Relapsers on Social Support Variables

Variable	Group		Statistic	η_p^2
	Early Relapsers	Delayed Relapsers		
Best Friend Smoking Status (smoker)	90%	61%	$\chi^2(1) = 11.00, p < .001^{**}$	
Friend Group Smoking Status (% smoke)	.28 (.71)	.55 (.30)	$F(1,37) = .65, p = .43$	.02
Best Friend Help Frequency	3.03 (1.76)	2.96 (1.66)	$F(1,36) = .01, p = .91$	.00
Best Friend Help Valence	.94 (.74)	1.08 (.92)	$F(1,36) = .27, p = .61$	.01
Best Friend Modeling Frequency	1.90 (2.06)	.45 (1.12)	$F(1,36) = 7.43, p = .01^*$	.17
Best Friend Modeling Valence	.97 (1.09)	.43 (.85)	$F(1,36) = 3.02, p = .09$	.08
Best Friend Criticism Frequency	1.39 (1.56)	.75 (1.39)	$F(1,36) = 1.78, p = .19$	.05
Best Friend Criticism Valence	.40 (.54)	.38 (.73)	$F(1,36) = .02, p = .90$	.00
Friend Group Help Frequency	3.77 (2.22)	3.03 (1.34)	$F(1,37) = 1.62, p = .21$	.04
Friend Group Help Valence	1.10 (.81)	.90 (.62)	$F(1,37) = .73, p = .40$	.02
Friend Group Modeling Frequency	1.08 (1.10)	1.15 (1.25)	$F(1,37) = .04, p = .85$	.00
Friend Group Modeling Valence	1.51 (1.50)	2.15 (2.11)	$F(1,37) = 1.17, p = .29$	.03
Friend Group Criticism Frequency	1.42 (1.41)	1.30 (1.32)	$F(1,37) = .07, p = .79$	.00
Friend Group Criticism Valence	.42 (.59)	.39 (.58)	$F(1,37) = .02, p = .88$	.00

* $p < .05$; ** $p \leq .01$.

Table 3*Intercorrelations between demographics, mood, and personality variables.*

<i>Variable</i>	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Number of cigs at follow-up	-.15	.22	-.15	.13	-.04	.62* *	-.02	-.22	.12	-.06	-.12	-.07	.05	.13	.01	-.10	-.16	-.08	-.12	-.14	.02	-.10
2. Age	---	-.19	.87* *	-.43	.14	.04	-.12	.10	.30	.33*	-.02	.01	.00	-.15	.02	.06	-.01	-.12	.04	-.06	-.06	-.15
3. Gender		---	-.18	.08	.15	.21	.01	-.11	.05	.22	-.01	.23	.12	.10	-.03	-.07	-.06	-.22	-.10	-.23	-.07	-.21
4. Year in school			---	-.41* *	.21	.10	-.10	.19	.28	.29	-.28	.03	.08	-.12	.08	.15	-.02	-.08	.08	-.08	-.05	-.25
5. Annual parental income				---	-.11	.05	.15	.03	-.06	-.37* *	-.05	.05	-.06	.10	.00	.09	-.14	-.13	-.23	.01	.26	-.02
6. Ethnicity: Caucasian					---	.20	-.08	-.08	.09	.08	-.20	-.03	.47* *	.47* *	.44* *	.12	-.13	-.41* *	-.20	-.39* *	-.47* *	-.37* *
7. Baseline cigs smoked/ day						---	-.04	-.06	.25	.04	-.22	.41* *	.04	.18	.02	-.09	-.05	-.09	-.06	.01	-.03	.01
8. Age started smoking							---	.63* *	-.32* *	-.03	.16	.19	-.34* *	-.19	-.23	.18	.08	.23	.11	.09	.05	.15
9. Age started smoking \geq 1 cig/day								---	-.38	-.03	.11	.22	-.36* *	-.22	-.30	.13	.11	.10	.13	.09	.15	.12
10. Months smoked regularly									---	.06	-.03	-.08	.03	-.07	.08	.00	.18	-.19	.03	-.11	-.13	-.04
11. # of past quit attempts										---	.08	.01	.32* *	.21	.28	.08	.08	.09	.07	.06	-.05	-.14

12. Motiv to quit	---	-.19	-.23	-.14	-.20	.34*	.15	.05	-.05	.02	-.04	.13
13. Nicotine depend. (FTND)		---	-.08	.04	-.06	-.04	.22	.21	.31	.30	.41*	.22
14. Lifetime # drugs used			---	.86*	.92*	-.25	-.03	.05	.17	.12	-.06	-.16
15. Current freq drugs used				---	.90*	-.24	-.12	-.12	.03	.08	-.12	-.16
16. Lifetime freq drugs used					---	-.23	-.11	.00	.09	.14	-.05	-.17
17. Positive baseline mood (PANAS)						---	-.05	-.06	-.42*	-.33*	-.13	-.29
18. Negative baseline mood (PANAS)							---	.56*	.64*	.39*	.37*	.30
19. Dep. symptoms (CES-D)								---	.67*	.76*	.55*	.48*
20. State Anxiety (STAI-S)									---	.63*	.38*	.45*
21. Trait Anxiety (STAI-T)										---	.59*	.65*
22. Social Anxiety (SAD)											---	.33*
23. Rejection Sensitivity (RSQ)												---

* $p < .05$. ** $p < .01$.

Table 4*Intercorrelations between smoking outcome, support source smoking status, and social support variables.*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Number of cigs at follow- up	---	.41*	.10	-.19	-.20	.62**	.26	-.03	-.05	-.04	-.10	.11	.15	.18	.01	-.18	-.09	.13
2. Best Friend Smoking Status (smoker)		---	-.14	-.18	-.31*	.55**	.32	-.04	-.16	.19	.26	-.05	-.12	-.02	-.03	-.03	-.18	.12
3. Friend Group Smoking Status (% smoke)			---	.09	-.02	-.05	.17	-.13	.003	.02	-.10	.18	.26	.08	-.03	.05	.13	-.14
4. Best Friend Help Frequency				---	.58**	-.10	-.04	.12	.17	.59**	.31	.04	.03	.24	.21	.34*	.06	-.19
5. Best Friend Help Valence					---	-.16	.03	.02	.27	.29	.58**	-.23	-.18	-.04	.19	.05	.09	-.15
6. Best Friend Modeling Frequency						---	.66**	.14	-.07	.26	.23	.05	.04	.30	.22	-.04	-.07	.04
7. Best Friend Modeling Valence							---	.10	.35*	.24	.34*	.07	.05	.34*	.47**	.12	-.26	.08
8. Best Friend Criticism Frequency								---	.52**	.38*	.33*	.17	.10	.42**	.41*	-.02	-.04	.37*
9. Best Friend Criticism Valence									---	.25	.33*	.001	.13	.41*	.70**	.20	-.37*	.33*
10. Friend Group Help Frequency										---	.71**	.07	.05	.35*	.37*	.33*	-.04	.15
11. Friend Group Help Valence											---	-.11	-.10	.18	.40*	.21	-.14	.26

12. Friend Group Modeling Frequency	---	.79**	.48**	.14	.13	.08	-.02
13. Friend Group Modeling Valence		---	.61**	.36*	.28	-.09	.11
14. Friend Group Criticism Frequency			---	.78**	.27	-.13	.31
15. Friend Group Criticism Valence				---	.44**	-.32	.43**
16. Four Needs Score (WNTQ)					---	-.32	.25
17. Positive Post-Task Mood (WNTQ)						---	-.53**
18. Negative Post-Task Mood (WNTQ)							---

* $p < .05$. ** $p < .01$.

Table 5*Correlations between mood and personality variables and post-Cyberball and social support variables*

<i>Variable</i>	Positive baseline mood (PANAS)	Negative baseline mood (PANAS)	Depressive symptoms (CES-D)	State Anxiety (STAI-S)	Trait Anxiety (STAI-T)	Social Anxiety (SAD)	Rejection Sensitivity (RSQ)
Best Friend Smoking Status (smoker)	.09	.07	.12	-.02	-.01	.28	.08
Friend Group Smoking Status (% smoke)	.21	.03	-.22	-.22	-.19	.11	-.31
Best Friend Help Frequency	.23	-.08	-.03	-.02	-.01	-.07	.23
Best Friend Help Valence	.09	-.25	.07	-.19	-.03	-.38	.04
Best Friend Modeling Frequency	-.01	.18	-.18	-.14	-.22	.12	-.09
Best Friend Modeling Valence	-.11	.22	.10	-.13	-.09	.12	.11
Best Friend Criticism Frequency	.29	.36*	.31	.27	.28	.20	.22
Best Friend Criticism Valence	.07	.36*	.36*	.26	.36*	.19	.41*
Friend Group Help Frequency	.24	.21	.22	.11	.14	.14	.37*
Friend Group Help Valence	.09	.04	.36	.04	.11	-.03	.27
Friend Group Modeling Frequency	-.03	.18	-.08	-.05	-.04	-.06	.12
Friend Group Modeling Valence	-.09	.16	.04	.14	.13	-.02	.31
Friend Group Criticism Frequency	.02	.41**	.32*	.24	.26	.23	.36*
Friend Group Criticism Valence	.04	.35*	.42**	.26	.32*	.30	.50**
Four Needs Score (WNTQ)	-.15	.07	-.06	.18	.03	-.00	.42**
Positive Post-Task Mood (WNTQ)	.39 **	-.31	-.39*	-.54**	-.37*	-.09	-.40**
Negative Post-Task Mood (WNTQ)	-.27	.51**	.48**	.42*	.36	.34*	.36*

* $p < .05$. ** $p < .01$

Table 6

Summary of the logistic regression analysis examining the incremental validity of frequency of best friend modeling in the prediction of time to relapse.

	<i>df</i>	χ^2	B	SE	Wald	OR	95% CI
Step 1	2	12.03**					
Best friend smoking status			2.54	.90	7.90	12.70**	2.16-74.67
Number of cigarettes smoked at baseline			.05	.06	.26	1.05	.88-1.26
Overall Model	3	13.04**					
Best friend smoking status			2.14	.97	4.88	8.47*	1.27-56.38
Number of cigarettes smoked at baseline			.03	.10	.07	1.03	.84-1.25
Best friend frequency of modeling			.30	.30	.97	1.35	.74-2.45

* indicates $p < .05$; ** indicates $p < .01$.

Table 7

Summary of the linear regression analysis examining the incremental validity of frequency of best friend modeling in the prediction of number of cigarettes smoked at follow-up.

	<i>df</i>	<i>F</i>	$R^2\Delta$	<i>B</i>	<i>SE</i>	sr^2
Step 1	2	14.40**	.45			
Number of cigarettes smoked at baseline				.42	.10	.29
Best friend smoking status				1.81	1.00	.05
Overall Model	3	13.70**	.10			
Number of cigarettes smoked at baseline				.33	.10	.15
Best friend smoking status				.42	1.06	.00
Best friend frequency of modeling				.82	.31	.10

* indicates $p < .05$; ** indicates $p < .01$.

Appendix

Table

Schedule of Assessments

Measures

1. Demographics questionnaire
2. Drug use questionnaire
3. FTND
4. Quit attempt history
5. Williams' Four Needs Questionnaire (WNTQ)
6. STAI
7. CES-D
8. SAD
9. RSQ
10. SIQ

Schedule of assessments.

Assessment	Phone Screen	Pre-Assessment	Follow-up (7 Days)
Length of session	15 mins	1 hour	15 mins
Diagnostic and Screening			
Phone Screen	X	X	
Motivation to quit	X	X	
# of cigs smoked per day	X	X	
Demographic and Smoking Variables			
Demographics			
Smkg and Quit History		X	
FTND		X	
Drug Use		X	
Cyberostracism Measures			
Cyberball Computer Task		X	
WNTQ		X	
Mood Measures			
PANAS		X	X
STAI-S		X	X
CES-D		X	X
STAI-T		X	
SAD		X	
Trait Measure			
RSQ		X	
Post-cessation smoking outcomes			
Timeline follow-back			X
Carbon monoxide			X
Saliva cotinine			X
Social Support			
SIQ			X
Payment		\$15	\$10

Demographic Data

Age: ____

Sex: Female ____ (0) Male (1)

Marital/Relationship Status:

____ (1) Single (never married, living alone, divorced, widowed, etc.)

____ (2) Living with a partner as if married

____ (3) Married but separated

____ (4) Married

Ethnicity/Race (please check one)

____ (1) White/Caucasian

____ (2) Black/African American

____ (3) Asian/Southeast Asian

____ (4) Hispanic/Latino

____ (5) Native American/American
Indian

____ (6) Other:

Education (the highest grade or degree you have completed)

____ (1) None

____ (2) 1st-8th grade

____ (3) Some High School

____ (4) High School Graduate

____ (5) GED

____ (6) Some College

____ (7) Technical or Business
School

____ (8) College Graduate

____ (9) Some Graduate School

____ (10) Graduate or Professional
Degree

Total Family/Household Income (please check one)

____ (1) None

____ (2) 1st-8th grade

____ (3) Some High School

____ (4) High School Graduate

____ (5) GED

____ (6) Some College

____ (7) Technical or Business
School

____ (8) College Graduate

____ (9) Some Graduate School

____ (10) Graduate or Professional
Degree

Employment Status:

____ (1) Unemployed

____ (2) Employed Part Time (working 1-30 hours a week)

____ (3) Employed Full Time (working more than 30 hours a week)

____ (4) Full Time Student

____ (5) Homemaker

____ (6) Part Time Student

____ (7) Retired

Occupation: _____

Drug Use Questionnaire

1. Have you ever used cannabis? (for example, hash, marijuana, THC, or other)?

- (0) No
- (1) Yes

IF YES:

1a. About how often did you use cannabis *in the past year*?

- (0) Never
- (1) One time
- (2) Monthly or less
- (3) 2 to 4 times a month
- (4) 2 to 3 times a week
- (5) 4 or more times a week

1b. *During the period in your life when you were using cannabis most frequently*, about how often were you using?

- (0) Never
- (1) One time
- (2) Monthly or less
- (3) 2 to 4 times a month
- (4) 2 to 3 times a week
- (5) 4 or more times a week

2. Have you ever used alcohol?

- (0) No
- (1) Yes

IF YES:

1a. About how often did you use alcohol *in the past year*?

- (0) Never
- (1) One time
- (2) Monthly or less
- (3) 2 to 4 times a month
- (4) 2 to 3 times a week
- (5) 4 or more times a week

1b. *During the period in your life when you were using alcohol most frequently*, about how often were you using?

- (0) Never
- (1) One time
- (2) Monthly or less
- (3) 2 to 4 times a month
- (4) 2 to 3 times a week
- (5) 4 or more times a week

3. Have you ever used cocaine?

(0) No

(1) Yes

IF YES:

3a. About how often did you use cocaine in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

3b. *During the period in your life when you were using cocaine most frequently, about how often were you using?*

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

4. Have you ever used MDMA (also known as Ecstasy, E, and X)?

(0) No

(1) Yes

IF YES:

4a. About how often did you use MDMA in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

4b. *During the period in your life when you were using MDMA most frequently, about how often were you using?*

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

5. Have you ever used stimulants that were not prescribed for you by a doctor (for example, amphetamine, "speed," crystal meth, dexadrine, Ritalin, "ice")?

(0) No

(1) Yes

IF YES:

5a. About how often did you use stimulants in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

5b. *During the period in your life when you were using stimulants most frequently*, about how often were you using?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

6. Have you ever used sedatives, hypnotics, or anxiolytics that were not prescribed for you by a doctor (for example, Xanax, Quaaludes, Valium, Librium, barbiturates, Miltown, Ativan, Dalmane, Halcion, Restoril, Seconal, or other)?

(0) No

(1) Yes

IF YES:

6a. About how often did you use sedatives in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

6b. *During the period in your life when you were using sedatives most frequently*, about how often were you using?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

7. Have you ever used opiates that were not prescribed for you by a doctor (for example, heroin, morphine, opium, Methadone, codeine, Demerol, Darvon, Percodan, Dilaudid, or other)?

(0) No

(1) Yes

IF YES:

7a. About how often did you use opiates in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

7b. *During the period in your life when you were using opiates most frequently, about how often were you using?*

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

8. Have you ever used hallucinogens other than PCP (for example, LSD, mescaline, peyote, psilocybin, STP, mushrooms, "angel dust," or other)?

(0) No

(1) Yes

IF YES:

8a. About how often did you use hallucinogens in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

8b. *During the period in your life when you were using hallucinogens most frequently, about how often were you using?*

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

9. Have you ever used PCP?

(0) No

(1) Yes

IF YES:

9a. About how often did you use PCP in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

9b. *During the period in your life when you were using PCP most frequently, about how often were you using?*

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

10. Have you ever used inhalants (for example, glue, gasoline, paint, nitrous oxide, "laughing gas," or other)?

(0) No

(1) Yes

IF YES:

10a. About how often did you use inhalants in the past year?

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

10b. *During the period in your life when you were using inhalants most frequently, about how often were you using?*

(0) Never

(1) One time

(2) Monthly or less

(3) 2 to 4 times a month

(4) 2 to 3 times a week

(5) 4 or more times a week

11. How often *during the past year* have you found that you were not able to stop using drugs once you had started?

(0) Never (1) Less Than Monthly (2) Monthly (3) Weekly (4) Daily or Almost Daily

12. How often *during the past year* have you failed to do what was normally expected from you because of your drug use?

(0) Never (1) Less Than Monthly (2) Monthly (3) Weekly (4) Daily or Almost Daily

13. How often *during the past year* have you had a feeling of guilt or remorse after using drugs?

(0) Never (1) Less Than Monthly (2) Monthly (3) Weekly (4) Daily or Almost Daily

14. How often *during the past year* have you been unable to remember what happened the night before because you had been using drugs?

(0) Never (1) Less Than Monthly (2) Monthly (3) Weekly (4) Daily or Almost Daily

15. How often *during the past year* have you used drugs to keep yourself from experiencing withdrawal symptoms?

(0) Never (1) Less Than Monthly (2) Monthly (3) Weekly (4) Daily or Almost Daily

16. Have you or someone else been injured as a result of your drug use?

(0) No (1) Yes, but not in the past year (2) Yes, in the past year

17. Has a relative or friend, or a doctor or other health worker been concerned about your drug use or suggested you cut down or stop?

(0) No (1) Yes, but not in the past year (2) Yes, in the past year

FTND:

- 1) How soon after you wake up do you smoke your first cigarette?**
 - a. Within 5 minutes
 - b. 6-30 minutes
 - c. 31-60 minutes
 - d. After 60 minutes

- 2) Do you find it difficult to refrain from smoking in places where it is forbidden?**
(e.g. in church, at the library, at the movies)
 - a. Yes
 - b. No

- 3) Which cigarette would you hate most to give up?**
 - a. The first one in the morning
 - b. All others

- 4) How many cigarettes a day do you smoke?**
 - a. 10 or less
 - b. 11-20
 - c. 21-30
 - d. 31 or more

- 5) Do you smoke more frequently during the first hours after waking than during the rest of the day?**
 - a. Yes
 - b. No

- 6) Do you smoke if you are so ill that you are in bed most of the day?**
 - a. Yes
 - b. No

Smoking History Questionnaire

1. How old were you when you smoked your first cigarette? ____
2. How old were you when you started regular daily cigarette smoking? ____
3. For how many years have you smoked regularly? ____
4. Since you started regular daily cigarette smoking, what is the average number of cigarettes you smoked per day? ____
5. When smoking the heaviest, how many cigarettes did you smoke per day? ____
6. Think about your smoking during the last week, how many cigarettes did you smoke in an average day?
7. How many times in your life have you made a serious attempt to quit smoking? ____
(If more than 9 times, put 9)
8. As best as you can remember, how long ago did you make your first attempt to quit smoking? ____
9. How many different times in your life have you made an attempt to quit smoking where you stayed off cigarettes for 12 or more hours? ____ (Do not include time sleeping)
10. Since you first started smoking, what was the longest period of time that you were able to stay off cigarettes?
Years: ____ Months: ____ Days: ____ Hours: ____

WNTQ:

The following items are statements about how you may have felt during the Cyberball game. Rate the following items according to this scale:

0	1	2	3	4	5
<i>not at all</i>					<i>very much so</i>

	Rating (0-5)
1. During the Cyberball game, I felt “disconnected”	
2. During the Cyberball game, I felt rejected	
3. During the Cyberball game, I felt like an outsider	
4. During the Cyberball game, I felt good about myself	
5. During the Cyberball game, my self-esteem was high	
6. During the Cyberball game, I felt liked	
7. During the Cyberball game, I felt invisible	
8. During the Cyberball game, I felt meaningless	
9. During the Cyberball game, I felt non-existent	
10. During the Cyberball game, I felt powerful	
11. During the Cyberball game, I felt I had control over the course of the interaction	
12. During the Cyberball game, I felt superior	

Please rate your current mood state from 1-7. (1= lowest, 7= highest)

Good	
Bad	
Happy	
Sad	
Friendly	
Unfriendly	
Tense	
Relaxed	

Assuming that the ball should be thrown to each person equally (33% if three people; 25% if four people), what percentage of throws was directed to you?

STAI - S

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel *right now*, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I feel strained	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel satisfied	1	2	3	4
9. I feel frightened	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel indecisive	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel confused	1	2	3	4
19. I feel steady	1	2	3	4
20. I feel pleasant	1	2	3	4

STAI-T

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel.

	ALMOST NEVER	SOMETIMES	OFTEN	ALMOST ALWAYS
21. I feel pleasant	1	2	3	4
22. I feel nervous and restless	1	2	3	4
23. I feel satisfied with myself	1	2	3	4
24. I wish I could be as happy as others seem to be	1	2	3	4
25. I feel like a failure	1	2	3	4
26. I feel rested	1	2	3	4
27. I am "calm, cool and collected"	1	2	3	4
28. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
29. I worry too much over something that doesn't really matter	1	2	3	4
30. I am happy	1	2	3	4
31. I have disturbing thoughts	1	2	3	4
32. I lack self-confidence	1	2	3	4
33. I feel secure	1	2	3	4
34. I make decisions easily	1	2	3	4
35. I feel inadequate	1	2	3	4
36. I am content	1	2	3	4
37. some unimportant thought runs through my mind and bothers me	1	2	3	4
38. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
39. I am a steady person	1	2	3	4
40. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

CES-D

Rate the following items using the scale below. Circle the number that best represents your answer for each statement.

0= Rarely or none of the time (less than one day)

1= Some or a little of the time (1-2 days)

2= Occasionally or a moderate amount of the time (3-4 days)

3= Most or all of the time (5-7 days)

During the past week:

1. I was bothered by things that usually don't bother me	0	1	2	3
2. I did not feel like eating, my appetite was poor	0	1	2	3
3. I felt that I could not shake off the blues even with help from my family and friends	0	1	2	3
4. I felt that I was just as good as other people	0	1	2	3
5. I had trouble keeping my mind on what I was doing	0	1	2	3
6. I felt depressed	0	1	2	3
7. I felt that everything I did was an effort	0	1	2	3
8. I felt hopeful about the future	0	1	2	3
9. I thought my life had been a failure	0	1	2	3
10. I felt fearful	0	1	2	3
11. My sleep was restless	0	1	2	3
12. I was happy	0	1	2	3
13. I talked less than usual	0	1	2	3
14. I felt lonely	0	1	2	3
15. People were unfriendly	0	1	2	3
16. I enjoyed life	0	1	2	3
17. I had crying spells	0	1	2	3
18. I felt sad	0	1	2	3
19. I felt that most people disliked me	0	1	2	3
20. I could not get going	0	1	2	3
21. I was a lot less interested in most things	0	1	2	3
22. I was unable to do the things I used to enjoy	0	1	2	3

SAD

Rate the following statements “true” or “false” by checking the appropriate box next to each statement.

	True	False
1. I feel relaxed even in unfamiliar social situations		
2. I try to avoid situations which force me to be very sociable		
3. It is easy for me to relax when I am with strangers		
4. I have no particular desire to avoid people		
5. I often find social occasions upsetting		
6. I usually feel calm and comfortable at social occasions		
7. I am usually at ease when talking to someone of the opposite sex		
8. I try to avoid talking to people unless I know them well		
9. If the chance comes to meet new people, I often take it		
10. I often feel nervous or tense in casual get-togethers in which both sexes are present		
11. I am usually nervous with people unless I know them well		
12. I usually feel relaxed when I am with a group of people		
13. I often want to get away from people		
14. I usually feel uncomfortable when I am in a group of people I don't know		
15. I usually feel relaxed when I meet someone for the first time		
16. Being introduced to people makes me tense and nervous		
17. Even though a room is full of strangers, I may enter it anyway		
18. I avoid walking up and joining a large group of people		
19. When my (parents, superiors) want to talk with me, I talk willingly		
20. I often feel on edge when I am with a group of people		
21. I tend to withdraw from people		
22. I don't mind talking to people at parties or social gatherings		
23. I am seldom at ease in a large group of people		
24. I often think up excuses in order to avoid social engagements		
25. I sometimes take the responsibility for introducing people to each other		
26. I try to avoid formal social occasions		
27. I usually go to whatever social engagements I have		
28. I find it easy to relax with other people		

RSQ

Each of the items below describes things college students sometimes ask of other people. Please imagine that you are in each situation. You will be asked to answer the following questions:

1) How concerned or anxious would you be about how the other person would respond?

2) How do you think the other person would be likely to respond?

Circle the number that best represents your answer.

1. You ask someone in class if you can borrow his/her notes.

How concerned or anxious would you be over whether or not your classmate would want to help you out?

very unconcerned
1 2 3 4 5 6
very concerned

I would expect that they would want to help me.

very unlikely
1 2 3 4 5 6
very likely

2. You ask your boyfriend/girlfriend to move in with you.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would say yes?

very unconcerned
1 2 3 4 5 6
very concerned

I would expect that they would say yes.

very unlikely
1 2 3 4 5 6
very likely

3. You ask your parents for help in deciding what programs to apply to.

How concerned or anxious would you be over whether or not your parents would want to help you?

very unconcerned
1 2 3 4 5 6
very concerned

I would expect that they would want to help me.

very unlikely
1 2 3 4 5 6
very likely

4. You ask someone you don't know well on a date.

How concerned or anxious would you be over whether they would say yes?

very unconcerned
1 2 3 4 5 6
very concerned

I would expect that they would say yes.

very unlikely
1 2 3 4 5 6
very likely

5. Your boyfriend/girlfriend has plans to go out with his/her friends tonight, but you really want to spend the evening with him/her, and you tell him/her so.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would say yes?

very unconcerned
1 2 3 4 5 6
very concerned

I would expect that they would say yes.

very unlikely
1 2 3 4 5 6
very likely

6. You ask your parents for extra money to cover living expenses.

How concerned or anxious would you be over whether or not your parents would want to give you this money? very unconcerned 1 2 3 4 5 6 very concerned

I would expect that they would want to give me this money. very unlikely 1 2 3 4 5 6 very likely

7. After class, you tell your professor that you have been having some trouble with a section of the course and ask if he/she can give you some extra help.

How concerned or anxious would you be over whether or not your professor would want to help you? very unconcerned 1 2 3 4 5 6 very concerned

I would expect that he/she would want to help me. very unlikely 1 2 3 4 5 6 very likely

8. You approach a close friend to talk after doing or saying something that seriously upset him/her.

How concerned or anxious would you be over whether or not your friend would want to talk with you? very unconcerned 1 2 3 4 5 6 very concerned

I would expect that he/she would want to talk with me to try to work things out. very unlikely 1 2 3 4 5 6 very likely

9. You ask someone in one of your classes to coffee.

How concerned or anxious would you be over whether or not they would want to go with you? very unconcerned 1 2 3 4 5 6 very concerned

I would expect that they would want to go with me. very unlikely 1 2 3 4 5 6 very likely

10. After graduation, you can't find a job and ask your parents if you can live at home for a while.

How concerned or anxious would you be over whether or not your parents would want you to come home? very unconcerned 1 2 3 4 5 6 very concerned

I would expect I would be welcome at home. very unlikely 1 2 3 4 5 6 very likely

11. You ask a friend to go on vacation with you over Spring Break.

How concerned or anxious would you be over whether or not your friend would want to go with you? very unconcerned 1 2 3 4 5 6 very concerned

I would expect that they would want to go with you. very unlikely 1 2 3 4 5 6 very likely

12. You call your boyfriend/girlfriend after a bitter argument and tell him/her you want to see him/her.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would want to see you?	very unconcerned					very concerned
	1	2	3	4	5	6
I would expect that he/she would want to see me.	very unlikely					very likely
	1	2	3	4	5	6

13. You ask a friend if you can borrow something of his/hers.

How concerned or anxious would you be over whether or not your friend would want to lend it to you?	very unconcerned					very concerned
	1	2	3	4	5	6
I would expect that he/she would want to lend it to me.	very unlikely					very likely
	1	2	3	4	5	6

14. You ask your parents to come to an occasion important to you.

How concerned or anxious would you be over whether or not your parents would want to come?	very unconcerned					very concerned
	1	2	3	4	5	6
I would expect that my parents would want to come.	very unlikely					very likely
	1	2	3	4	5	6

15. You ask a friend to do you a big favor.

How concerned or anxious would you be over whether or not your friend would do this favor?	very unconcerned					very concerned
	1	2	3	4	5	6
I would expect that he/she would willingly do this favor for me.	very unlikely					very likely
	1	2	3	4	5	6

16. You ask your boyfriend/girlfriend if he/she really loves you.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would say yes?	very unconcerned					very concerned
	1	2	3	4	5	6
I would expect that he/she would answer yes sincerely.	very unlikely					very likely
	1	2	3	4	5	6

17. You go to a party and notice someone on the other side of the room and then you ask them to dance.

How concerned or anxious would you be over whether or not the person would want to dance with you?	very unconcerned					very concerned
	1	2	3	4	5	6
I would expect that he/she would want to dance with me.	very unlikely					very likely
	1	2	3	4	5	6

18. You ask your boyfriend/girlfriend to come home to meet your parents.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would want to come?	very unconcerned					very concerned
	1	2	3	4	5	6
I would expect that they would want to help me.	very unlikely					very likely
	1	2	3	4	5	6

SIQ:

The questions we are about to ask you refer to the behaviors of others in your environment and the degree to which those behaviors either help or hinder (hurt) your

What were they?

Who did this behavior? _____

How often was it done? _____

Are there other things we did not ask about that others did that really HINDERED you?

What were they?

Who did this behavior? _____

How often was it done? _____

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