

Does Ostracism Help Smokers Quit?

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Research on the effects of stigmatizing on smokers shows that it is stressful to be reminded of one's devalued status and stigmatization might help or hinder quitting intentions. In this study, we asked smokers ($N = 277$) to play an online ball-tossing Cyberball game, ostensibly with nonsmoking strangers. Participants were randomly assigned to an ostracism (included or excluded) and concealment (smoking status concealed or revealed) manipulation. We found that exclusion led smokers (directly or via threat appraisals) to be more stressed, cognitively depleted, rejection sensitive, have fewer positive cognitions, see themselves at greater health risk, feel more internalized stigma, and be more interested in quitting, with stronger effects when their smoking status was revealed instead of concealed. These results suggest that concealment is imperfect in protecting against stigma and that exclusion (although stressful and cognitively taxing) can lead to cognitions, attitudes, and intentions helping smokers quit and thus leave their devalued identity. The results do not imply that one ought to stigmatize; stigmatizing smokers might be unethical or create barriers to health-seeking behaviors which could counteract structural efforts to help smokers quit. Future research should examine the role of self-affirmation to increase the effectiveness of health messages perceived as stigmatizing or identity threatening.

Keywords: ostracism, social exclusion, smoking, concealability, stigma

When smokers are asked to describe their stigma experience, they have little difficulty naming a range of situations including the momentary (people coughing hysterically to a brief exposure to smoke), the impractical (having to stand outside to smoke at work or restaurants), the economic (paying more for health insurance), and the hurtful (being avoided or seen as disgusting; Brandt, 2007; Helweg-Larsen et al., 2010). Thus, smokers experience both interpersonal and structural forms of discrimination that support their exclusion from various parts of social life (Stuber et al., 2008, 2009). Stigmatized individuals, such as smokers, are perceived to have a characteristic or attribute that is devalued in a particular social situation (Crocker et al., 1998) and as a result, they are often stressed by the experience or anticipation of mistreatment; mistreatment which includes being ignored and excluded (Williams, 2007).

Stigmatization, in general, is associated with stress and a myriad of negative physical and emotional outcomes (Link & Phelan, 2001), but smoking self-stigma is inconsistently related to outcomes such as guilt, self-blame, and smoking behaviors (Evans-Polce et al., 2015). On the one hand, correlational research shows that

smokers were more interested in quitting the more they agreed with moralized sentiments about smoking (Helweg-Larsen, 2014), internalized their smoking stigma (Brown-Johnson et al., 2015), or were exposed to strangers' disapproval of their smoking (Kim & Shanahan, 2003). On the other hand, in experimental research, smokers were less able to resist smoking after reading about the stigmatization of smokers (Cortland et al., 2019) and less interested in quitting after viewing a stigmatizing smoking video (Kim et al., 2018). Thus, it is unclear what the consequences are of smoking stigma but importantly, what the process is. To address these issues, we used the model of stigma-induced identity threat (Major & O'Brien, 2005).

The model of stigma-induced identity threat (Major & O'Brien, 2005) proposes that stigmatized individuals are generally aware of their devalued status but do not, in everyday life, think about it unless reminded by situational cues. For smokers, these cues might come from family, friends, colleagues, children, health care professionals, or antitobacco messaging, and could include explicit or implicit suggestions that smokers are dumb, disgusting, or unworthy (Helweg-Larsen et al., 2010). Importantly, identity threat can occur even without the presence of cues directly caused by bias because the anticipation of being targeted can threaten core social motivations such as the need to belong (Major & Schmader, 2018). If people see the situation as threatening to their identity and are unable to cope, then the result is a series of emotional, cognitive, and attitudinal responses which include nonvolitional reactions such as stress and cognitive depletion as well as volitional reactions such as changing attitudes and beliefs to cope with the identity-threatening experience. According to the model, together, these volitional and nonvolitional reactions lead to health-related intentions or behavioral outcomes.

Applying the model to smoking, it makes sense that stigmatization could lead to more stress, which causes smokers to enjoy smoking more and be less able to resist it (McKee et al., 2011).

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This work was supported by the National Cancer Institute at the National Institutes of Health (R15CA194937). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Cancer Institute or the National Institutes of Health. We thank Sarah DiMuccio and Clarissa Cortland for their comments on a draft of this article. Materials are available on the Open Science Framework: <https://osf.io/6xmuy/>

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Stigmatization can also lead to cognitive depletion resulting both from the effort of coping with identity threat and with the stress (Inzlicht et al., 2006). Importantly, because smokers can cope with stigma by leaving or intending to leave their devalued group (i.e., they have permeable group boundaries; Jetten et al., 2018), a key question is whether the resulting stress and cognitive depletion are associated with smoking-related attitudes and intentions that push smokers toward leaving or staying in their devalued group. One study directly testing the model found that when smokers were reminded or recalled personal instances of smoking stigmatization, they were more stressed, but also more rejection sensitive and interested in quitting (Helweg-Larsen et al., 2020). Thus, it appears that in certain circumstances, the stress resulting from stigmatization (identity threat) leads to coping associated with more positive health-related outcomes such as quitting. Based on this research, we tentatively predicted in the current study, that ostracism (an extreme form of stigmatization) would lead to stress and cognitive depletion but also lead to quitting-favorable attitudes, beliefs, and intentions.

People cope with stigma and identity threat using a variety of cognitive, social, and behavioral strategies (Major & Schmader, 2018). One such strategy is to conceal their stigmatized identity. Research on concealment shows that the psychological outcomes are complex (Pachankis, 2007) with potential benefits and harms depending on the type of stigma and the extent to which the environment is hostile (Quinn, 2018). As a group, smokers are concerned about concealing their smoking status and although friends, family, and colleagues might know them as smokers, they also avoid smoking in public, reduce smoking around others they perceive as judgmental, or attempt to hide the smell in their breath, hair, and clothes (Helweg-Larsen et al., 2010). A recent experiment showed the effects of outing smokers who might wish to be concealed. In the study, smokers participated in a mock job interview where their smoking status was either concealed or revealed to the interviewer. Results showed that smokers who were “outed” reacted with greater stress, cognitive depletion, self-exempting beliefs and were overall less interested in quitting, especially when they had a strong smoking identity (Helweg-Larsen et al., 2019). Based on these findings, we expected in the current study that concealment would attenuate the effects of exclusion.

We used an experimental approach to investigate the effects of ostracism (excluded or included) and concealment (concealed or revealed) on smokers’ emotional, cognitive, and attitudinal responses, and intentions. We used a well-established ostracism manipulation (Cyberball; Hartgerink et al., 2015) which allowed us to examine an extreme form of stigmatization without explicitly mentioning smoking stigma unlike previous manipulations which directly reminded smokers of their devalued status (e.g., Helweg-Larsen et al., 2020). We also assessed if smokers felt their exclusion had to do with their devalued status as smokers, which is an important step in the model of stigma-induced identity threat. Finally, the Cyberball paradigm allowed us to manipulate concealment and examine its moderating influence on ostracism. No study has, to our knowledge, examined the process and consequences of ostracizing smokers.

We tentatively predicted that the manipulations of ostracism and concealment would interact such that in the revealed condition (but not in the concealed condition), smokers who were excluded (as opposed to included) would react with greater stress and cognitive

depletion as well as less positive attitudes toward smoking and more interest in smoking cessation. Thus, we expected that excluding and outing smokers would lead to stress and cognitive depletion but also to cognitions, attitudes, and quitting intentions that indicate interest in moving away from their devalued identity.

Method

Power Analyses

Using G*Power (version 3.1.9.4), we selected the “Analysis of covariance (ANCOVA): Fixed effects, main effects, and interactions” option, set the effect size at $f = .20$, power to .80, alpha to .05, the numerator df to 1 (testing for a three-way interaction approximating the mediational model) and the number of groups to 8. We found that we needed 199 participants in total and based on the dropout rates from previous research (Helweg-Larsen et al., 2020), we aimed at getting 340 participants. Once our recruitment goal was reached, we stopped collecting data, and only then began analyzing the data.

Participants

Of the 340 invited participants, 335 completed the survey. We removed the data from 60 participants (see the Materials section) because they answered incorrectly on either the attention check or manipulation check questions. We did not find evidence of differential attrition, in that the number of people ($N = 17$) who dropped out of the survey after seeing the experimental manipulations was equal across the four experimental conditions, $\chi^2(1) = 1.07, p = .30$.

The final sample consisted of 277 U.S. smokers, with 49.5% women and 50.5% men. Ages ranged from 19 to 77 ($M = 42.10, SD = 12.27$) with the majority of participants identifying as White (91.7%), while others identified as Black (4.0%), Asian (1.4%), American Indian (0.7%), or other (2.2%). Most participants (39.4%) had obtained a high school education, 21.7% had received an associate’s degree and 38.2% had completed a bachelor’s education or higher. On average, participants smoked from 5 to 40 cigarettes per day ($M = 13.03, SD = 6.85$) and had attempted to quit 0–20 times in the past 5 years ($M = 4.56, SD = 3.01$).

Procedure

In this 2×2 factorial design participants were randomly assigned to ostracism (excluded or included) and concealment (concealed or revealed) conditions. Participants were recruited on Prolific using the following criteria: 18 years of age or older, from the United States, and a current smoker who smoked at least five cigarettes a day for a year. The participants were compensated \$11.38/hr, presented with a consent form and if they agreed to participate, were checked for eligibility. Eligible participants answered questions on their background and smoking habits before they were randomly assigned to the conditions. After playing the Cyberball game, they answered attention and manipulation check questions, reported their perceived identity threat and stress, and were then instructed to complete a Stroop test. After, we measured participants’ levels of rejection sensitivity, perceived risk, and smoking attitudes. They were then asked to browse through a smoking cessation webpage and answered questions about cessation

intentions and internalized stigma. Participants were debriefed and thanked for their participation. The study was approved by the University of East Anglia ethics board.

Materials (In the Order They Appeared)

Cyberball Game: Concealment and Ostracism Manipulations

Cyberball (Williams et al., 2000) is a virtual ball-tossing game often used in social psychology research to study the psychological effects of ostracism (Hartgerink et al., 2015). Research shows that the effects of Cyberball are powerful enough to elicit responses similar to that of real-life social exclusion experiences and the effect holds even when participants are told that the responses are scripted or that they are playing against a computer (Zadro et al., 2004).

All participants were told that they had been selected to play a ball-tossing game as part of a three-person team and that they happened to be on a team with two nonsmokers. They were instructed to mentally visualize what the other players and their surroundings would look like if they were playing the game in real-life. When the ball was tossed to the participant, they clicked on the icon of the player they wanted to pass the ball to.

Concealment was manipulated by randomly assigning the participants to information that the other players did (*revealed* condition) or did not know (*concealed* condition) that they were playing the game with a smoker. No other information was provided about the players.

Ostracism was manipulated by randomly assigning people to the *inclusion* or *exclusion* condition in Cyberball. In both conditions, the total game length was set to 30 throws, which takes around 1 min to complete. In the inclusion condition, participants were passed the ball a third of the time and in the exclusion condition, they were passed the ball twice at the beginning of the game and then not again.

Attention and Manipulation Checks

Participants were asked an attention check: “Who did you play the ball-tossing game with?” and incorrect answers were excluded (14 people said *smoker* and 19 said they did not know/remember). Furthermore, a manipulation check question for the concealment manipulation asked participants to identify whether the other players knew they were smokers and incorrect answers were excluded (8 did not know/remember and 19 answered inconsistently with the condition they were in). Participants were also asked a manipulation check question (Stock et al., 2017), namely “To what extent did you feel excluded in the ball-tossing game?” using a 5-point scale from *not at all* to *a great deal* ($M = 2.83$, $SD = 1.63$).

Threat Appraisal (Mediating Variable)

Five questions (not mentioning smoking) asked if they felt judged, attacked, inferior or identity threatened (e.g., “I felt I was being judged as a person,”) and how well they “were able to cope with how they felt during the game” (adapted from Stock et al., 2017). We also asked if they felt their “inclusion or exclusion was due to their smoking status,” and if they “felt discriminated against based on their smoking status.” Responses were indicated on a 5-point scale from *not at all* to *a great deal*. Scores from the coping

item were reverse coded and were averaged with scores from the other seven items, with higher scores indicating higher perceived threat ($\alpha = .93$).

Self-Reported Stress

The self-reported stress questionnaire consisted of five items (Major et al., 2012) where participants were asked to indicate the extent to which they felt *nervous*, *worried*, *uncomfortable*, *overwhelmed*, and *anxious*, from a 5-point scale from *not at all* to *a great deal*. The scores were averaged, with higher scores indicating higher stress ($\alpha = .84$).

Cognitive Depletion

Cognitive depletion was measured using the Stroop Color-Word Interference Test which measures the executive control needed to suppress reading a word and instead naming the color of the word (for a review, see Scarpina & Tagini, 2017). The task required participants to quickly respond to the color of the word presented on the screen by typing the first letter of that color. Congruent words were presented in the same color as the word spells out (e.g., the word *blue* was presented in blue ink) and incongruent words were presented in a different color from the actual word on the screen (e.g., the word *blue* was presented in red ink).

We excluded all Stroop data from two participants whose response times were found to be greater than 3 s on more than half of the 20 trials (Bielecki et al., 2017). Next, we winsorized the data to deal with nonnormality issues involving data that is measured with time. Response times greater than 3 *SD* from the global mean ($M = 1.32$, $SD = 1.50$) were recorded as 5.82 s. This affected 155 outliers or 2.8% of all data, which is considered an acceptable proportion (Inzlicht et al., 2006). Finally, we log-transformed the scores before averaging the congruent trials together and the incongruent trials together. As expected, response times were significantly faster for congruent words ($M = .04$, $SD = .13$) than incongruent words ($M = .09$, $SD = .12$), $t(274) = -12.61$, $p < .001$. For the final Stroop variable (incongruent minus congruent), higher numbers indicated greater cognitive depletion.

Rejection Sensitivity

The Smoking Rejection Sensitivity scale measures smokers’ rejection sensitivity following exposure to a potentially stigmatizing situation (Helweg-Larsen et al., 2020). The shortened scale consists of four situations: Strangers coughing when walking by one’s smoke, a coworker commenting on the high price of cigarettes, a person asking to switch to a different seat on a flight, and a nurse asking about one’s smoking. After each situation, questions assessed concern about the reaction being tied to their smoking (4-point scale from *very unconcerned* to *very concerned*) and expecting the reaction being caused by their smoking (4-point scale from *extremely unlikely* to *extremely likely*). The scores were averaged, and higher scores indicated greater rejection sensitivity ($\alpha = .77$).

Perceived Risk of Lung Cancer

To measure perceived risk, participants were asked “Imagine that you in the future smoke a pack of cigarettes every day. What is then

your chance of getting lung cancer in your lifetime?" (Weinstein et al., 2007). They indicated their response on a 5-point scale from *not at all likely* to *extremely likely*.

Positive Cognitions About Smoking

Positive cognitions were measured using five items (Süssenbach et al., 2013), such as "A cigarette makes me more confident" and "Smoking is sociable" on a 5-point scale from *strongly disagree* to *strongly agree*. The scores were averaged, with higher scores indicating higher positive cognitions about smoking ($\alpha = .72$).

Self-Exempting Beliefs

Eight items from the Self-Exempting Beliefs scale (Oakes et al., 2004) were used, such as "The medical evidence that smoking is harmful is exaggerated" and "Smoking cannot be that bad for you because many people who smoke live long lives." Responses were recorded on a 5-point scale from *strongly disagree* to *strongly agree*, with higher scores indicating higher self-exempting beliefs ($\alpha = .80$).

Interest in Smoking Cessation Website

Participants were instructed to browse a website for smokers trying to quit (<https://smokefree.gov/>) and the seconds they spent on the webpage were recorded by Qualtrics. We winsorized seven outliers and log-transformed the scores. After spending time on the website, interest in quitting was measured using three items (Helweg-Larsen et al., 2020) such as "I would like to learn more about topics related to quitting" (5-point scale from *strongly disagree* to *strongly agree*), $\alpha = .89$.

Smoking Cessation Intentions

Interest in quitting was assessed with three items (Helweg-Larsen, 2014). The items were "Do you have plans to quit smoking?" (4-point scale from *yes, within a month* to *no, I do not have plans to quit smoking*), "Do you want to stop smoking?" and "Would you like to smoke less?" (3-point scale from *not at all* to *a great deal*).

Responses from the first item were reverse coded and all items were turned into z scores and averaged ($\alpha = .80$).

Self-Efficacy

One item measured self-efficacy (Velicer et al., 1990), "How confident are you that you could quit smoking for good if you wanted to?" which was measured on a 5-point scale from *not at all* to *extremely*.

Internalized Stigma

We asked six items (two from each subscale) from The Internalized Stigma of Smoking Inventory (Brown-Johnson et al., 2015). The subscales were self-stigma (e.g., "I am embarrassed or ashamed that I am a smoker"), felt stigma (e.g., "people ignore me or take me less seriously just because I am a smoker"), and discrimination (e.g., "people often discriminate against me because I'm a smoker"). Responses were measured on a 4-point scale from *strongly disagree* to *strongly agree* and averaged, with higher scores indicating more internalized stigma ($\alpha = .85$).

Results

Analysis Strategy

We first examined if the manipulations had the intended effects using ANOVA. Then, we conducted a series of regression analyses using PROCESS v 3.4.1 macro in SPSS (Hayes, 2017). We used Model 8 for the moderated mediation analysis and set X as the ostracism manipulation, W as the concealment manipulation (affecting both paths a and ab), and Y as each dependant variable (DV). We examined how the 2 (ostracism: included or excluded) \times 2 (concealment: concealed or revealed) manipulations directly affected the DVs or indirectly affected the DVs via mediation by threat appraisal. We set the regression parameters at 5,000 bootstrap bias-corrected samples, 95% confidence intervals, and mean-centered products. We report unstandardized regression weights along with their p values and confidence intervals. Figure 1 shows the hypothesized

Figure 1
The Hypothesized Moderated-Mediation Model of the Effect of Ostracism and Concealment via Threat Appraisal on the Dependent Variables: Stress, Cognitive Depletion, Rejection Sensitivity, Perceived Risk, Positive Cognitions About Smoking, Self-Exempting Beliefs, Webpage Timer, Webpage Smoking Cessation Tools, Smoking Cessation Intentions, Self-Efficacy, and Internalized Stigma

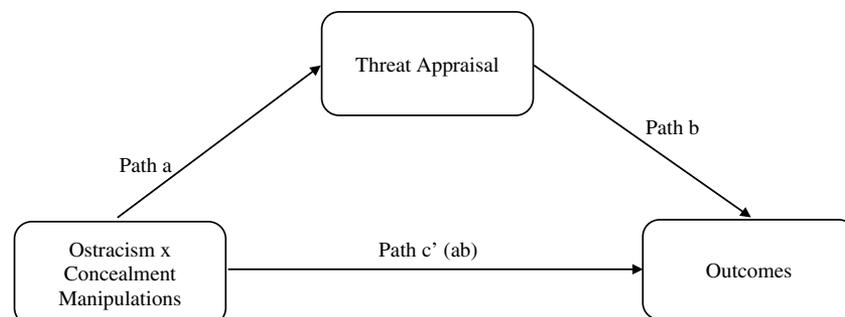


Table 1
Bivariate Correlations Among Study Variables for All Conditions

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Threat	—											
2. Stress	.59**	—										
3. Cognitive depletion	-.14*	-.08	—									
4. Rejection sensitivity	.15*	.28**	.02	—								
5. Perceived risk	.16**	.19**	-.08	.26**	—							
6. Positive cognitions	.01	.09	-.02	.03	-.05	—						
7. Self-exempting beliefs	.02	.08	-.04	-.21**	-.27**	.33**	—					
8. Webpage timer	-.03	-.05	.08	.07	.05	.06	-.03	—				
9. Webpage cessation tools	.22**	.19**	.04	.22*	.20**	-.03	-.09	.19**	—			
10. Smoking cessation intentions	.08	.10	.08	.23**	.29**	-.22**	-.40**	.13*	.51**	—		
11. Self-efficacy	.03	.03	.04	-.12	.06	-.04	-.06	.01	.06	.15*	—	
12. Internalized stigma	.19**	.26**	.05	.51**	.20**	-.10	-.22**	.05	.28**	.35**	-.04	—
Mean (SD)	1.92 (1.02)	1.41 (0.56)	-0.05 (0.07)	2.45 (0.54)	3.39 (0.96)	3.22 (0.75)	2.43 (0.69)	3.95 (1.05)	3.45 (1.09)	0.00 (0.84)	2.76 (1.03)	2.04 (0.62)

Note. $N = 277$.

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

model, Table 1 shows the bivariate correlations between the study variables, Table 2 and Figure 2 summarize the results. There were no effects (direct or indirect) for the DVs of smoking cessation intentions, self-efficacy, or time spent on the webpage. This is consistent with past research (e.g., Helweg-Larsen et al., 2020) and for ease of presentation, we did not include the null results in Table 2 and Figure 2.

Manipulation Check

To measure if the manipulations had the anticipated psychological effect on the participants we asked, “To what extent did you feel excluded in the ball-tossing game?”

The results of a 2 (concealability: concealed vs. revealed) \times 2 (ostracism: included vs. excluded) ANOVA showed two main effects and no interaction. $F(1, 273) = 2.14, p = .15$. Specifically, the main effect of exclusion, $F(1, 273) = 556.12, p < .0001$, partial $\eta^2 = .67$ showed, as expected, more feelings of exclusion in the exclusion ($M = 4.08, SD = 0.08$) than in the inclusion ($M = 1.45, SD = 0.81$) condition. Thus, the manipulation worked as intended. Furthermore, the main effect of concealment $F(1, 273) = 8.89, p < .0001$, partial $\eta^2 = .03$, showed more feelings of exclusion in the revealed ($M = 2.93, SD = 0.08$) than concealed ($M = 2.60, SD = 0.08$) condition, showing that smokers felt more excluded just by having their smoking status revealed to nonsmokers.

Effect of Manipulations on the Mediator

First, we examined the effect of the manipulations (ostracism and concealment) on the mediator (threat appraisal). We found that threat was greater in the exclusion than inclusion condition ($b = 0.53, t = 3.81, p = .0002, 95\% \text{ CI } [0.25, 0.80]$) and we found an interaction between ostracism and concealment ($b = 1.05, t = 5.28, p < .0001, 95\% \text{ CI } [0.66, 1.44]$) which was the result of a larger effect of ostracism on threat appraisals when people were revealed ($b = 1.57, t = 11.11, p < .0001, 95\% \text{ CI } [1.29, 1.85]$) than concealed ($b = 0.53, t = 3.81, p = .0002, 95\% \text{ CI } [0.25, 0.80]$). It is not surprising that in the revealed condition, smokers felt more threatened when they were excluded than included. However, in the concealed condition (recall that smokers were told explicitly that the other players did not know they were smokers), smokers still felt more threatened/discriminated against in the excluded than included condition. This is consistent with the identity threat model which stipulates that identity stress comes from anticipating stigma and can occur even in the absence of information relating to their devalued identity (Major & Schmader, 2018).

Direct Effects

We next examined the *direct effects* in the mediation model (see Table 2, results in columns on the left) and found a generally consistent pattern such that in the revealed condition, exclusion compared to inclusion caused fewer self-exempting beliefs and fewer positive cognitions, suggesting that regardless of the degree of threat, simply being excluded when people know of your devalued status led to beliefs and cognitions associated with *more* interest in quitting.

Table 2
Results of the Moderated-Mediation Analysis

Dependent variables	IV1 ostracism	IV2 concealment	Direct effects			Indirect effects		Index of moderated mediation#
			<i>b</i>	<i>t</i>	CI	<i>b</i>	CI	
Stress	Included or excluded	Concealed	.10	1.34	[−.05, .25]	.19*	[.11, .29]	.39*
		Revealed	−.15	−1.70	[−.33, .02]	.58*	[.39, .79]	[.22, .57]
Cognitive depletion	Included or excluded	Concealed	−.01	−1.06	[−.04, .01]	.01*	[.00, .01]	.01*
		Revealed	−.01	−0.84	[−.04, .02]	.02*	[.01, .03]	[.01, .02]
Rejection sensitivity	Included or excluded	Concealed	−.08	−.90	[−.27, .10]	.08*	[.03, .14]	.16*
		Revealed	−.20	−1.77	[−.42, .02]	.24*	[.11, .38]	[.07, .27]
Perceived risk	Included or excluded	Concealed	−.10	−.62	[−.42, .22]	.12*	[.04, .22]	.24*
		Revealed	−.13	−.66	[−.51, .26]	.36*	[.13, .61]	[.08, .43]
Positive cognitions	Included or excluded	Concealed	−.21	−1.64	[−.46, .04]	.07*	[.01, .15]	.15*
		Revealed	−.50	−3.21*	[−.80, −.20]	.22*	[.04, .42]	[.02, .30]
Self-exempting beliefs	Included or excluded	Concealed	.08	.63	[−.16, .31]	.04	[−.01, .10]	.09
		Revealed	−.32	−2.24*	[−.61, −.04]	.13	[−.16, .29]	[−.01, .20]
Webpage cessation tools	Included or excluded	Concealed	−.43	−2.35*	[−.80, −.07]	.17*	[.06, .31]	.34*
		Revealed	−.18	−.84	[−.62, .25]	.51*	[.22, .84]	[.14, .60]
Internalized stigma	Included or excluded	Concealed	−.13	1.21	[−.33, .08]	.10*	[.04, .17]	.19*
		Revealed	−.16	−1.31	[−.41, .08]	.29*	[.13, .46]	[.08, .33]

Note. $N = 277$. Bootstrap confidence intervals used 5,000 resamples and 95% bias-corrected confidence intervals. CI = 95% confidence interval. Ostracism was coded as 0 = included and 1 = excluded and concealment was coded as 0 = concealed and 1 = revealed. Not displayed are the nonsignificant direct and indirect results for the DVs of smoking cessation intentions, self-efficacy, or how long they spent looking at the webpage.

* $p < .05$. #difference between indirect effect.

For the DV of webpage cessation tools, the pattern was different in that when smokers were revealed, there was no difference between the excluded and included conditions, but when smokers were concealed, there was greater interest in the webtools in the included than excluded condition. This suggests that being hidden and included might have a direct positive effect on interest in quitting. However as described below, there was also an indirect effect for this variable that showed the expected pattern toward less interest in the webtools (via threat appraisals) when excluded instead of included, especially when revealed.

Indirect Effects

For indirect effects in the mediation model (see Table 2, results in columns on the right), we also found a generally consistent pattern of indirect effects via threat appraisal so that people were more stressed, cognitively depleted, rejection sensitive, had greater perceived lung cancer risk, felt more internalized stigma, and were more interested in using the webtools to quit when they were excluded than included, and this indirect effect was greater when they were revealed than concealed.

There was one exception to this pattern for the DV of positive cognitions. Smokers had more positive cognitions about smoking when they were excluded than included and this effect was greater in the revealed than concealed condition. This defensive reaction to the exclusion is consistent with a study showing that smokers had more positive cognitions when they viewed graphic tobacco warnings compared to text-only warnings, especially when they perceived the images as threatening (Süssenbach et al., 2013). But our finding is inconsistent with the direct effect on positive cognitions (which showed the usual pattern). Future research will have to explore exactly when people react to ostracism by having more

positive as opposed to more negative attitudes toward their devalued identity.

Discussion

In this experimental examination of the effects of ostracism and concealment, we found that ostracism led smokers (either directly or via threat appraisals) to be more stressed, cognitively depleted, rejection sensitive, have fewer positive cognitions, see themselves at greater risk, feel more internalized stigma, and be more interested in using webtools to quit, with stronger effects when smokers were revealed instead of concealed. Thus, ostracism led smokers to feel more stressed and mentally taxed—results that could lead to more rather than less interest in smoking. But instead, ostracism led smokers toward cognitions, attitudes, and intentions associated with quitting smoking and thus leaving their devalued identity as smokers. Overall, the findings are consistent with our predictions as well as previous research which showed that when smokers recalled actual experiences of smoking stigma (and felt their identity was threatened) they reacted with stress, rejection sensitivity, and interest in quitting (Helweg-Larsen et al., 2020).

Overall, our results add to our understanding of the process by which smokers react to identity threat. First, we found a cascade of effects of ostracism which were seemingly negative (stress and cognitive depletion) as well as positive (attitudes and intention supporting quitting) for one's health. Research suggests that stigmatization is bad for health-related outcomes (Major et al., 2017) but in the case of smokers, coping can include leaving their group which is ultimately beneficial to their health. Second, our findings add to the identity-threat model of stigma (Major & O'Brien, 2005), which does not specify whether coping is ultimately associated with interest in tightening or loosening one's identity-ties with the devalued group. In this study, we found that smokers generally

wanted to loosen their ties. Third, our understanding of stigmatization is enhanced by research on ostracism. Because ostracism threatens one of the core aspects of social life, namely our need to belong (Williams, 2007), people might react by fortifying their social belonging with the ostracizers (in this case, nonsmokers) and one indication of this could be interest in smoking cessation and their related beliefs (“smoking is bad”) and cognitions (“smoking is risky for me”). Smokers’ interests in quitting might also be a signal of their wish for reinclusion. Mindful that smoking stigma is prevalent (Stuber et al., 2008), smokers may feel that the best approach to restore social inclusion is by leaving their devalued group; the pattern we observed. If reinclusion with the nonsmoking group is not possible (due to inability or unwillingness to quit), then social inclusion might be restored by enhancing one’s affinity for smoking, but that is not the pattern we observed.

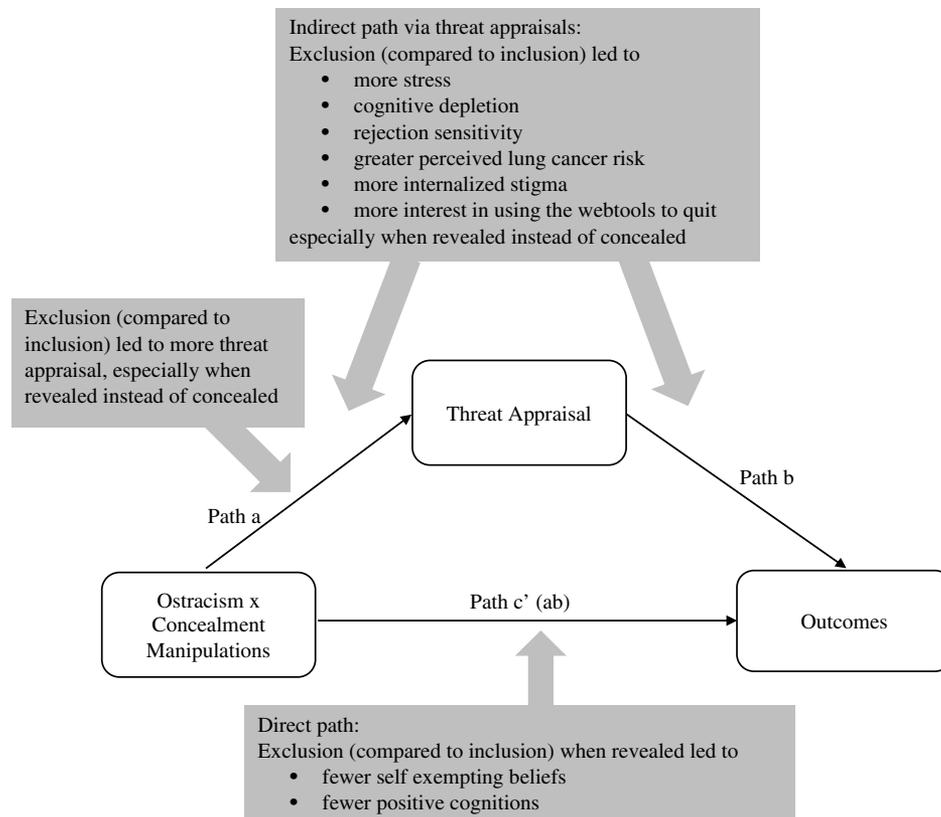
Ostracism is an unpleasant experience and can, to some extent, be avoided by hiding one’s devalued status. Smokers report strategically and selectively concealing their stigma, which can be an effective coping strategy depending on how it is used. For example, simply not disclosing one’s stigma (“selective disclosure”) can be an adaptive strategy whereas actively concealing one’s stigma (“active concealment”) can be maladaptive because it is associated with stress, cognitive depletion, thought suppression, and anticipated

discrimination (Camacho et al., 2020). In the present study, we expected that concealment in the Cyberball paradigm would protect against the effects of ostracism and although we found that concealment buffered against the effects of ostracism, it did so imperfectly. We found that even when smokers were told that the other players did not know of their smoking status, they felt the ostracism was tied to their smoking status. Analogously, research on racial discrimination shows that stigmatized individuals often internalize stereotypes and as a result, attribute ostracism to their identities even when their identities are concealed (Corrigan et al., 2011).

The strengths of this study included drawing on the process outlined in a well-established model (the model of stigma-induced identity threat) and from research on ostracism (Williams et al., 2000). In addition, we used the Cyberball paradigm; a well-validated method to study the immediate effects of ostracism. Limitations include using an experimental approach that does not capture the long-term consequences of ostracism or stigmatization. Perhaps smoking stigma could negatively affect mental and physical health as obesity stigma does (Hunger et al., 2015; Puhl et al., 2005). Furthermore, due to the complexity of real-life social rejection, experimental paradigms may inadequately capture (or manipulate) smokers’ experiences. For example, ostracism by a known or close acquaintance is perceived to be more painful compared to

Figure 2

The Results of the Moderated-Mediation Model of the Effect of Ostracism and Concealment via Threat Appraisal on the Dependent Variables



Note. Only Significant Findings Are Shown. See Table 2 for Statistical Results.

ostracism by strangers, which is usually the case in laboratory research (Nezlek et al., 2012).

Future research should examine the upstream process of why nonsmokers stigmatize smokers in the first place. It is clear that stigmatization results in complex social and behavioral outcomes, but the question of the motivations, intentions, and cognitions of ostracizers are woefully understudied (Zadro & Gonsalkorale, 2014). Why do we stigmatize, lecture, or belittle smokers? Do we feel better about our transgressions, believe we are genuinely helping smokers to quit, or think we are upholding the moral and social order which is currently nonsmoking (Williams, 2007)? Broadly speaking, to understand or reduce stigmatization and ostracism, it is important to know why we do it.

In conclusion, ostracism and stigmatization are stressful and our findings suggest that smokers generally react with more interest in moving away from their group or activity by having quitting-favorable attitudes, cognitions, and intentions rather than reconnecting with their stigmatized group by enhancing smoking-favorable beliefs. We do not conclude that public health messages or individuals ought to stigmatize smokers, which might be unethical (e.g., Riley et al., 2017) and stigmatization has been shown to globally create barriers to health-seeking behaviors (Stangl et al., 2019), which could counteract structural efforts to help smokers quit. Instead, the research could examine the possibly useful role of self-affirmation which can reduce defensiveness and increase quit intentions in response to smoking health messaging (Harris et al., 2007) and reduce stress and improve self-worth following ostracism (Hales et al., 2016). Self-affirmation is therefore a fruitful area of further research to increase the effectiveness of health messages perceived as stigmatizing or identity threatening and thus ultimately reduce smoking prevalence.

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Received October 22, 2020

Revision received December 14, 2020

Accepted January 23, 2021 ■