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# Social Control of Health Behavior: Associations With Conscientiousness and Neuroticism

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*Despite considerable research demonstrating associations of conscientiousness and neuroticism with health-related behavior, our understanding of how and why these traits are related to lifestyle is limited. This study examined the social regulation of health behavior in a probability sample of 509 household residents who completed a Random Digit Dial (RDD) telephone survey. Results suggest that the social regulation of health behavior experienced by highly conscientious individuals has more to do with their own internalized notions of responsibility and obligation to others than to specific actions by others aimed at influencing their health habits. In contrast, individuals with higher neuroticism experience more overt attempts by others to influence their health habits but have more negative affective and behavioral responses to these social influence attempts. Findings suggest that elucidating the distinct social influence processes that operate for conscientiousness and neuroticism may further understanding of how these traits are related to health behaviors and status.*

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**Keywords:** conscientiousness; neuroticism; social control; health behaviors; affect

Certain stable patterns of psychological responding can pose significant and long-term health risks. Higher rates of serious illness and mortality have been found, for example, among individuals prone to emotional instability and distress, impulsivity, unreliability, and feelings of alienation (Friedman & Booth-Kewley, 1987; Friedman et al, 1993; Martin et al., 1995). Various models have been postulated to understand the association between personality and disease. Long-term differentials in physical health between individuals with resilient versus disease-prone personalities are likely due to a combination of physiological, psychosocial, and behavioral factors (Smith & Gallo, 2001). The present study

focuses on the behavioral mechanism, namely, why individuals with certain personality traits may be more or less inclined to engage in health-compromising behaviors. Research grounded in the five-factor taxonomy of personality (McCrae & John, 1992) suggests that two personality traits may be particularly relevant to engagement in health-related behavior: neuroticism and conscientiousness.

Individuals with high neuroticism and low conscientiousness tend to perceive themselves as being in poorer health (Goodwin & Engstrom, 2002), although evidence for neuroticism's association with objective clinical assessments of physical health status has been mixed (Costa & McCrae, 1987; Watson & Pennebaker, 1989). Both high conscientiousness and low neuroticism have been associated with less engagement in risky behaviors such as smoking, substance use, unsafe driving, and sexual behavior that increases susceptibility to disease (Booth-Kewley & Vickers, 1994; Hoyle, Fejfar, & Miller, 2000; Lemos-Giráldez & Fidalgo-Aliste, 1997; Terracciano & Costa, 2004; Trobst et al., 2000; see also recent meta-analysis of the literature on conscientiousness and health-related behavior by Bogg & Roberts, 2004). Conscientiousness has been further associated with greater engagement in preventive behaviors (Ingledeu & Brunning, 1999) and

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may be particularly important in predicting health behaviors that affect others as well as oneself (e.g., household smoking; Hampson, Andrews, Barckley, Lichtenstein, & Lee, 2000). A number of prospective studies have shown that these personality traits predict engagement in health-related behavior over a period of decades (Caspi et al., 1997; Kubička, Matějček, Dytrych, & Roth, 2001; Roberts & Bogg, 2004; Tucker et al., 1995).

Despite considerable evidence linking conscientiousness and neuroticism with health-related behavior, our understanding of why and how these personality traits are related to substance use, exercise, nutrition, sexual practices, and other aspects of lifestyle is still limited. Much of the relevant research has examined how conscientiousness and neuroticism are related to health-related beliefs that may predict behavior, such as perceived susceptibility to health risks (Vollrath, Knoch, & Cassano, 1999), the consequences of illness and effectiveness of treatment (Skinner, Hampson, & Fife-Schaw, 2002), and one's own health competence (Marks & Lutgendorf, 1999). In contrast, the present study focuses on interpersonal factors that may help to explain why individuals with high conscientiousness and low neuroticism tend to engage in a healthier lifestyle. Specifically, we examine the regulatory function of social relationships, commonly referred to as social control. A growing body of evidence suggests that individuals who experience social control tend to engage in a healthier lifestyle and are more successful in making positive changes to their lifestyle (e.g., Doherty, Schrott, Metcalf, & Iasiello-Vailas, 1983; Lewis & Rook, 1999; Tucker, 2002; Umberson, 1992; Westmaas, Wild, & Ferrence, 2002). If exposure to health-related social control, or responses to this type of social influence, differ as a function of the individual's level of conscientiousness or neuroticism, it might shed light on an important mechanism through which these personality traits influence health-related behavior.

Social control can influence engagement in health-related behavior in two basic ways (Rook, Thuras, & Lewis, 1990; Umberson, 1987, 1992). Indirect social control involves feelings of obligation or responsibility to others that encourage engagement in a healthier lifestyle. Conscientious individuals may experience stronger indirect social control, for example, if they feel a greater sense of duty to others to maintain their health, are more likely to think about the influence of their current lifestyle on the future well-being of their loved ones, or have a greater propensity to follow socially prescribed norms regarding healthful behavior. Direct social control involves deliberate influence attempts aimed at encouraging another individual to modify his or her health habits. It may involve the use of positive strategies, such as engaging in the desired

behavior together and providing encouragement, as well as negative strategies, such as expressing anger and making the person feel guilty about their health habits (Butterfield & Lewis, 2002; Tucker & Mueller, 2000). Individuals with high neuroticism may have a strong negative response to direct social control attempts, especially when less positive or more aversive strategies are used, given their heightened emotional reactivity to interpersonal conflict, stress, and other negative stimuli (Bolger & Schilling, 1991; Clark, Hemsley, & Nason-Clark, 1987; Larson & Ketelaar, 1991; Suls, Martin, & David, 1998). In contrast, more conscientious individuals, given their greater internalized sense of responsibility to others, may have a stronger positive response to others' efforts to influence their health behaviors.

The present study examined associations of conscientiousness, neuroticism, and experiences of health-related social control in a sample of 509 household residents in Los Angeles County who were recruited for a larger study of health-related social control processes, 290 of whom provided information on a recent situation involving someone attempting to influence their health habits. The present study had two goals. The first goal was to examine associations of conscientiousness and neuroticism with experiences of indirect and direct social control. We hypothesized that conscientiousness would be positively associated with feelings of obligation and responsibility to others to be healthy (i.e., more indirect social control). A more exploratory analysis examined how these personality traits might be associated with the frequency of experiencing direct social control attempts from others. The second goal was to investigate, within the context of a specific situation involving health-related social control, the ways in which conscientiousness and neuroticism were associated with how individuals responded emotionally (positive and negative affect) and behaviorally (e.g., engaged in the desired behavior, hid the unhealthy behavior) to social control attempts. We expected that individuals with high neuroticism would report more negative responses to others' attempts to influence their health behaviors, particularly when less positive or more aversive social control strategies were used. However, more conscientious individuals were expected to have more positive responses to social control attempts given their greater internalized sense of responsibility to others.

## METHOD

### *Participants*

A Random Digit Dial (RDD) telephone survey was conducted with a probability sample of 509 English-speaking

household residents in Los Angeles County. We conducted 30- to 45-min interviews with 203 participants age 25 to 44 years, 154 participants age 45 to 64 years, and 152 participants age 65 to 80 years. As described below, 290 of these individuals described a recent situation involving health-related social control. Due to a small amount of missing data across variables, analyses of the full sample are based on  $n = 498$  to  $499$  and analyses of the subsample describing a specific social control situation are based on  $n = 283$  to  $284$ . Participants were told that the interview was completely confidential. If they chose to provide a mailing address, they were sent a \$10 gift certificate upon completion of the interview. About half of the participants were female (56%) and married (46%). Most participants (73%) had some post-high school education (6% were not high school graduates). The racial/ethnic composition of the sample was 55% White (non-Hispanic), 19% Hispanic, 13% African American, 9% Asian, and 4% Other or Mixed. The average age of participants was 46.4 years ( $SD = 15.2$ ) and median annual household income was \$40,000 to 50,000.

#### *Procedure*

Lists of random telephone numbers, including both listed and unlisted numbers, were purchased from a well-known firm specializing in developing RDD samples. Interviews were conducted by the RAND Survey Research Group using a computer-assisted telephone interviewing system to identify eligible households and select respondents. Households were eligible for the survey if they contained at least one adult age 25 to 80 years and an English-speaking informant. Starting with a pool of 7,635 random numbers, interviewers attempted to determine whether the number was associated with a household. Once a number had been confirmed as a household, the interviewer attempted to conduct a 2-min screening interview with an adult household informant who could provide the information needed to select a respondent for the interview. The screening interview briefly introduced the study and asked the informant to provide information on the number of household members in each of three age groups: 25-44 years, 45-64 years, and 65-80 years. A sampling strategy was then employed to select households and respondents in such a way as to generate a representative sample containing sufficient numbers of respondents in each of these age groups. A household was always selected for an interview if it contained someone age 65 to 80 years and was randomly selected with a probability of 0.5 to 0.6 if it did not contain someone age 65 to 80 years. Once a household was selected, an algorithm based on household composition information was used to determine whether the interviewer should select someone age 25 to 44 years, 45 to 64 years, or 65 to 80

years for the interview. Once the targeted age group was selected, interviewers attempted to complete an interview with the household member in that age group. If there were two or more household members in the targeted age group, interviewers attempted to complete an interview with the person who had the most recent birthday. Interviewers made an average of three calls on different days and times to determine household and eligibility status for each number and an average of six calls to eligible households to complete an interview.

About 48% of the random numbers were known to not be households ( $n = 931$ ) or were otherwise ineligible for the study due to various reasons ( $n = 2,733$ ). Of the remaining numbers, 509 were screened households in which a respondent completed an interview and 102 were screened households in which an informant or respondent refused the interview, resulting in an 83% cooperation rate. By the end of the field period, 2,798 numbers remained unknown, 265 were households for which a screener could not be completed, and 295 were screened households for which an interview could not be completed. The study's response rate is 51%, based on the percentage of completed interviews among selected respondents in known households. This is the response rate that corresponds to cases given full field effort (i.e., the calculation excluded the 2,798 less heavily pursued numbers that remained unknown by the end of the field period) and is probably the rate that is most reflective of selective nonresponse. Among the 265 households that did not complete the screener, we estimated that 87 would have been eligible for the study and selected for an interview and added this number to the denominator in calculating the response rate.

As part of the interview, participants were asked to think of a specific situation where they received direct health-related social control and, if they could recall such a situation, answered a series of questions about the situation based on the work of Lewis and Rook (1999). Two hundred and ninety individuals reported on a specific situation: the behavior that was targeted and their relationship to the social control agent, as well as how long the situation had lasted and whether it was ongoing. We also asked additional questions about the type of social control that was used (positive vs. negative) and the respondent's reaction to experiencing the social control. Those who described a specific situation tended to be younger and less conscientious than study participants who did not describe a specific situation ( $p < .05$ ), although the two groups did not differ on other demographic characteristics (gender, education, marital status) or neuroticism. Analyses based on this subsample ( $n = 283$  to  $284$  due to missing data) are specifically noted; otherwise, analyses are based on the full sample ( $n = 498$  to  $499$ ).

TABLE 1: Mean, Standard Deviation, and Intercorrelations for Main Study Variables

Variable	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12
1. Conscientiousness	3.3 (0.5)	1.00											
2. Neuroticism	2.0 (0.5)	-.44***	1.00										
3. Direct social control	2.0 (0.6)	-.15***	.34***	1.00									
4. Indirect social control	3.2 (1.1)	.23***	-.04	.16***	1.00								
5. Positive social control	0.6 (0.3)	.11	.08	.28***	.20***	1.00							
6. Negative social control	0.3 (0.3)	-.08	.15*	.01	.08	-.22***	1.00						
7. Positive affect	2.5 (0.9)	.21***	-.08	.17**	.26***	.41***	-.28***	1.00					
8. Negative affect	1.5 (0.5)	-.13*	.26***	.09	.06	-.16**	.60***	-.30***	1.00				
9. Engage in behavior	2.3 (0.8)	.04	-.06	.05	.07	.28***	-.24***	.38***	-.22***	1.00			
10. Ignore or do nothing	2.1 (0.9)	-.07	-.01	-.04	-.06	-.33***	.31***	-.33***	.36***	-.61***	1.00		
11. Do the opposite	1.9 (0.9)	-.07	.11	.07	-.02	-.14*	.34***	-.20**	.31***	-.38***	.47***	1.00	
12. Hide unhealthy behavior	1.5 (0.8)	-.16**	.11	.12*	.02	-.10	.32***	-.16**	.41***	-.12	.24***	.24***	1.00

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### Measures

*Demographic covariates.* All regression analyses controlled for gender, education (post-high school education vs. high school graduate or less), race/ethnicity (non-Hispanic White, African American, Hispanic, and Other), and marital status.

*Personality.* We used the Conscientiousness and Neuroticism subscales of the NEO Five-Factor Inventory (Costa & McCrae, 1992) to measure these personality traits. Agreement with each item was indicated using a 4-point scale (1 = *disagree strongly* to 4 = *agree strongly*;  $\alpha s = .82-.83$ ).

*Direct social control (general).* Using an approach similar to Lewis and Rook (1999), direct social control was assessed by asking participants to rate how often they were urged by others to modify different health-related behaviors (1 = *never* to 4 = *often*). In this study, we examined 14 such behaviors, including smoking, alcohol and caffeine consumption, exercise, sleep, relaxation, weight, nutrition, obtaining medical care, and medication use. We calculated the mean frequency of experiencing direct social control by averaging across the items that were applicable to the participant (e.g., certain items, such as smoking, had a “not applicable” response option;  $\alpha = .84$ ).

*Indirect social control (general).* A five-item measure of indirect social control, adapted from Tucker (2002), asked, “How important is it to others that you try to be physically fit?” “How much do you feel responsible or obligated to others to try to stay healthy?” “How much do others depend on you to stay healthy?” and “How much would others be disappointed if you did not make an effort to be healthy?” (1 = *not at all* to 5 = *extremely*;  $\alpha = .79$ ).

*Specific social control situation.* In the subsample of participants who reported on a specific social control situation,

we administered a measure developed for this study based on our earlier work identifying health-related social control strategies (Tucker & Mueller, 2000), which asked whether the social control agent in this situation used each of five positive strategies (e.g., “Offer to help you make this change”; “Do things that would make it easier for you to make this change”) and five negative strategies (e.g., “Try to make you feel guilty”; “Repeatedly tell you or nag you to make this change”). For each type of social control, we calculated the proportion of endorsed items.

Participants were then asked to think about how they responded when the social control agent was trying to influence them to change their behavior. Using 10 items from a mood scale developed by Brunstein, Dangelmayer, and Schultheiss (1996), participants rated how often they had felt positive and negative affect in response to these social control attempts (1 = *never* to 4 = *always*). Positive affect items included feeling loved, valued, happy, pleased, and inspired ( $\alpha = .85$ ) and negative affect items included feeling embarrassed, anxious, hurt, resentful, and irritated ( $\alpha = .84$ ). Previous research has indicated that these measures of positive and negative affect are significantly associated with behavioral responses to health-related social control (Tucker, 2002). Participants also indicated how often they had each of the following behavioral responses to these social control attempts (1 = *never* to 4 = *always*): (a) did what the person wanted them to do, (b) ignored the person, (c) did the opposite, and (d) hid the behavior. These items have been used in previous research on older adults (Tucker, 2002) and married couples (Tucker & Anders, 2001), the latter study finding that spouses’ rating on these items correlated moderately to strongly with their partners’ perceptions of their behavioral responses to social control attempts. Table 1 presents descriptive statistics and intercorrelations for the main study variables.

*Analytic Approach*

Hierarchical linear regression analysis was used to examine associations of conscientiousness and neuroticism with the outcomes of interest. Demographic covariates were entered at the first step of the regression models, followed by conscientiousness and neuroticism on the second step. For analyses predicting to affective and behavioral responses to direct social control, we also included type of social control (positive strategies, negative strategies) on the second step of the model, followed by the four Personality  $\times$  Type of Social Control interaction terms on the third step of the model. All analyses used design weights to obtain unbiased estimates for the population of all eligible (age 25-80, English-speaking) household residents of Los Angeles County. These weights accounted for the differential selection probabilities by age and household structure created by the selection algorithm. Nonresponse weights were not constructed given that a simple model of nonresponse, based on participation rates as a function of the age of the requested respondent, found no evidence of differential nonresponse ( $p = .65$ ). Standardized regression coefficients are reported throughout.

## RESULTS

The first goal of this study was to examine associations of conscientiousness and neuroticism with general measures of indirect and direct health-related social control. Results from these analyses are shown in Table 2. We expected that individuals with higher conscientiousness would report stronger feelings of obligation and responsibility to others to be healthy (i.e., indirect social control). This hypothesis was supported. We did not make a similar prediction for neuroticism given that a sense of responsibility to others is not a hallmark of this personality trait and neuroticism was in fact unrelated to experiences of indirect social control in our sample. In terms of direct social control, our exploratory analysis indicated that individuals with higher neuroticism reported more frequent attempts by others aimed at changing their health habits, although conscientiousness was unrelated to frequency of direct social control.

The second goal of the study was to investigate how conscientiousness and neuroticism were associated with affective and behavioral responses in a specific situation involving health-related social control.<sup>1</sup> We expected that more conscientious individuals would have stronger positive affective and behavioral responses to direct social control. As shown in Table 3, this was the case in terms of having a more positive affective response to others' attempts to influence their health habits. However, conscientiousness was not significantly

**TABLE 2: Linear Regression Analysis Predicting Health-Related Social Control From Conscientiousness and Neuroticism, Adjusting for Demographic Characteristics**

Step and Variable	Direct Social Control		Indirect Social Control	
	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$
Step 1	.172***		.067***	
Age (continuous)		-.16***		.10*
African American (vs. White)		.15**		-.01
Hispanic (vs. White)		.24***		-.02
Other (vs. White)		.21***		.03
Post-high school education		-.16**		-.01
Female		.06		.12*
Married		.08		.19***
Step 2	.064***		.045***	
Conscientiousness		.01		.23***
Neuroticism		.28***		.05
Total $R^2$	.236***		.112***	

NOTE:  $N = 498-499$ . Standardized regression coefficients are reported.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

related to any of the four behavioral responses that we examined, although individuals with higher conscientiousness were marginally less likely to hide their unhealthy behaviors from others in response to direct social control attempts ( $p = .08$ ).

In the case of neuroticism, we expected that individuals with high neuroticism would report having a more negative response to others' attempts to influence their health behaviors, especially when less positive or more aversive social control strategies were used. In partial support of this prediction, we found that individuals with higher neuroticism reported feeling significantly more negative affect in response to attempts by others to influence their health behaviors. However, when the four Personality  $\times$  Type of Social Control interaction terms were added to the models, we did not find the associations of neuroticism with these affective responses were moderated by the extent to which the respondent experienced positive and negative social control (see Table 3). In terms of behavioral responses to social control, we did not find main effects of neuroticism on any of the four behavioral responses that we examined. When the Personality  $\times$  Type of Social Control interaction terms were added to these models, we found significant Neuroticism  $\times$  Positive Social Control interactions in three of the four cases: attempting to engage in the desired behavior, ignoring the social control agent, and hiding unhealthy behavior from the social control agent (see Table 4). However, the nature of these interactions was contrary to expectations. To provide a clear representation of these interactions, we plotted the associations of neuroticism with these behavioral responses to

**TABLE 3: Linear Regression Analysis Predicting Affective Responses to Experiencing Direct Health-Related Social Control From Conscientiousness and Neuroticism, Adjusting for Demographic Characteristics and Type of Social Control**

<i>Step and Variable</i>	<i>Positive Affect</i>		<i>Negative Affect</i>	
	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$
Step 1	.072**		.041	
Age (continuous)		.15*		-.13*
African American (vs. White)		.01		-.05
Hispanic (vs. White)		.14*		-.15*
Other (vs. White)		.03		-.001
Post-high school education		-.07		-.01
Female		.16*		.04
Married		.04		-.08
Step 2	.232***		.40***	
Positive social control		.36***		-.05
Negative social control		-.18***		.58***
Conscientiousness		.14*		-.01
Neuroticism		-.08		.19***
Step 3	.012		.008	
Conscientiousness $\times$ Positive SC		.19		-.16
Conscientiousness $\times$ Negative SC		-.35		.23
Neuroticism $\times$ Positive SC		.11		.33
Neuroticism $\times$ Negative SC		.33		.19
Total $R^2$	.316***		.449***	

NOTE:  $N = 283$ - $284$ . SC = social control. Standardized regression coefficients are reported.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

direct social control under conditions of low ( $1\ SD < M$ ), medium ( $M$ ), and high ( $1\ SD > M$ ) levels of positive social control. As shown in Figure 1, individuals low in neuroticism were more likely to engage in the desired behavior and were less likely to ignore the social control agent or hide their unhealthy behavior when more positive social control attempts were used. However, as neuroticism increased, the positivity of the social control attempts made less of a difference in terms of behavioral responses.

## DISCUSSION

A number of studies have found that conscientiousness and neuroticism are significant predictors of engagement in health-compromising and health-promoting behaviors (e.g., Booth-Kewley & Vickers, 1994; Hoyle et al., 2000; Ingledew & Brunning, 1999; Lemos-Giráldez & Fidalgo-Aliste, 1997; Terracciano & Costa, 2004; Trobst et al., 2000). The goal of this study was to significantly extend this literature by investigating a possible mechanism through which these personality traits might be associated with lifestyle: the social regulation of health behavior. Our findings suggest that both conscientiousness and neuroticism are associated with health-related social control, but in very different ways that may further our understanding of how these personality traits influence current engagement

in health-related behavior and have a long-term influence on health outcomes such as mortality (e.g., Christensen et al., 2002; Friedman et al., 1993).

The conscientiousness trait reflects, in part, one's propensity to be responsible, to be dependable, and to follow norms and rules (John & Srivastava, 1999). As such, we expected individuals with higher conscientiousness to report stronger experiences of indirect health-related social control; in other words, they would feel greater responsibility and obligation to try to be healthy because they perceived that others thought it was important to be physically fit, depended on them to be healthy, and would be disappointed if they did not make an effort to do so. This hypothesis was supported. Furthermore, individuals with higher conscientiousness appeared to be more receptive to direct social control attempts from others in that they reported stronger positive affect (e.g., feeling loved, valued, happy, pleased, inspired) in response to these attempts. However, conscientiousness was not related to the frequency with which these direct social control attempts occurred or to participants' behavioral responses to experiencing direct social control. Thus, a key finding from this study is that the social regulation of health behavior experienced by highly conscientious individuals may have more to do with their own internalized notions of responsibility and obligation to significant others than to specific actions by these significant others aimed at influencing their health habits. It is interesting to note that the healthier lifestyle of conscientious

**TABLE 4: Linear Regression Analysis Predicting Behavioral Responses to Experiencing Direct Health-Related Social Control From Conscientiousness and Neuroticism, Adjusting for Demographic Characteristics and Type of Social Control**

<i>Step and Variable</i>	<i>Engage</i>		<i>Do Nothing/Ignore</i>		
	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	
Step 1	.028		.021		
Age (continuous)		-.03		.02	
African American (vs. White)		-.01		.005	
Hispanic (vs. White)		-.06		-.06	
Other (vs. White)		-.12		.07	
Post-high school education		.07		.03	
Female		.08		-.04	
Married		.06		-.11	
Step 2	.105***		.159***		
Positive social control		.25***		-.27***	
Negative social control		-.16***		.25***	
Conscientiousness		-.04		-.04	
Neuroticism		-.06		-.03	
Step 3	.018		.026		
Conscientiousness $\times$ Positive SC		-.13		.22	
Conscientiousness $\times$ Negative SC		-.12		.86	
Neuroticism $\times$ Positive SC		-.48*		.65*	
Neuroticism $\times$ Negative SC		.26		.45	
Total $R^2$	.151***		.207***		
		<i>Do the Opposite</i>		<i>Hide Behavior</i>	
<i>Step and Variable</i>	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	
Step 1	.070**		.037		
Age (continuous)		-.12*		-.18**	
African American (vs. White)		.05		.06	
Hispanic (vs. White)		-.10		-.03	
Other (vs. White)		-.02		-.03	
Post-high school education		-.15		-.03	
Female		-.03		.01	
Married		-.15*		-.02	
Step 2	.102***		.111***		
Positive social control		-.08		-.02	
Negative social control		.29***		.31***	
Conscientiousness		.03		-.11	
Neuroticism		.05		.01	
Step 3	.008		.015		
Conscientiousness $\times$ Positive SC		.35		.53	
Conscientiousness $\times$ Negative SC		.30		-.35	
Neuroticism $\times$ Positive SC		.42		.58*	
Neuroticism $\times$ Negative SC		.02		-.06	
Total $R^2$	.180***		.163***		

NOTE:  $N = 283-284$ . SC = social control. Standardized regression coefficients are reported.

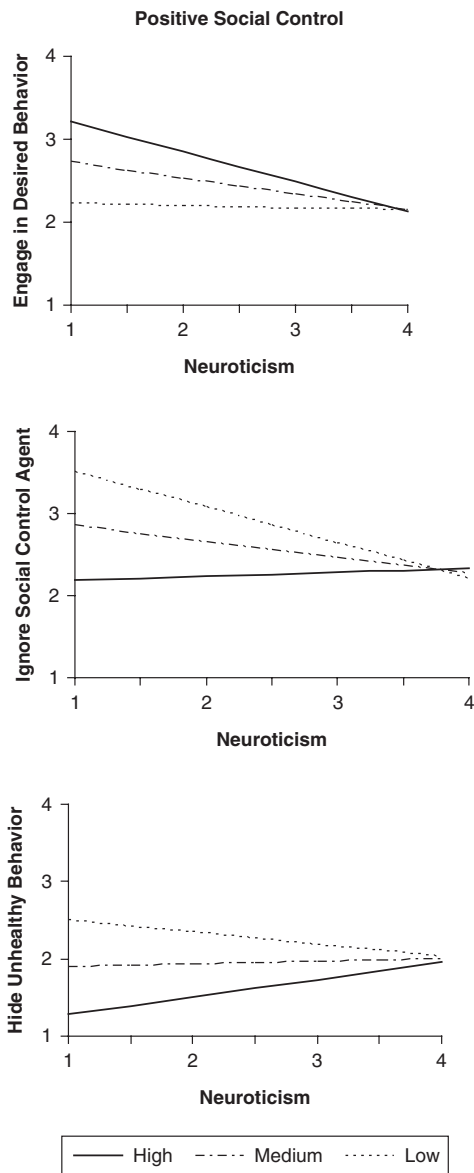
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

individuals often is interpreted as due to qualities such as perseverance, self-discipline, goal-directedness, and deliberativeness (e.g., Booth-Kewley & Vickers, 1994; Hoyle et al., 2000). Results from this study suggest that how conscientious individuals think about themselves in relation to significant others—specifically, their heightened sense of responsibility and obligation to do the right thing—may be another reason why conscientious individuals are

more likely to avoid risky behavior and engage in health-promoting behavior.

Our results further indicate that the social regulation of health behavior operates quite differently in the case of neuroticism. As expected, neuroticism was unrelated to experiences of indirect social control. However, individuals with higher neuroticism reported experiencing more frequent direct social control attempts





**Figure 1** Associations of neuroticism with behavioral responses to direct social control under conditions of low ( $1\ SD < M$ ), medium ( $M$ ), and high ( $1\ SD > M$ ) levels of positive social control.

from others, perhaps reflecting their greater engagement in unhealthy or risky behavior.<sup>2</sup> These direct social control attempts, our results suggest, do not appear to be particularly effective for individuals with high neuroticism. Perhaps due to their greater propensity toward negative affect and self-consciousness (John & Srivastava, 1999), individuals with high neuroticism reported having a more negative affective response when others attempted to influence their health habits. In terms of behavioral responses to social control, our results

indicated that individuals low in neuroticism had more favorable responses when social control attempts were more positively framed. This is consistent with previous research indicating that positive social control strategies—such as doing things to make it easier for the person to change the behavior, offering to help, providing information, rewarding attempts to change the behavior, and providing encouragement and support—are generally associated with more favorable responses to social control (Cohen & Lichtenstein, 1990; Tucker & Anders, 2001). As neuroticism increased, however, the positivity of the social control attempts made less of a difference in terms of the individual's behavioral responses. The reasons for this unexpected finding are unclear but raise the interesting possibility that individuals with high neuroticism are unable to detect different levels of positive social control, or perhaps are unresponsive to these different levels of positive social control. Regardless of the source, these results suggest that social control strategies that generally tend to be facilitative in encouraging healthy behavior change may not make much of a difference for individuals with high neuroticism.

In their recent review of the literature on personality and sexual risk taking, Hoyle and colleagues (2000) lamented the conspicuous absence of personality processes from models of sexual risk taking. This is true of health behavior and behavior change models in general (Fishbein et al., 2001). Results from this study add to a growing literature demonstrating the relevance of personality characteristics to understanding why individuals engage in certain health-related behavior and the importance of incorporating personality into such models. Furthermore, our findings have implications for interventions aimed at encouraging positive health behavior change. Although research on the stability of personality in adulthood (McCrae & Costa, 1994) suggests that it may not be possible to significantly modify an individual's propensity toward conscientiousness or neuroticism, it may be desirable to design interventions and programs that take personality characteristics into account (Muten, 1991). A smoking cessation program that involves a partner or friend in the behavior modification effort, for example, may be especially useful for individuals with low conscientiousness due to their relatively low internalized sense of social responsibility to change their behavior. However, it would be important for such a program to address the special needs of individuals with high neuroticism: a tendency to experience psychological distress when others attempt to influence their health habits combined with lower sensitivity to the social control strategies that may be most effective in eliciting positive behavior change. These suggestions, of course, are quite speculative at this point; further

research is needed to better understand how personality and social influence processes may work together to shape health-related behavior and encourage positive behavior change.

Although not a main focus of this study, our findings revealed some interesting associations of demographic characteristics with experiences of health-related social control. For example, being older was negatively associated with experiencing direct social control but being female and older were each positively associated with feelings of indirect social control. We have recently examined in greater detail how social control processes differ according to age and gender in this data set and refer interested readers to this article (Tucker, Orlando, Elliott, & Klein, in press). Although prior research has found marital status differences in exposure to direct social control, at least among men (Umberson, 1992), we did not find an association between marital status and direct social control; however, being married was associated with stronger feelings of indirect social control in our sample. Finally, there is little understanding of whether, and in what ways, race/ethnicity and educational attainment may moderate health-related social control processes. Our findings provide an initial glimpse at this issue, suggesting that racial/ethnic minorities and less-educated persons experience greater direct social control aimed at influencing their health behaviors, but there are more similarities than differences across racial/ethnic and educational groups in affective and behavioral responses to this type of social influence.

An important strength of this study is the use of a probability sample of household residents to investigate the ways in which conscientiousness and neuroticism are associated with experiences of health-related social control. However, the study has a number of limitations. The sample was restricted to English-speaking household residents of Los Angeles County who were willing and able to complete a telephone interview; thus, results from this study may not generalize to other populations, such as adults who are less acculturated, reside in nonhousehold settings or different geographic regions, or have significant cognitive or physical impairments. We experienced some difficulty recruiting household informants to complete the eligibility screener as well as eligible respondents to complete the interview within the time constraints of our field period. Although few of the screened households refused the interview, resulting in an excellent cooperation rate, the relatively low response rate is a limitation of the study and it is possible that individuals with low conscientiousness and/or high neuroticism were less likely to complete the screener and thus participate in the study. Other limitations include the cross-sectional nature of this study as well as the use of retrospective

reports (which may reflect perceptual biases inherent in the personality constructs of interest, particularly neuroticism). Two other caveats should be noted. First, some of the items in our measure of negative social control required respondents to infer the social control agent's motives (e.g., "Did this person try to make you feel guilty?") and it is possible that individuals with high neuroticism are more likely to interpret their interactions with others as reflecting negative social control efforts and respond in accordance with those interpretations. Second, findings from this study should be interpreted in light of the number of analyses performed, particularly given that several hypothesized associations were not empirically supported.

Despite these limitations, this study is groundbreaking in its examination of how conscientiousness and neuroticism are associated with experiences of direct and indirect health-related social control. Findings from this study indicate that these associations are not straightforward, particularly in the case of neuroticism. However, they point to interesting and innovative directions for theory and research that should further our understanding of how these aspects of personality are related to engagement in health-related behavior and, ultimately, to important health outcomes.

#### NOTES

1. To determine whether associations of personality with responses to the social situation were due to characteristics of the situation itself, we correlated the two personality scales (conscientiousness, neuroticism) with the following situational characteristics: how long the situation lasted, whether the situation was ongoing, frequency of experiencing social control, how much the social control agent wanted the respondent to change the behavior in question, and how much the respondent wanted to change the behavior in question. All of these correlations were weak ( $r < .10$ ) and nonsignificant.

2. Although longitudinal analyses would be expected to show that experiencing health-related social control is associated with declines in unhealthy or risky behaviors over time, cross-sectional analyses typically indicate that current engagement in a less healthy lifestyle is associated with greater attempts from others to encourage health-related behavior change.

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