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**EXAMINING EARLY MALADAPTIVE SCHEMAS, DEPRESSION, AND  
HEALTH BEHAVIORS**

by

Juliana D'Onofrio

A Thesis

Submitted to the  
Department of Psychology  
College of Science and Mathematics  
In partial fulfillment of the requirement  
For the degree of  
Master of Arts in Clinical Psychology  
at  
Rowan University  
May 9, 2019

Thesis Chair: Jim A. Haugh, Ph.D.

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## Dedications

I would like to dedicate this manuscript to my mother, Holly D'Onofrio, my sisters, Michela D'Onofrio and Isabella D'Onofrio, my stepfather, Cliff Rachman, and my partner, Michael Squicciarini.

## Acknowledgments

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## Abstract

Juliana D'Onofrio  
EXAMINING EARLY MALADAPTIVE SCHEMAS, DEPRESSION, AND HEALTH  
BEHAVIORS  
2018-2019  
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Doctor of Philosophy

Chronic disease continues to predominate the leading causes of death and account for the majority of healthcare expenditures in the United States. Researchers have identified that engagement in negative health behaviors, such as eating a poor diet, physical inactivity, risky sexual activity, nicotine and illicit drug use, and excessive alcohol consumption is a key risk factor for developing chronic disease later in life. In order to help motivate individuals to adhere to a healthy lifestyle, understanding why an individual might engage in negative health behaviors is warranted. Young's schema theory is a social cognitive theory that explores early maladaptive schemas in relation to mental health and maladaptive behaviors. The current exploratory study offers direct examination of the differential relationships between depressive symptoms, early maladaptive schemas, and a range of negative health behaviors. The sample consisted of 518 participants, with an age range of 18 to 66 ( $M=20.5$ ;  $SD=4.9$ ). Participants completed the Young Schema Questionnaire-3, Short Form (YSQ-S3), the Center for Epidemiologic Studies for Depression Scale, 10-item (CES-D-10), and a survey to assess engagement in negative health behaviors. Results identified eight specific early maladaptive schemas as important predictors for engagement in negative health behaviors. Clinical implications and future directions are discussed.

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## Chapter 1

### Introduction

Chronic disease continues to predominate the leading causes of death and account for the majority of healthcare expenditures in the United States. Cardiovascular disease, cancer, lower respiratory disease, stroke, diabetes, and human immunodeficiency virus are common chronic diseases associated with high burden. Collectively, it has been estimated that chronic diseases account for 68% of all deaths and 90% of healthcare expenditures in the country (Gerteis, et al., 2014; Heron, 2016; National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], 2019). Moreover, expenses are anticipated to continue to rise. For example, the cost of treating diabetes totaled \$327 billion in 2017, which was a 26% increase from 2014 (American Diabetes Association, 2018). In response to the burden of chronic disease, researchers have identified risk factors associated with susceptibility. One identified risk factor is engagement in negative health behaviors, such as eating a poor diet, physical inactivity, risky sexual activity, nicotine and illicit drug use, and excessive alcohol consumption (Farhud, 2015; Willett, 2006). While engagement in negative health behaviors increases vulnerability (Heron, 2016), maintaining a healthy lifestyle acts as an important buffer for developing chronic disease (NCCDPHP, 2019). Schroeder (2007) examined health in the United States and identified five main sources of influence. Results indicated that a majority of health is influenced by behavioral patterns (40%), followed by genetic predisposition (30%), social circumstances (15%), health care (10%), and environmental exposure (5%).

Despite the well-documented link between negative health behaviors and the development of chronic disease, many individuals do not adhere to a healthy lifestyle. Within the context of psychological intervention, it can become important to understand why individuals might engage in negative health behaviors. Personality is one construct that has been associated with negative health behaviors in previous literature. A recent meta-synthesis found a moderate direct relationship between the Big Five personality traits and sexual risk taking, alcohol consumption, nicotine use, physical inactivity, and poor diet (Strickhouser, Zell, & Krizan, 2017). While the Big Five originates as a trait theory of personality, Young's schema theory (1990) is one major social cognitive theory that explores maladaptive personality characteristics in relation to mental health. The value of approaching personality through a social cognitive lens as opposed to the trait perspective is the comparative malleability of cognition. Young first proposed schema theory in an attempt to explain why some individuals might be unresponsive to traditional cognitive-behavioral therapy (CBT) and why some individuals experience higher rates of relapse following treatment. He posited that underlying characterological problems were not being fully addressed, making treatment less effective (Young, Klosko, & Weishaar, 2003).

Schemas are cognitive patterns individuals apply to reality in order to help them explain, perceive, and respond to situations (Tesser & Leone, 1977). Young further proposed that early maladaptive schemas (EMSs) are defined as self-defeating emotional and cognitive patterns that begin early in our development and repeat throughout the life. Young theorized that specific characterological problems result from the development of EMSs formed in early childhood or adolescence. The theory posits that unmet core

emotional needs are the basis for EMS development. While an EMS might be formed as a means to adaptively respond to emotional neglect or an adverse experience, beliefs are carried into late adolescence or early adulthood when they potentially become maladaptive (Young, Klosko, & Weishaar, 2003; Young & Matilla, 2006). Young brought forth a model to explain maladaptive behavior, which includes 18 individual EMSs (see Table 1; Young, 1999). Young also proposed that the 18 EMSs can be organized into five higher-order domains; however, confirmatory factor analysis has supported the utilization of only three higher-order domains (Calvete, Estévez, López de Arroyabe, & Ruiz, 2005; Calvete, Orue, & González-Diez, 2013).

Table 1

*Descriptions of early maladaptive schemas.*

EMS	Description
Mistrust/Abuse	Expectation that others will intentionally harm the individual (e.g., hurt, abuse, neglect, humiliate, cheat, lie, manipulate).
Emotional Deprivation	Expectation that a normal degree of nurturance, empathy, or protection will not be provided by others.
Defectiveness/Shame	Belief that one is defective, bad, inferior and therefore unlovable to a significant other. Perceived flaws might be private (e.g., selfishness) or public (e.g., attractiveness).
Social Isolation/Alienation	Belief that one does not belong to any particular group or community.
Emotional Inhibition	Excessive suppression of actions, feelings, or communication as a means to avoid disapproval from others, shame, or loss of control of one's emotional impulses.

Table 1 (continued)

EMS	Description
Abandonment/Instability	Belief that others will not be able to provide core emotional needs (e.g., support, connection, practical protection) because they will imminently die or abandon the individual for someone more favorable.
Failure	Belief that one failure has already failed, will fail, or is inadequate and inferior to one's peers.
Dependence/Incompetence	Belief that one is incompetent in the absence of others.
Vulnerability to Harm/Illness	Fear that pending catastrophe will occur, and one will be unable to prevent medical, emotional, or external harm.
Emmeshment/Undeveloped Self	Belief that one may not survive without the constant support of the other, or vice versa. Belief might include feelings of emptiness, having no direction, and lack of self-identity.
Subjugation	Belief that one is not valid or important to others leading to suppression of one's preferences, decisions, desires, and emotions.
Insufficient Self-Control/Discipline	Extreme difficulty to exercise adequate self-control and inhibit one's emotions or impulses.
Self-Sacrifice	Excessive effort to meet the needs to others at the consistent expense of oneself as a means to avoid causing pain, feeling guilty or selfish, or to maintain social connections.
Approval/Recognition-Seeking	Excessive effort to gain approval, recognition, or attention from others.
Negativity/Pessimism	Pervasive and life-long emphasis the negative (e.g., pain, loss, disappointment, conflict) while minimizing the positive.
Unrelenting Standards	Standards placed on oneself that are difficult or impossible to meet (e.g., perfectionism, rigid rules, need to accomplish).
Punitiveness	Belief that people, including oneself, should be severely punished for imperfections.
Entitlement/Grandiosity	Belief that one is entitled, privileged, and superior when compared to others.

*Note.* EMS=Early Maladaptive Schemas. Descriptions were adapted from Young, Klosko, and Weishaar (2003).

Within schema theory, behaviors an individual might engage in are not components of the EMS itself, but a response to EMS activation. Specifically, a situation or experience may activate a specific EMS that an individual has developed. As a means to cope with EMS activation, an individual might respond in different negatively reinforcing or self-defeating ways. For example, as an attempt to avoid an activated EMS, an individual might consume excessive amounts of alcohol or use illicit drugs. The cycle of EMS activation and corresponding behavioral responses perpetuate and maintain the EMS (Young, Klosko, & Weishaar, 2003).

Previous literature has examined the long-term negative implications of schema development and perpetuation. For example, EMSs have been associated with a number of personality disorders, mood disorders, substance use disorders, and eating disorders (Anderson, Rieger, & Caterson, 2006; Ball, & Young, 2000; Calvete, 2014; Elmquist, Shorey, Anderson, & Stuart, 2015; Nordahl, Holthe, & Haugum, 2005; Saritaş Atalar & Gençöz, 2015; Shorey, Elmquist, Anderson & Stuart, 2015; Shorey, Stuart, & Anderson, 2013). Young originally developed schema therapy for individuals with personality disorders (Young, 1999). However, schema therapy has since been used across multiple disorders in order to counter avoidance patterns and alter underlying EMSs. Research within this area has indicated that when individuals are treated with a schema-focused treatment approach, targeted EMS endorsement is reduced, and corresponding symptom reduction is maintained (Shorey, Stuart, Anderson, & Strong, 2013; Renner, et al., 2013).

Given the established effectiveness of schema therapy, it seems plausible that individuals with stable EMSs might also benefit from a schema-focused approach as a means to prevent or modify their engagement in negative health behaviors. However, one

limitation is that these studies largely focus on diagnosis rather than on negative health behaviors. Specifically, studies conducted have often examined whether the individual is diagnosed and the dichotomous association with EMS endorsement. While diagnosis might imply engagement in negative health behaviors (e.g., alcohol use disorder implies excessive alcohol consumption), previous research into the direct association between EMS endorsement and negative health behaviors is limited.

A second limitation is that EMSs have been frequently examined through EMS domains rather than individual EMSs. Within the three higher-order domain model, domains are organized to each include five to seven individual EMSs. Accurate assessment and identification of specific EMSs becomes important for case conceptualization as well as using a schema-focused treatment approach. According to Young, Klosko, and Weishaar (2003), identifying the correct EMS guides the process of treatment, improves therapeutic alliance, and counterbalances areas of potential difficulty throughout change.

A final limitation pertains to the possible existence of multicollinearity among the individual EMSs. Panić, Stanojević, and Pešić (2016) discussed possible multicollinearity across EMSs when they found significant correlations across all EMSs at the  $<.01$   $p$ -value. Few studies have examined EMSs with specific health behaviors, such as eating habits, sexual activity, and substance use. In addition, those studies have also tended to use statistical procedures vulnerable to multicollinearity (e.g., multivariate analysis of variance, multiple linear regression). As a result, it becomes difficult to discern whether multicollinearity among EMSs have impacted previous results.

As briefly stated, EMSs have been associated with mood disorders. Particularly, EMSs have been consistently linked with the presence of depressive disorders (Calvete, 2014; Shorey, Elmquist, Anderson, & Stuart, 2015). Moreover, depressive symptoms have also been consistently associated with negative health behaviors. Allgower, Wardle, and Steptoe (2001) explored the associations across depressive symptoms and personal health behaviors in a sample of college undergraduate students. Results indicated that depressive symptoms were positively associated with poor nutritional habits (e.g., not eating breakfast, not eating fruits), physical inactivity (e.g., sedentary behavior), nicotine use, and irregular sleep (Allgower, Wardle, & Steptoe, 2001).

In a later study, Soltis et al. (2018) examined how baseline depressive symptoms influenced alcohol problems, and substance-related and substance-free reinforcement. Results indicated that depressive symptoms at baseline predicted higher impaired self-control, self-perception, and self-care with regards to alcohol problems and lower engagement or interest in substance-free activities at 12-months (Soltis, et al., 2018). Finally, previous research has indicated an association between depressive symptoms and sexual risk taking, including higher adolescent sexual activity, condom nonuse, and sexually transmitted infections (Lehrer, Shrier, Gortmaker, & Buka, 2006; Shrier, Harris, Sternberg, & Beardslee, 2001; Waller, et al., 2006).

The overarching goal of the current study was to explore how individual EMSs might directly and differentially relate to engagement in negative health behaviors. This study sought to explore this goal while using a statistical procedure that accounts for the existence of multicollinearity across variables. Moreover, given the previously established and stable link between depressive symptoms and negative health behaviors



(Allgöwer, Wardle, & Steptoe, 2001), we also sought to account for preexisting relationships by including depressive symptoms as a predictor variable.

## Chapter Two

### Method

#### Participants

A total of 616 individuals were recruited for the current study. Seventy-seven participants were removed for incomplete data, 17 participants were removed for straightlining (e.g., continuously selecting the same answer regardless of question; Zhang & Conrad, 2014), and four participants were removed for responses that were three standard deviations above the mean on items assessing for physical activity and alcohol consumption. As a result, the current sample consisted of 518 participants. Participant age ranged from 18 to 66 ( $M=20.5$ ;  $SD=4.9$ ) and 57.3% identified as female ( $n=297$ ). Seventy and three percent ( $n=366$ ) identified as Caucasian, followed by African American (13.3%;  $n=69$ ), Asian (7.7%;  $n=40$ ), Native American/Alaska Native (0.6%;  $n=3$ ), and Native Hawaiian/Pacific Islander (0.4%;  $n=2$ ), while 7.3% ( $n=38$ ) indicated other/none or preferred not to answer. Eighty-three percent of the sample identified as Non-Hispanic/Latinx ( $n=428$ ) and Hispanic/Latinx (14.7%;  $n=76$ ), while 3% ( $n=16$ ) preferred not to answer.

#### Measures

**Young Schema Questionnaire-3, Short Form (YSQ-S3; Young, 2005).** The YSQ-S3 is a 90-item self-report measure that was developed to assess the 18 EMSs and five schema domains originally identified by Young and Brown (1990; Young, Klosko, & Weishaar, 2003). In order to detect straightlining, the authors of the current study

added five check questions to determine validity of participant responses. Previous confirmatory factor analysis supported the 18 first-order factor structure (Calvete, Estévez, López de Arroyabe, & Ruiz, 2005). Items on the YSQ-S3 include statements about beliefs for oneself, others, and the world. Participants are asked to rate each statement on a 6-point Likert-scale, ranging from *Completely untrue of me* (1) to *Describes me perfectly* (6). Five items within the YSQ-S3 assess each of the specific 18 EMSs. To calculate the specific EMS total scores, corresponding items are summed. The 18 EMS scales have demonstrated adequate to high internal consistency ( $\alpha > .70$ ; Bach, Simonsen, Christoffersen, & Kriston, 2015) and adequate to high internal consistency for the current sample ( $\alpha = .58-.91$ ).

**Health behaviors.** A survey was created to assess a number of participants' health behaviors. In order to assess for a broad range of health behaviors and to allow for better comparability with previous research, items were either adapted from a number of existing measures or original. Items that were adapted originated from the following measures: The Brief Risk Factor Surveillance System Questionnaire (BRFSS; Centers for Disease Control and Prevention [CDC], 2017), The Youth Risk Behavior Survey (YRBS; CDC, 2017), The Binge-Eating Disorder Screener 7 (BEDS-7; Herman, 2015), and The Food and Drug Administration (FDA) Health and Diet Survey (Lin, Zhang, Carlton, & Lo, 2014). Participants answered between 31 and 47 items based on their responses to questions and skip logic within the survey. Health behaviors were chosen based on previous literature examining risk factors for chronic diseases and include nine areas (Gerteis, et al., 2014; Heron, 2016; NCCDPHP, 2019). More specifically, items assess physical activity, eating habits, sexual activity, nicotine use, marijuana use, alcohol use,

safety and prevention, physical health, and mental health (see Table 2). A full copy of the survey used to assess health behaviors can be viewed in Appendix A.

Table 2

*Items used to assess each health behavior.*

Outcome	Items
Physical activity	<ul style="list-style-type: none"> <li>• During the past month, other than your regular job, did you participate in any physical activities or exercise such as running, calisthenics, golf, gardening, or walking for exercise? When you took part in this activity, for how many minutes or hours did you usually keep at it?</li> </ul>
Eating habits	<ul style="list-style-type: none"> <li>• In general, how healthy is your overall diet?</li> <li>• During the last 3 months, did you have any episodes of excessive overeating (i.e. eating significantly more than what most people would eat in a similar period of time)?</li> </ul>
Sexual activity	<ul style="list-style-type: none"> <li>• During the past 3 months, with how many people did you have sexual intercourse?</li> <li>• The last time you had sexual intercourse, did you or your partner use a condom?</li> <li>• Did you drink alcohol or use drugs before you had sexual intercourse the last time?</li> </ul>
Nicotine use	<ul style="list-style-type: none"> <li>• Do you smoke cigarettes every day, some days, or not at all?</li> <li>• Do you use e-cigarettes or other electronic vaping products every day, some days, or not at all?</li> </ul>
Marijuana use	<ul style="list-style-type: none"> <li>• During the past 30 days, on how many days did you use marijuana or hashish?</li> </ul>
Alcohol use	<ul style="list-style-type: none"> <li>• One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on average?</li> <li>• Considering all types of alcoholic beverages, how many times during the past 30 days did you have X [X=5 for men; X=4 for women] or more drinks on an occasion?</li> </ul>

Table 2 (continued)

Outcome	Items
Safety and prevention	<ul style="list-style-type: none"> <li>• How often do you use seat belts when you drive or ride in a car?</li> <li>• About how long has it been since you last visited a doctor for a routine checkup?</li> </ul>
Physical health	<ul style="list-style-type: none"> <li>• In general, how would you rate your physical health?</li> <li>• During the past 30 days, for about how many days did poor physical health keep you from doing your usual activities, such as self-care, work, or recreation?</li> </ul>
Mental health	<ul style="list-style-type: none"> <li>• In general, how would you rate your mental health?</li> <li>• During the past 30 days, for about how many days did poor mental health keep you from doing your usual activities, such as self-care, work, or recreation?</li> </ul>

*Note.* Quantitative data from items was entered as the outcome variables in Random Forest analyses.

**Center for Epidemiologic Studies for Depression Scale, 10-item (CES-D-10; Kohout, Berkman, Evans, & Cornoni-Huntley, 1993).** The CES-D-10 is a 10-item self-report questionnaire that assesses for the presence of depressive symptoms over the past week. Items are rated on a 4-point Likert-scale, ranging from *Rarely or none of the time* (0) to *All of the time* (3). Total scores on the CES-D-10 range from 0-30, and a total score of 10 or higher indicates the presence of depressive symptoms. In previous research, the CES-D-10 has demonstrated high test-retest reliability in geriatric samples ( $r=.71$  to  $.83$ ; Andresen, Malmgren, Carter, & Patrick, 1994; Irwin, Artin, & Oxman, 1999). In addition, the CES-D-10 has been reported to have high convergent validity with the Depression and Functioning subscale of the Behavior and Symptom Identification Scale (BASIS-24;  $r=.86$ ) and high divergent validity with the Psychosis and Substance Use subscales of the BASIS-24 ( $r=.18$  and  $.09$ , respectively; Björgvinsson, Kertz, Bigda-

Peyton, McCoy, & Aderkal, 2013). The CES-D-10 demonstrated adequate internal consistency in the current sample ( $\alpha=.74$ ).

## **Procedure**

Participants were recruited through two different strategies. First, undergraduate students from a public university in the northeastern United States were recruited through SONA-systems, an online participant management program. Second, individuals from the general community were recruited online through advertisements posted on Reddit, Craigslist, and social media sites, such as Facebook and Twitter. Regardless of recruitment method, questionnaires were uploaded and administered through Qualtrics, an online research platform through which participants can access surveys. Participants were provided the link to Qualtrics and completed, in order, the online consent form, a brief demographic questionnaire, the YSQ-S3, the health behavior questionnaire, and the CES-D-10.

Participants recruited through the online undergraduate subject pool were granted credit toward their completion of participation requirements for their Introduction to Psychology course. Participants recruited through online advertisement were given the opportunity to enter their email address into a drawing for a \$25 Tango gift card. Participation was voluntary and all responses were anonymous. In order to maintain anonymity, all participants were redirected to a separate hyperlink at the end of the survey where they were given the option to enter their name or email address for credit and compensation. The study protocol was approved by the university's Institutional Review Board.

## Statistical Analysis

Statistical analyses were calculated with the Statistical Package for Social Sciences, Version 24 (SPSS-24) and the R Package software (RStudio). Descriptive data and internal consistencies for the YSQ-S3 and the CES-D-10 were calculated in SPSS-24 using the Cronbach's alpha statistic. Missing data for the YSQ-S3 and CES-D-10 was replaced with multiple imputation in RStudio. Random Forest analyses were conducted in RStudio to determine how the individual EMSs might differentially relate to negative health behaviors. More specifically, the 18 EMSs and CES-D-10 total score were entered as predictor variables for each model. Correspondingly, each item to assess aforementioned health behaviors were entered as criterion variables (see Table 2). Taken together, final results consisted of 17 separate Random Forest models that were analyzed in RStudio.

Random Forest is a machine learning algorithm that builds multiple decision trees based on random observations of the data (Matsuki, Kuperman, & Van Dyke, 2016). Random Forest aggregates fitted predictions across multiple decision trees in order to obtain better predictor performance. Random Forest is capable of performing both classification and regression, while also inherently protecting against overfitting as well as detecting interactions among predictors (Biau, 2012; Matsuki, Kuperman, & Van Dyke, 2016). To protect against overfitting, Random Forest randomly samples 66% of the data when computing decision trees. Once the decision tree is built using 66% of the data, Random Forest inherently cross-validates the model using the remaining 33% of data, called the out-of-bag (OOB) data. Variable importance is determined through random permutation of one predictor across decision trees and calculating loss of

prediction accuracy as Random Forest aggregates decision tree predictions (Matsuki, Kuperman, & Van Dyke, 2016). The package used in RStudio to calculate variable importance as well as variable selection. The variable importance and standard deviation for OOB data were reported. The result of each Random Forest analysis was graphed in order to determine the relationship between variable importance and each health behavior. Graphical representation was reported and discussed for each outcome variable. Given that Random Forest is a nonparametric statistical procedure, determining normality of the data was not required (Steinberg & Colla, 1995).



## Chapter Three

### Results

#### Random Forest Analyses

Table 3 provides the variable importance from Random Forest analyses for each measure of health behavior assessed in the current study.

Table 3

*Variable importance for each health behavior.*

Health Behavior Outcome	Variable Importance
Physical activity	
Minutes of exercise per month	Abandonment/Instability
Eating habits	
Overall eating habit rating	Insufficient Self-Control/Self-Discipline
Excessive eating episodes	Insufficient Self-Control/Self-Discipline
Sexual activity	
Number of sexual partners	Emotional Inhibition
Condom use	Mistrust/Abuse
Sexual contact after alcohol/drug use	Mistrust/Abuse
Nicotine use	
Daily use of cigarettes	Abandonment/Instability
Daily use of electronic cigarettes	Social Isolation/Alienation
Marijuana use	
Number of times per month	Vulnerability to Harm/Illness
Alcohol use	
Drinks consumed per month	Approval/Recognition-Seeking
Excessive alcohol consumption	Mistrust/Abuse
Safety and prevention	
Last checkup	Defectiveness/Shame
Seatbelt use	Emotional Deprivation

Table 3 (continued)

Health Behavior Outcome	Variable Importance
Physical health	
Overall physical health rating	Mistrust/Abuse
Days of impairment	Depressive Symptoms (CES-D-10)
Mental Health	
Overall mental health rating	Depressive Symptoms (CES-D-10)
Days of impairment	Depressive Symptoms (CES-D-10)

**Physical activity.** Participants reported the number of times they exercised per week or per month as well as the minutes or hours spent each time they exercised. Responses were converted to total minutes of exercise within the previous month, with a range of 0 to 5,880 minutes. A total of 83 participants were removed for indicating “don’t know/not sure” ( $n=435$ ). Results of Random Forest analysis indicates the abandonment/instability schema is the variable importance for physical activity, with a standard deviation of 45.16 for the out-of-bag data. Graphical representation indicates those who did not endorse abandonment/instability tended to report more minutes of exercise. As endorsement for abandonment/instability increased, self-reported number of minutes for physical activity decreased.

**Eating habits.** Participants ( $N=518$ ) rated their eating habits on a 5-point Likert scale, ranging from *Poor* (1) to *Excellent* (5). Results of Random Forest analysis indicates the insufficient self-control/self-discipline schema is the variable importance for eating habits, with a standard deviation of 0.043 for the out-of-bag data. Graphical representation indicates those who did not endorse insufficient self-control/self-discipline tended to report their eating habits to be good to very good. As endorsement for insufficient self-control/self-discipline increased, self-reported eating habits decreased.

Specifically, those participants who endorsed high insufficient self-control/self-discipline tended to report that their eating habits to be fair.

Participants reported the number of times they have engaged in binge-eating within the previous three months on a 4-point Likert scale, ranging from *Never* (0) to *More than 4 times* (3). A total of 50 participants were removed for indicating “don’t know/not sure” ( $n=468$ ). Results of Random Forest analysis indicates the insufficient self-control/self-discipline is the variable importance for binge-eating episodes, with a standard deviation of 0.047 for the out-of-bag data. Graphical representation indicates those who did not endorse insufficient self-control/self-discipline tended to report never binge-eating or 1-2 times of binge-eating. As endorsement for insufficient self-control/self-discipline increased, self-reported frequency for binge-eating also increased. Specifically, those participants who endorsed high insufficient self-control/self-discipline tended to report 3-4 times or more than 4 times of binge-eating.

**Sexual activity.** Participants reported their number of sexual partners within the previous three months on an 8-point Likert scale, ranging from *I have never had sexual intercourse* (0), to *6 or more* (7). A total of 37 participants were removed for indicating “refuse to answer” ( $n=481$ ). Results of Random Forest analysis indicates the emotional inhibition schema is the variable importance for number of sexual partners, with a standard deviation of 0.067 for the out-of-bag data. Graphical representation indicates those who did not endorse emotional inhibition tended to report at least two sexual partners within the past three months. As endorsement for emotional inhibition increased, self-reported number of sexual partners decreased. Specifically, those participants who

endorsed high emotional inhibition tended to report they either have never had sexual intercourse or have not had sexual intercourse within the previous three months.

Participants reported their condom use pertaining to their most recent sexual encounter on a 3-point Likert scale, including *I have never had sexual intercourse* (0), *Yes* (1), and *No* (2). A total of 45 participants were removed for indicating “refuse to answer” ( $n=473$ ). Results of Random Forest analysis indicates the mistrust/abuse schema as the variable importance for condom use, with a standard deviation of 0.035 for the out-of-bag data. Graphical representation indicates those who did not endorse mistrust/abuse tended to report they did use a condom during their most recent sexual encounter. As endorsement for mistrust/abuse increased, self-reported condom use decreased. Specifically, those participants who endorsed high mistrust/abuse tended to report they did not use a condom during their most recent sexual encounter.

Participants reported whether they consumed alcohol and/or used drugs prior to their most recent sexual encounter on a 3-point Likert scale, including *I have never had sexual intercourse* (0), *Yes* (1), and *No* (2). A total of 28 participants were removed for indicating “refuse to answer” ( $n=481$ ). Results of Random Forest analysis indicates the mistrust/abuse schema as the variable importance for alcohol consumption or drug use prior to their most recent sexual encounter, with a standard deviation of 0.038 for the out-of-bag data. Graphical representation indicates those who did not endorse mistrust/abuse tended to report they did not consume alcohol and/or use drugs prior to their most recent sexual encounter. As endorsement for mistrust/abuse increased, likelihood of self-reported alcohol consumption and/or drug use also increased. Specifically, those

participants who endorsed high mistrust/abuse tended to report consuming alcohol and/or using drugs prior to their most recent sexual encounter.

**Nicotine use.** Participants reported their frequency of cigarette use on a 3-point Likert scale, including *Every day* (1), *Some days* (2), and *Not at all* (3). A total of 14 participants were removed for indicating “don’t know/not sure” ( $n=504$ ). Results of Random Forest analysis indicates the abandonment/instability schema as the variable importance for cigarette frequency, with a standard deviation of 0.019 for the out-of-bag data. Graphical representation indicates those who did not endorse abandonment/instability tended to report smoking cigarettes either not at all or some days. As endorsement for abandonment/instability increased, self-reported cigarette use increased. Specifically, those participants who endorsed high abandonment/instability tended to report smoking cigarettes some days to every day.

Participants reported their frequency of electronic cigarette use on a 3-point Likert scale, including *Every day* (1), *Some days* (2), and *Not at all* (3). A total of 11 participants were removed for indicating “don’t know/not sure” ( $n=507$ ). Results of Random Forest analysis indicates the social isolation/alienation schema as the variable importance for electronic cigarette frequency, with a standard of 0.028 for the out-of-bag data. Graphical representation indicates a weak, but trending relationship. Specifically, those who did not endorse social isolation/alienation tended to report less electronic cigarette use.

**Marijuana use.** Participants reported the number of days they used marijuana over the previous month with a range of zero to 30 days. A total of 36 participants were

removed for indicating “don’t know/not sure” ( $n=482$ ). Results of Random Forest analysis indicates the vulnerability to harm/illness schema as the variable importance for marijuana use, with a standard deviation of 0.403 for the out-of-bag data. Graphical representation indicates a weak, trending relationship. Specifically, those who did not endorse vulnerability to harm/illness tended to report less days of marijuana use.

**Alcohol use.** Participants reported the number of days within the previous month in which they consumed alcohol as well as the number of beverages consumed on each day. Responses were converted to total number of alcoholic beverages consumed within the previous month, with a range of 0 to 360 drinks. A total of 59 participants were removed for indicating “don’t know/not sure” ( $n=459$ ). Results of Random Forest analysis indicates the approval/recognition-seeking schema as the variable importance for alcoholic beverages consumed, with a standard deviation of 1.80 for the out-of-bad data. However, graphical representation indicates little to no relationship between approval/recognition-seeking endorsement and number of alcoholic beverages consumed.

Participants reported the number of times they engaged in excessive alcohol consumption (i.e., consuming  $X$  [ $X=5$  for men;  $X=4$  for women] or more drinks on one occasion) within the previous month, with a range of 0 to 20 times. A total of 87 participants were removed for indicating “don’t know/not sure” ( $n=431$ ). Results of Random Forest analysis indicates the mistrust/abuse schema as the variable importance for excessive alcohol consumption, with a standard deviation of 0.138 for the out-of-bag data. Graphical representation indicates a weak, but trending relationship. Specifically, those who did not endorse mistrust/abuse tended to report a lower number times they

consumed alcohol excessively. As endorsement for mistrust/abuse increased, self-reported times of excessive alcohol consumption increased.

**Safety and prevention.** Participants reported when they attended their last routine checkup on a 5-point Likert scale, ranging from *Within the previous year* (1), to *Never* (5). A total of 28 participants were removed for indicating “don’t know/not sure” ( $n=490$ ). Results of Random Forest analysis indicates the defectiveness/shame schema as the variable importance for most recent checkup, with a standard deviation of 0.046 for the out-of-bag data. Graphical representation indicates those who did not endorse defectiveness/shame tended to report they attended their last routine checkup within the past one or two years. As endorsement for defectiveness/shame increased, self-reported time since last routine checkup increased. Specifically, those participants who endorsed high defectiveness/shame tended to report their last routine checkup was within the past five years.

Participants ( $N=518$ ) reported their seatbelt use on a 5-point Likert scale, ranging from *Never* (1), to *Always* (5). Results of Random Forest analysis indicates the emotional deprivation schema as the variable importance for seatbelt use, with a standard deviation of 0.034 for the out-of-bag data. Graphical representation indicates a weak, but trending relationship. Specifically, those who did not endorse emotional deprivation tended to report more frequent seatbelt use. As endorsement for emotional deprivation increased, self-reported seatbelt use decreased.

**Physical health.** Participants ( $N=518$ ) rated their overall physical health on a 5-point Likert scale ranging from *Poor* (1) to *Excellent* (5). Results of Random Forest

analysis indicates the mistrust/abuse schema as the variable importance for general physical health rating, with a standard deviation of 0.041 for the out-of-bag data. Graphical representation indicates those who did not endorse mistrust/abuse tended to rate their overall physical health as good to very good. As endorsement for mistrust/abuse increased, self-rated physical health decreased. Specifically, those participants who endorsed high mistrust/abuse tended to rate their overall physical health as fair.

Participants reported the number of days their physical health negatively impacted their daily life within the previous month, with a range of 0 to 30 days. A total of 65 participants were removed for indicating “don’t know/not sure” ( $n=453$ ). Results of Random Forest analysis indicates depressive severity (CES-D-10) as the variable importance for impairment from physical health, with a standard deviation of 0.205 for the out-of-bag data. Graphical representation indicates those who did not endorse depressive symptoms tended to report that their physical health was not negatively impacting their daily life. As endorsement for depressive symptoms increased, self-reported days of impairment increased. Specifically, those participants who endorsed severe depressive symptoms tended to report their physical health negatively impacted their daily life at least ten days within the previous month.

**Mental health.** Participants ( $N=518$ ) rated their overall mental health on a 5-point Likert scale, ranging from *Poor* (1) to *Excellent* (5). Results of Random Forest analysis indicates depressive severity (CES-D-10) as the variable importance for general mental health rating, with a standard deviation of 0.044 for the out-of-bag data. Graphical representation indicates those who did not endorse depressive symptoms tended to rate their overall mental health as good to excellent. As endorsement for depressive symptoms



increased, self-rated mental health decreased. Specifically, those participants who endorsed severe depressive symptoms tended to rate their overall mental health as poor to fair.

Participants reported the number of days their mental health negatively impacted their daily life within the previous month, with a range of 0 to 30 days. A total of 93 participants were removed for indicating “don’t know/not sure” ( $n=425$ ). Results of Random Forest analysis indicated depressive severity (CES-D-10) as the variable importance for impairment from mental health, with a standard deviation of 0.225 for the out-of-bag data. Graphical representation indicates those who did not endorse depressive symptoms tended to report that their mental health was not negatively impacting their daily life. As endorsement for depressive symptoms increased, self-reported days of impairment increased. Specifically, those participants who endorsed severe depressive symptoms tended to report their mental health negatively impacted their daily life at least ten days within the previous month.

## Chapter Four

### Discussion

The current exploratory study offers direct examination of the differential relationships between the 18 individual EMSs and a range of negative health behaviors. To our knowledge, this is the first study to utilize Random Forest to explore these relationships. The advantages Random Forest provides as a statistical procedure allowed us to avoid overfitting models and control for multicollinearity across EMSs. The current study also accounted for depression by entering the CES-D-10 total score as a predictor in Random Forest analyses. Random Forest selected the CES-D-10 as variable importance for days of impairment due to overall physical and mental health, and mental health in general. More specifically, participants who endorsed more severe depressive symptoms were more likely to report a higher number of days they were unable to complete daily tasks due to their physical and mental health. These participants were also more likely to rate their general mental health as poor to fair.

The Random Forest analyses revealed a number of patterns and shed light on a variety of relationships. As we consider schema theory, the endorsement of EMSs and corresponding behavioral trends found within the data are compelling. According to Young, Klosko, and Weishaar (2003), an individual might respond to schema activation in three different ways, specifically referred to as the three maladaptive coping styles. *Schema avoidance* involves living in a way to avoid activating the developed schema entirely. However, if the schema does become activated, the individual then attempts to avoid possible distress from schema activation. Maladaptive behaviors meant to help an

individual temporarily avoid or distract themselves from distress might include binge-eating, consuming excessive alcohol, or using drugs. *Schema surrender* involves accepting and giving in to the schema. Individuals with this coping style tend to live in a way that confirms the developed schema. For example, an individual whom believes others will intentionally harm them (e.g., mistrust/abuse schema) might permit abuse from a partner or spouse. *Schema overcompensation* involves intentionally behaving in a way that directly opposes the developed schema. For example, an individual with a developed mistrust/abuse schema might abuse others rather than permit expected abuse (Young, Klosko, & Weishaar, 2003).

Results identified eight specific EMSs as important predictors for negative health behaviors. These EMSs included mistrust/abuse, abandonment/instability, insufficient self-control/self-discipline, emotional inhibition, social isolation/alienation, approval/recognition-seeking, emotional deprivation, and defectiveness/shame. The mistrust/abuse schema encompasses the expectation that others will intentionally harm the individual through abuse, neglect, manipulation, or other means. Participants who endorsed high levels of the mistrust/abuse schema tended to report condom nonuse, consuming alcohol and/or using drug prior to their most recent sexual encounter, more days of excessive alcohol consumption, or lower overall physical health. In theory, individuals might cope through engaging in dangerous or reckless behaviors in an effort to avoid mistrust/abuse schema activation.

The abandonment/instability schema encompasses the belief that others will not be able to provide core emotional needs to the individual for the reason that they will abandon or leave them for someone more favorable. Participants who endorsed the

abandonment/instability schema were more likely to report lower minutes of exercise during the previous month or report more frequent use of nicotine. In theory, individuals might cope with abandonment/instability activation by avoiding relationships or using substances.

The insufficient self-control/self-discipline schema encompasses an extreme difficulty to maintain adequate self-control. Participants who endorsed the insufficient self-control/self-discipline schema were more likely to rate their eating habits lower or report more times of excessive eating during the previous three months. It seems possible that individuals might surrender to insufficient self-control/self-discipline activation by giving in to their own impulses.

The emotional inhibition schema encompasses the effort to suppress actions, feelings, or interaction with others as a means to avoid disapproval, shame, or loss of control. Participants who endorsed the emotional inhibition schema were more likely to report a lower number of sexual partners within the previous three months. In this instance, the EMS might be associated with seemingly adaptive behavior. However, the relationship may be more complex. For example, the emotional inhibition schema might be related to a lower number of reported sexual partners, but it may simultaneously be associated with loneliness, isolation, or depressive symptoms.

The social isolation/alienation schema encompasses the belief that the individual does not belong to a particular group. While results indicate a weak relationship, participants who endorsed high levels of the social isolation/alienation schema tended to

report daily use of electronic cigarettes. In theory, individuals might engage in behaviors to fit into groups in order to overcompensate for social isolation/alienation activation.

The approval/recognition-seeking schema encompasses the excessive effort to gain approval or attention from others. While results indicate a weak relationship, the approval/recognition-seeking schema as a variable of importance for the number of alcoholic beverages participants reported to consume within the previous month. In theory, individuals might attempt to overcompensate for approval/recognition-seeking activation by engaging in behaviors to impress others.

The emotional deprivation schema encompasses the expectation that others will not provide a normal degree of nurturance or protection. Participants who endorsed the emotional deprivation schema were more likely to report less frequent seatbelt use. It seems possible that individuals who endorse the emotional deprivation schema might have an expectation that not only other individuals will not protect them, but materialistic objects developed for protection will also not serve their purpose.

Finally, the defectiveness/shame schema encompasses the belief that the individual is defective and inferior with perceived internal and external flaws. Participants who endorsed the defectiveness/shame schema were more likely to report a longer duration between present time and last routine healthcare checkup. It seems possible that individuals might attempt to avoid the defectiveness/shame schema by not scheduling or attending a checkup visit with their primary care physician.

The novelty of the current statistical procedure and how it pertains to the possible existence of multicollinearity make it difficult to compare results with previous literature.

As stated previously, studies conducted that have examined EMSs with negative health behaviors are limited. In addition, a number of these studies used statistical tests vulnerable to multicollinearity. For example, Elmquist, Shorey, Anderson, and Stuart (2015) examined EMSs in patients diagnosed with eating disorders who exhibited symptoms of bulimia and binge-eating. The authors used multivariate analysis of variance (MANOVA) and analysis of variance (ANOVA) to examine whether groups based on diagnosis differed on EMS endorsement. Results indicated patients diagnosed with eating disorders differed on eight out of the 18 individual EMSs. These results are similar to the current results. Specifically, the insufficient self-control/self-discipline schema was one of the eight EMSs significantly different between participants diagnosed with eating disorders and participants without eating disorders (Elmquist, Shorey, Anderson, & Stuart, 2015). However, the current study identifies one EMS as an important predictor to eating habits and binge-eating episodes. This allows for additional clinical specificity when using a schema-focused treatment approach.

In another example, Roemmele and Messman-Moore (2011) examined EMSs with number of sexual partners. The authors used bivariate correlations to test EMSs as a mediator between sexual abuse and risky sexual activity in college women. Results indicated schemas organized within the disconnection and rejection domain fully mediated the relationship between a history of sexual abuse and engagement in risky sexual activity during college (Roemmele, & Messman-Moore, 2011). These results are similar with the current results in that both the mistrust/abuse schema and the emotional inhibition schema are organized within the disconnection and rejection domain. However,

the disconnection and rejection domain has been organized to include five individual EMSs.

While results of previous literature are vital in identifying such a relationship exists, it becomes clinically beneficial to accurately identify how EMSs are differentially related to specific health behaviors. The current study provides a unique method in using RF to identify a single variable of importance. Graphical representation as well as model comparison can then be used to obtain intuitive estimates. While such novelty is advantageous for the aforementioned reasons, it also presents a limitation. Future research should seek to replicate the statistical procedure utilized in the current study. In addition, the current study used a cross-sectional design. Future research should aim to examine those individuals who engage in negative health behaviors over time. A longitudinal design might shed light on how EMSs might predict chronicity of engagement in negative health behaviors. Further, a more representative sample should be examined in future research. More specifically, individual characteristics should not only include demographic variables (e.g., gender), but also the engagement in multiple versus few negative health behaviors. Finally, future research would benefit from a validated measure to assess for a wide range of health behaviors. The current study utilized original items and adapted items from a number of reputable measures. However, some items were more ambiguous when compared to others.

To conclude, it has been established that physical inactivity, poor diet, risky sexual activity, nicotine and illicit drug use, and excessive alcohol consumption leave individuals susceptible to developing any number of chronic diseases. We also know that 40% of health is influenced by these negative health behaviors (Schroeder, 2017).

However, individuals frequently disregard recommendations for maintaining a healthy lifestyle. In order to help motivate individuals to adhere to a healthy lifestyle, understand why an individual might engage in negative health behaviors is warranted. Results of the current study further elucidate the direct nature of relationships found in previous research and offer new evidence that EMSs are related to physical activity and health as well as safety and prevention behaviors.



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## Appendix

### Health Behavior Survey

Following is a series of questions that ask about specific behaviors that relate to health. Select the answer that you think best corresponds to you and your behaviors.

What is your height in feet and inches?

Feet (1) \_\_\_\_\_

Inches (2) \_\_\_\_\_

What is your weight in pounds?

\_\_\_\_\_

During the past month, other than your regular job, did you participate in any physical activities or exercise such as running, calisthenics, golf, gardening, or walking for exercise?

Yes (1)

No (2)

Don't know/Not sure (3)

*Skip To: Muscle Training If During the past month, other than your regular job, did you participate in any physical activitie... = No*

What type of physical exercise did you spend most of the time doing during the past month?

- Please Specify (1) \_\_\_\_\_
- Don't know/Not sure (2)

How many times per week or per month did you take part in this activity during the past month?

- Times per week (1) \_\_\_\_\_
- Times per month (2) \_\_\_\_\_
- Don't know/Not sure (3)

And when you took part in this activity, for how many minutes or hours did you usually keep at it?

- Minutes (1) \_\_\_\_\_
- Hours (2) \_\_\_\_\_
- Don't know/Not sure (3)

What other type of physical activity gave you the next most exercise during the past month?

- Please Specify (1) \_\_\_\_\_
- No other activity (2)
- Don't know/Not sure (3)

*Skip To: Muscle Training If What other type of physical activity gave you the next most exercise during the past month? = No other activity*

How many times per week or per month did you take part in this activity during the past month?

- Times per week (1) \_\_\_\_\_
- Times per month (2) \_\_\_\_\_
- Don't know/Not sure (3)

And when you took part in this activity, for how many minutes or hours did you usually keep at it?

- Minutes (1) \_\_\_\_\_
- Hours (2) \_\_\_\_\_
- Don't know/Not sure (3)

During the past month, how many times per week or per month did you do physical activities or exercises to strengthen your muscles? Do not count aerobic activities like walking, running, or bicycling. Count activities using your own weight like yoga, sit-ups, push-ups and those using weight machines, free weights, or elastic bands.

- Times per week (1) \_\_\_\_\_
- Times per month (2) \_\_\_\_\_
- Never (3)
- Don't know/Not sure (4)

Overall, how would you rate your level of physical activity?

- Poor (1)
- Fair (2)
- Good (3)
- Very Good (4)
- Excellent (5)

Have you smoked at least 100 cigarettes in your entire life? Do not include electronic cigarettes, herbal cigarettes, cigars, cigarillos, little cigars, pipes, bidis, kreteks, water pipes (hookahs), or marijuana. (NOTE: 5 packs = 100 cigarettes)

- Yes (1)
- No (2)
- Don't know/Not sure (3)

Do you smoke cigarettes every day, some days, or not at all?

- Every day (1)
- Some days (2)
- Not at all (3)
- Don't know/Not sure (4)



During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?

- Yes (1)
- No (2)
- Don't know/Not sure (3)

How long has it been since you last smoked a cigarette, even one or two puffs?

- Within the past month (less than one month ago) (1)
- Within the past 3 months (1 month but less than 3 months ago) (2)
- Within the past 6 months (3 months but less than 6 months ago) (3)
- Within the past year (6 months but less than 1 year ago) (4)
- Within the past 5 years (1 year but less than 5 years) (5)
- Within the past 10 years (5 years but less than 10 years ago) (6)
- Never smoked regularly (7)
- Don't know/Not sure (8)

Do you currently use chewing tobacco, snuff, or snus every day, some days, or not at all?

- Every day (1)
- Some days (2)
- Not at all (3)
- Don't know/Not sure (4)

Have you ever used an e-cigarette or other electronic "vaping" products, even just one time in your entire life?

- Yes (1)
- No (2)
- Don't know/Not sure (4)

Do you now use e-cigarettes or other electronic "vaping" products every day, some days, or not at all?

- Every day (1)
- Some days (2)
- Not at all (3)
- Don't know/Not sure (4)

During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?

- Days per week (1) \_\_\_\_\_
- Days in the past 30 days (2) \_\_\_\_\_
- No drinks in the past 30 days (3)
- Don't know/Not sure (4)

One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on average? (A 40-ounce beer would count as 3 drinks, or a cocktail drink with 2 shots would count as 2 drinks.)

- Number of drinks (1) \_\_\_\_\_
- None (2)
- Don't know/Not sure (3)

Considering all types of alcoholic beverages, how many times during the past 30 days did you have X [X=5 for men; X=4 for women] or more drinks on an occasion?

- Number of times (1) \_\_\_\_\_
- None (2)
- Don't know/Not sure (3)

During the past 30 days, what is the largest number of drinks you had on any occasion?

- Number of drinks (1) \_\_\_\_\_
- Don't know/Not sure (2)

During the past 30 days, on how many days did you use marijuana or hashish?

- Number of days (1-30) (1)  
\_\_\_\_\_
- None (0 days) (2)
- Don't know/Not sure (3)

*Skip To: Sex If During the past 30 days, on how many days did you use marijuana or hashish? = None (0 days)*

During the past 30 days, what was the primary mode you used marijuana? Please select one. Did you...

- Smoke it, for example, in a joint, bong, pipe, or blunt (1)
- Eat it, for example, in brownies, cakes, cookies, or candy (2)
- Drink it, for example, in tea, cola, or alcohol (3)
- Vaporize it, for example, in an e-cigarette-like vaporizer or another vaporizing device (4)
- Dab it, for example, using waxes or concentrates (5)
- Use it in some other way (6)

When you used marijuana or hashish during the past 30 days, was it for medical reasons to treat or decrease symptoms of a health condition or was it for non-medical reasons to get pleasure or satisfaction (such as: excitement, to "fit in" with a group, increased awareness, to forget worries, for fun as a social gathering).

- Only for medical reasons to treat or decrease symptoms of a health condition (1)
- Only for non-medical purposes to get pleasure or satisfaction (2)
- Both medical and non-medical (3)

Have you ever had sexual intercourse?

- Yes (1)
- No (2)
- Refuse to answer (3)

*Skip To: Seatbelts If Have you ever had sexual intercourse? = No*

How old were you when you when you had sexual intercourse for the first time?

- 11 years old or younger (1)
- 12 years old (2)
- 13 years old (3)
- 14 years old (4)
- 15 years old (5)
- 16 years old (6)
- 17 years old or older (7)
- Refuse to answer (8)

During your life, with how many people have you had sexual intercourse?

- 1 person (1)
- 2 people (2)
- 3 people (3)
- 4 people (4)
- 5 people (5)
- 6 or more people (6)
- Refuse to answer (7)

During the past 3 months, with how many people did you have sexual intercourse?

- I have had sexual intercourse, but not during the past 3 months (1)
- 1 person (2)
- 2 people (3)
- 3 people (4)
- 4 people (5)
- 5 people (6)
- 6 or more people (7)
- Refuse to answer (8)

Did you drink alcohol or use drugs before you had sexual intercourse the last time?

- Yes (1)
- No (2)
- Refuse to answer (3)

The last time you had sexual intercourse, did you or your partner use a condom?

- Yes (1)
- No (2)
- Refuse to answer (3)

The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy? (Select only one response)

- No method was used to prevent pregnancy (1)
- Birth control pills (2)
- Condoms (3)
- An IUD (such as Mirena or ParaGard) or implant (such as Implant or Nexaplanon) (4)
- A shot (such as Depo-Provera), patch (such as Ortho Erva), or birth control ring (such as NuvaRing) (5)
- Withdrawal or some other method (6)
- Refuse to answer (7)

During your life, with whom have you had sexual contact?

- Females (1)
- Males (2)
- Females and Males (3)
- Refuse to answer (4)

Which of the following best describes you?

- Heterosexual (straight) (1)
- Gay or lesbian (2)
- Bisexual (3)
- Other (4) \_\_\_\_\_
- Refuse to answer (5)

How often do you use seat belts when you drive or ride in a car?

- Never (1)
- Seldom (2)
- Sometimes (3)
- Nearly Always (4)
- Always (5)

Would you say that in general your health is...?

- Poor (1)
- Fair (2)
- Good (3)
- Very Good (4)
- Excellent (5)



Now think about your eating habits. In general, how healthy is your overall diet? Would you say...

- Poor (1)
- Fair (2)
- Good (3)
- Very Good (4)
- Excellent (5)

During the last 3 months, did you have any episodes of excessive overeating (i.e. eating significantly more than what most people would eat in a similar period of time)?

- 1-2 times (1)
- 3-4 times (2)
- More than 4 times (3)
- Never (4)
- Don't know/Not sure (5)

Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

- Number of days (1-30) (1)  
\_\_\_\_\_
- None (2)
- Don't know/Not sure (3)

In general, how would you rate your physical health? Would you say...

- Poor (1)
- Fair (2)
- Good (3)
- Very Good (4)
- Excellent (5)

Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?

- Number of days (1-30) (1)  
\_\_\_\_\_
- None (2)
- Don't know/Not sure (3)

In general, how would you rate your mental health? Would you say...

- Poor (1)
- Fair (2)
- Good (3)
- Very Good (4)
- Excellent (5)

During the past 30 days, for about how many days did poor physical health keep you from doing your usual activities, such as self-care, work, or recreation?

Number of days (1-30) (1)

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None (2)

Don't know/Not sure (3)

In general, how much would you say that your physical health keeps you from doing your usual activities, such as self-care, work, or recreation?

Never (1)

Seldom (2)

Sometimes (3)

Nearly Always (4)

Always (5)

During the past 30 days, for about how many days did poor mental health keep you from doing your usual activities, such as self-care, work, or recreation?

Number of days (1-30) (1)

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None (2)

Don't know/Not sure (3)

In general, how much would you say that your mental health keeps you from doing your usual activities, such as self-care, work, or recreation?

- Never (1)
- Seldom (2)
- Sometimes (3)
- Nearly Always (4)
- Always (5)

A routine checkup is a general physical exam, not an exam for a specific injury, illness, or condition. About how long has it been since you last visited a doctor for a routine checkup?

- Within the past year (anytime less than 12 months) (1)
- Within the past 2 years (1 year but less than 2 years ago) (2)
- Within the past 5 years (2 years but less than 5 years ago) (3)
- 5 or more years ago (4)
- Don't know/Not sure (5)
- Never (6)