

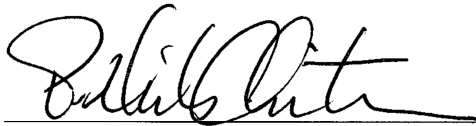
The Good, Bad, and Indifferent:  
Do Habits Have Trait-Like Qualities?

by

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## **Abstract**

The automatic nature of habits means that these behaviors have a surprising – and often hidden - influence over a wide range of daily actions when compared to the influence of conscious goals (Bargh, 1994, 1996). Although goals influence behaviors when habits are weak, goals become less influential as the strength of the habit increases (Neal et al., 2011; Neal et al., 2013). Despite habits’ importance, basic questions about the construct remain. The primary goal of the current research was to address a fundamental question: To what degree do individuals vary in their strength of habits across positive and negative behaviors? That is, do habits have trait-like qualities? To answer these questions, 309 Radford University undergraduates reported their habit strength on ten different positive and negative habits. Using exploratory factor analysis, it was revealed that habit strength is somewhat consistent across positive and negative habits. Although some habits may be particular to the individual, having strong habits for positive or negative behaviors is a significant predictor of having other positive or negative habits.

*Keywords:* habits, goals

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## **Chapter 1: Introduction**

The cost of unhealthy habits and behaviors has received increased attention in the past decade. For example, the Centers for Disease Control and Prevention (CDC, 2015) estimates that the annual medical costs associated with obesity is approximately \$147 billion. Given these accruing costs, it is surprising that little research has been conducted on how people's habits can shape their behavior (Wood & Neal, 2007). Previous research has already established habits' importance to the extent that strong habits can guide behavior irrespective of intentions, attitudes, or even goals (Aarts & Dijksterhuis, 2000; Aarts, Verplanken, & van Knippenberg, 1998; Triandis, 1979). These strong habits guide everyday behavior and serve as action plans even when willpower is depleted (Neal, Wood, & Drolet, 2013). However, what remains unclear is whether habits have trait-like qualities. That is, are some individuals more susceptible to habits or are habits more idiosyncratic to the person-behavior interaction.

The present study is designed to address three goals. The primary goal is to assess the extent to which habits have trait-like qualities. More specifically, the goal will be to gauge the degree to which individuals vary in their strength of habits. The secondary goal of this study will be to evaluate whether a trait-like quality of habit varies across positive and negative habits. For example, do individuals have the same strength of positive and negative habits, or is there an inclination to engage in more positive or negative habits across individuals? Last, a minor goal of this study will be to explore whether habit susceptibility can be predicted by individual differences in goal motivation. For instance, are people who are motivated by promotion goals or prevention goals more likely to endorse habitual behaviors? This manuscript will begin by defining habit based on the

pertinent research and discussing the variation between positive and negative habits. This review will detail what is already known about the construct and where there are still gaps in the literature. The remainder of this manuscript will outline the methodology and results used to determine whether habits have trait-like qualities.

### **Defining Habit**

Defining habit has been a goal in a myriad of disciplines other than social psychology. For example, in the business realm, habits are defined by their ability to maximize profits and reduce costs. According to Fox (2012) when successful CEO's discuss their managing methodology, they rarely talk about the big strategy decisions, but rather the small choices that habitually impact their companies. A majority of their decisions come down to how day to day operations will run: managing what the culture will be like and structuring the rewards and incentives that determine how people automatically behave (Fox, 2012). Thus, habits in the workplace are characterized by their ability to maximize company productivity.

Alternatively, in animal models, habits have historically been operationalized through a behavioral approach and have largely been defined by automatic responses to stimulus cues, with no real consideration to mental processes (Aarts & Dijksterhuis, 2000). For instance, pairing a motivational stimulus (such as food) with a particular signal (e.g., a ringing a bell) will eventually result in a habitual behavior when cued by the bell. However, this definition of habit is not universal in all psychology disciplines.

From a cognitive psychology and neuroscience standpoint, the formation of habits has been defined by its distinct mental processes. The formation of habit is characterized by the slow, incremental increase of input into procedural memory. This slow learning is

paramount in establishing habits because it enables these behaviors to be fixed over time (Pasupathy & Miller, 2005; Wood & Neal, 2007). Furthermore, the engagement in habit has been implicated in specific brain regions. For example, once habits are formed, the caudate nucleus becomes active when engaging in these habitual behaviors (Gillan, 2014, 2015).

In the social psychology literature, however, defining habit has proven to be more complex (Eagly & Chaiken, 1993). Defining habit has been difficult mainly due to habit's automatic nature. Specifically, operationalizing habit has proven complex because there is a debate as to whether current measures have adequate construct validity (Verplanken et al., 1994). The current methods require participants to consciously recall habits, despite the fact that habits are an automatic process. Yet, throughout the literature, the definition of habit consistently includes the same key elements: habit is context-dependent, automatic, and significantly different from goals, attitudes, and intentions. Thus, for the purposes of this study, habits are operationally defined as automatic "psychological dispositions to repeat past behavior. They are acquired gradually as people repeatedly respond in a recurring context" (Neal, Wood, Labrecque, & Lally, 2012, p. 492; Wood & Neal, 2007, 2009).

### **Elements of Habit**

**Context-dependent.** The cornerstone of defining habits is that they are context-dependent. Habits can be triggered by features of the context through past performance, performance locations, preceding actions in a sequence, or particular people. In fact, a diary study that examined where participants are most likely to perform repeated behaviors found that forty-five percent of behaviors are likely to be repeated in the same



physical location (Wood & Neal, 2007; Wood, Quinn, & Kashy, 2002; Wood & Quinn, 2005). For example, strong habitual popcorn eaters have been found to eat the same amount of popcorn, regardless of freshness, as long as the context remains constant (i.e., eating popcorn at the movies; Neal, Wood, Wu, & Kurlander, 2011). Furthermore, habit strength is defined as a continuum that is moderated by the stability of the context. Thus, habits of weak to moderate strength are performed with lower frequency, in more variable contexts, whereas strong habits are more likely to be performed in fixed environments (Aldrich, Montgomery, & Wood, 2011; Danner, Aarts, & de Vries, 2008; Ji & Wood, 2007; Neal et al., 2011).

It is this recurring context that enables the development of habits (James, 1914; Oullette & Wood, 1998; Triandis, 1979; Wood & Neal, 2007). For instance, the important role of context in habit maintenance has been noted when university students transfer to a new school. Wood, Tam, and Wit (2005) found that students with pre-existing habits to exercise, read the newspaper, or watch TV only maintained these habits at the new university if characteristics of the performance context did not alter. This phenomenon, known as the discontinuity hypothesis, has been repeatedly found in other behavioral contexts (Neal et al., 2011; Verplanken, Walker, Davis, Jurasek, 2008; Wood et al., 2005).

**Automatic.** Habits are also characterized by their automaticity. Bargh (1994, 1996) has noted that there are "four horsemen" to any automatic behavior: unintentionality, uncontrollability, lack of awareness, and efficiency. Habitual behavior resides under this definition, as habits are unintentional once formed, controllable to a certain extent, executed without awareness, and increase efficiency (Bargh, 1994, 1996;

James, 1914; Verplanken & Orbell, 2003). However, unlike other forms of automaticity, habit is comparatively rigid due to the slow accrual of behavior over time (Aarts & Dijksterhuis, 2000; Quinn, Pascoe, Wood, & Neal, 2010).

**Habits versus attitudes and intentions.** It is also important to note that habitual behavior is not mediated by attitudes, intentions, or other conscious processes (Aarts & Dijksterhuis, 2000; Aarts, Verplanken, & van Knippenberg, 1998; Triandis, 1979; Verplanken, 2006). Although attitude and intentions have been utilized for predicting non-habitual behaviors, such as bus travel, these motivational factors are less influential in predicting behaviors with a strong unyielding habit (Neal et al., 2011; Oullette & Wood, 1998). In sum, when habit is strong, the attitude-behavior relation is weak. Conversely, when habit is weak, the attitude-behavior association is strong (Verplanken, Aarts, Knippenberg, & van Knippenberg, 1994).

**Independent from goals.** Last, habits are not goal-dependent, but some research posits that daily habits may be correlated with people's goals to a certain extent. It is assumed that habits are initially formed to promote goals because people are more likely to repeat behaviors in stable contexts that result in desired outcomes (Neal et al., 2013; Oullette & Wood, 1998; Wood & Neal, 2009). It is also speculated that habits emerge as a result of failures in goal-directed control (Gillan, 2015). Either way, as habits become mental associations with goals, habitual responses can be activated upon initiating goals (Aarts & Dijksterhuis, 2000). Thus, habits can serve as a regulatory mechanism when habits are congruent with goals.

Yet, the caveat to this argument is that habits can impede goal pursuit when the constructs are incongruent. When habitual behavior is of moderate strength it appears to

be influenced by goals, but as the strength of the habit increases, the goal is less influential (Neal et al., 2011; Neal et al., 2013). For instance, Neal et al. (2013) performed a study in which participants recorded two of their personal goals (e.g., getting good grades) and then had participants list three actions that would align with achieving, or opposing, that goal. The researchers also had participants engage in a series of ego-depletion exercises to gauge whether strong habits would override current goals. Neal et al. (2013) found that in situations where energy is drained, individuals are more susceptible to rely on their strong habits, which can be a good thing if it is a positive habit aligned with one's goals. However, if negative habits are in place, increased cognitive load will deter goal achievement. In a sense, habits enable a gating mechanism for behavioral maintenance, irrespective of goals (Rothman, Sheeran, & Wood, 2009).

Moreover, this phenomenon is not restricted to human models, but has also been demonstrated in animal models. Neal and Wood (2007) note that according to the reinforce-devaluation paradigm, when a rat first acquires a skill, its performance is goal-dependent (i.e., get the food award), but as the response becomes habitual, the reinforcing agents are minimized in predicting behavior. In sum, it appears that goals may aid in the formation of habits, but when habit dispositions are fixed they place constraints on goals.

## **Chapter 2: Individual Habitual Variability**

As previously stated, automatic behavior is complex to study, and thus the majority of studies analyzing habit tend to only look at specific habits. For instance, research predominately only looks at variability within one habitual behavior, such as eating habits, physical exercise, dental flossing, or transportation mode choice (Verplanken, 2006; Verplanken, Herabadi, Perry, & Silvera, 2005; Honkanen, Olsen, & Verplanken, 2005; Verplanken & Melkevik, 2008). Although these are all useful studies, they avoid the more basic question of whether some people are more susceptible to habits than other people. In other words, do individuals vary in their overall strength of habits and across behaviors?

Variability in habits has already been observed in relation to treating psychopathology. In relation to Obsessive Compulsive Disorder (OCD), Gillan (2015, 2015) found that patients with OCD exhibit significantly more habits compared to healthy comparison participants. It is unclear why this variability exists, but it was predicted that OCD patients are attempting to avoid punishment, or gain rewards, through repetitive behavior. Based on the habit hypothesis of OCD, it was posited that habits become compulsions as these acts' rewarding effects diminish. Further, there is evidence that the activation of excessive habits in OCD patients is linked to hyperactivation in the caudate nucleus (Gillan, 2014, 2015).

Additionally, decreased habit formation has been linked to the neurotransmitter dopamine. Parkinson patients on a dopaminergic medication (levodopa), which is a dopamine agonist, compared to Parkinson patients off medication, showed a significant decrease in the number of habits learned (Fuhrer, Kupsch, Hälbig, Kopp, Scherer, &

Gruber, 2013). Dopamine has also been implicated in the development of habits in schizophrenic patients with the SG polymorphism of the dopamine D<sub>3</sub> receptor (Kéri et al., 2005). Consequently, there might be a biological basis for variability of habits from individual to individual.

Given the evidence that habits might vary across individuals, it is plausible that habits might have trait-like qualities. According to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association, 2013) personality traits are anything that “are enduring patterns of perceiving, relating to, and thinking about the environment and oneself that are exhibited in a wide range of social and personal contexts” (p. 647). Traits are also stable over time and affect behavior across situations (Matthews, Deary, & Whiteman, 2003). It is already established that habits have stable behavior characteristics and there is evidence that habit strength varies in patients with OCD, schizophrenia, and Parkinson’s disease (Aarts & Dijksterhuis, 2000; Furher et al., 2013; Gillan 2014; 2015; Kéri et al., 2005). Furthermore, engaging in certain types of habits may be indicative of engaging in similar types of habits (e.g., positive or negative habits). According to Allport and Odbert’s (1936) trait hypothesis theory, a trait may originate through the integration of many idiosyncratic behaviors until it is a generalized character that can predict a larger range on behaviors. The current study thus examined if certain types of behaviors (positive and negative) are indicative of engaging in similar types of behaviors.

### **Chapter 3: Habit Valence**

Although there is some evidence that habits may vary from person to person, it still remains unclear whether people differ in their habit strength across positive and negative behaviors. The current study addresses some of these unanswered questions concerning habitual valence. Specifically, this study attempts to define what constitutes a positive and negative habit and whether individuals are more inclined to engage in positive or negative habits.

The current literature on positive and negative habits is rather limited in scope and predominantly only looks at how to break bad habits or promote positive habits (Neal et al., 2013). Most studies look at individual habits and are not particularly concerned with categorizing habits' valence. This research is geared toward understanding how strong habits facilitate goal attainment. For example, there are numerous studies exploring how to maximize weight loss, and there is a general consensus that changing habits is a key component in promoting healthy lifestyle changes (Riet, Sijtsema, Dagevos, & De Bruijn, 2011; Rothman et al., 2009; Verplanken & Melkevik, 2008). In fact, one study examining which weight loss intervention programs are most effective found that an intervention rooted in a habit-informed approach is more successful than a no-intervention control (Riet et al., 2011). However, beyond addressing the power of strong habits and the need for habit-oriented interventions, the line between positive and negative habits has not been well defined.

Furthermore, what constitutes a positive or negative habit has not been clearly operationalized. For the purposes of this study, whether a habit is positive or negative is defined by the extent to which the habit is aligned with one's current goals (Neal, Wood,

& Drolet, 2013). If a habit is aligned with one's current goals then that habit is considered a positive habit. Conversely, if a habit is opposite to one's current goals, it is classified as a negative habit.

## **Chapter 4: Regulatory-Focus Theory and Habit**

If individuals do actually vary in their strength of habits, there are many individual differences that may account for this disparity. Habit variability might be accounted for by biological discrepancies, stress levels, time-constraints, or even motivational factors. Regulatory-focus theory, for instance, is a motivational theory that explains a wide range of behaviors (e.g., decision-making and dieting tactics).

Regulatory-focus theory posits that the quintessential aspect of behavior is to regulate thoughts and emotions to achieve positive desired end-goals (Higgins et al., 2001; Posner & Rothbart, 1989). In order to reach these positive end-states, people typically utilize a prevention or promotion approach towards goal pursuit (Klenk, Strauman, & Higgins, 2011).

Both promotion and prevention orientations are geared towards achieving a positive end-state, but use different motivational approaches. Promotion-focused goals are thought about in relation to accomplishment and revolve around achieving an ideal and maximizing gains. For example, in the scope of learning, a good education is not solely defined by good grades, but the aftermath of the degree: a better understanding of one's field and a future career. Whereas, prevention-focused goals are centered on minimizing potential dangers (e.g., getting a flu shot to avoid getting sick). Although both approaches can be used in achieving positive end-states, people tend to gravitate towards the orientation that has proven most effective for them in the past (Higgins, 1997; Higgins, Roney, Crow, & Hymes, 1994; Klenk et al., 2011, Strauman, 1996).

Moreover, these two strategies are mutually inhibitory to the extent that one may have prevention and promotion goals for the same topic, but only one system will be



actively engaged at a time (Higgins, 1997; Shah, Higgins, & Friedman, 1998). The distinct functions of these orientations have even been linked to differing cortical activation (Amodio, Shah, Sigelman, Brazy, & Harmon-Jones, 2004; Eddington, Dolcos, Cabeza, Krishnan, & Strauman, 2007; Kelnk et al., 2011).

Regulatory-focus theory has already been applied to various behavioral domains, but its clinical significance is of particular interest to this study. Chronic self-regulatory failure has previously been linked to psychopathology; however, its manifestation looks different between promotion and prevention-oriented individuals. Promotion-focused individuals are more driven by the positive trajectory of a goal, which fosters a positive-outcome motivational state. Such that the more progress one makes toward a goal, the more motivated the individual becomes. However, when failure occurs, it often leads to a sense of sadness or disappointment (Klenk et al., 2011). Prevention-focused individuals, on the other hand, are more motivated to avoid failures or dangers. Subsequently, prevention-oriented individuals are more likely to take the stance of a vigilant, negative-focused state, in order to reduce anxiety. These individuals may even have routine mechanisms in place to reduce potential goal-failures, such as having more habits than promotion-focused individuals.

## Chapter 5: Present Research

The present research explores the extent to which habits have trait-like qualities. First, it was hypothesized that habit strength would vary across individuals. Second, it was predicted that this variation would be consistent across positive and negative habits. Last, assuming support for the first hypothesis, it was expected that regulatory focus would account for some of this variation. More specifically, prevention-oriented individuals would have a higher aggregate of habit strength than promotion-minded individuals.

### Method

**Participants.** A total of 367 participants were recruited for this study. These participants were recruited through an online scheduling system for undergraduates at Radford University and predominantly came from introductory psychology courses. Data from 58 participants were ultimately removed due to failure to give informed consent, leaving a lot of the questions blank, completing the survey in less than four minutes, or taking over 30 minutes to complete the survey. The final sample size was 309 participants (72% female, 28% male; age range = 18-29,  $M = 19.59$ ,  $SD = 1.81$ ). The majority of participants were either White (68%) or African American (20%).

**Materials. *Habit strength.*** The Self-Report Index of Habit Strength (SRHI) is a 12-item questionnaire measuring habit strength. Responses are recorded on a 6-point scale, ranging from 1 (*disagree*) to 6 (*agree*; Verplanken & Orbell, 2003). Higher mean scores indicate stronger habits. The SRHI questionnaire is designed to be applied to various behavioral domains. For example, a participant might consider the stems “Exercise is something...” or “Attending class is something...” and then respond to the 12

SRHI items for each behavior. Thus, the SRHI is subsequently a flexible measure for the specific behaviors in a given study (e.g., public transportation, eating habits, or physical exercise; Verplanken, 2006).

Although the habit construct has been considered difficult to measure, the SRHI has been demonstrated to be reliable and valid (Eagly & Chaiken, 1993; Verplanken, 2006). Unlike previous measures of habit, the SRHI does not solely rely on questions of behavioral frequency, but also considers that habit is characterized by a history of repetition, difficulty of controlling behavior, elements of efficiency, and identity aspects. Data from Verplanken (2006) suggest that the questionnaire has high test-retest reliability ( $r = .91, p < .001$ ), with internal consistencies of .89 and .92 for the pretest and posttest respectively. In the present study, all 10 behaviors also had high reliability with Cronbach's alphas all above .90. Moreover, the SRHI has been shown to correlate with pre-existing measures of habit ( $r = .58, p < .001$ ) and can differentiate between strong and weak habits.

The behaviors that were examined using the SRHI were selected from Hofmann, Vohs, and Baumeister's (2012) fifteen behavioral desires (e.g., see Appendix A for all 15 behavioral desires). The Hofmann et al. (2012) study utilized these categorical desires based on the high frequency of these behaviors reported by participants, and thus it is reasonable to assume that participants could have habits for each category. However, in order to reduce the time required to complete this study, the participants were only asked questions concerning ten of the reported desires and these ten consisted of an equal number of positive and negative habits. The ten habits were assessed using the SRHI questionnaire. Positive habits included: exercising, waking up at the same time, eating

fruits and vegetables, attending class, and studying/working on homework assignments. Negative habits asked about watching television, drinking soda, eating fast food, using social media, and playing videogames/games on phone (see Appendix B). These ten habits were chosen based on a combination of factors, such that most of these behaviors are reported as participants' top desires, but also based on the criteria that they are not subject-sensitive (e.g., alcohol or drug related questions for participants under 21 years of age). Additionally, these potential habitual behaviors were selected in order to ask participants about an equal number of intuitively positive and negative habits.

***Habit valence.*** In order to assess whether participants differ in the number of positive and negative habits, the ten revised behaviors from the Hofmann et al. study (2012) were utilized to gauge the behavior's valence. Participants were presented with the five predetermined positive habits and five negative habits. These habits are assumed to be aligned with individuals' goals as these habits are credited as participants' top desires according to Hofmann and colleagues. Additionally, to ensure participants view these behaviors as either positive or negative, participants were asked whether each behavior is aligned with their current goals. Furthermore, there should be a difference in the overall strength of positive and negative habits across participants.

***Regulatory focus.*** The Regulatory Focus Pride Questionnaire (RFQ) is an 11-item questionnaire gauging participants' prevention and promotion score (Higgins et al., 2001). Participants report how frequently events occur in their lives using a scale of 1 (never or seldom/ never true/ certainly false) to 5 (very often/ very often true/ certainly true). A mean for each subscale is calculated. An example question assessing promotion is, "I feel like I have made progress toward being successful in my life." Conversely, a

prevention-tailored question would be "How often did you obey rules and regulations that were established by your parents?"

The measure is also said to have good reliability and validity in previous studies. Higgins and colleagues (2001) previously found that promotion ( $\alpha = .73$ ) and prevention ( $\alpha = .80$ ) subscales both exhibit good internal reliability and have appropriate test-retest reliability ( $r = .79$  for the promotion scale;  $r = .81$  for the prevention scale). However, reliabilities in the present study were not as high and should be noted when interpreting results (promotion  $r = .62$ ; prevention  $r = .77$ ). The average inter-item correlations also revealed similar findings with generally low correlations among the promotion scale items (average  $r = .26$ ) and moderate correlations among the prevention scale items (average  $r = .40$ ).

**Procedure.** Participants signed up for the study on SONA, which is an online participant scheduling system for undergraduate students. Then, participants electronically completed the survey online via Qualtrics. Participants first electronically provided informed consent to participate and then were directed to the questionnaires (SRHI, RFQ, and perceptions of habit valence). The order of all these measures and the sequence of the ten positive and negative habits were counterbalanced to deter ordering effects. Finally, the participants were asked demographic information such as gender, age, and ethnicity. Participants were thanked for their cooperation and debriefed on the intention of the study.

## **Chapter 6: Results**

Analyses first examined whether participants viewed the 10 behaviors as positive or negative. In order to assess this question, participants reported whether the behavior was aligned with their current goals. If a behavior aligned with their current goals, it would be classified as a positive behavior. Conversely, if they reported the behavior not to be aligned with their current goals, it would be considered a negative behavior. It was found that the majority of participants reported the behaviors to be strictly positive or negative, as can be seen in Table 1. However, it should be noted that some behaviors were seen more rigidly as positive or negative. For example, there was more variability in classifying the behavior as positive or negative for watching television, using social media, and waking up at the same time.

Next, each of the SRHI scales was examined for internal consistency and overall endorsement of the behaviors as habits. All of the behaviors had high Cronbach's alphas with levels ranging from .90 - .98. In addition, the majority of the behaviors were reported to be moderate to strong habits (i.e., mean scores on the SRHI are above 3; Verplanken & Orbell, 2003). However, on average, drinking soda, eating fast food, and playing videogames were not strong habits.

### **Exploratory Factor Analysis**

The 10 behavior scores from the SRHI were then examined to determine if factor analysis should be conducted. Initial analyses suggested that the data were appropriate for conducting the exploratory factor analyses. First, the 10 behaviors all correlated ( $> .30$ ) with at least one other behavior. Second, the Kaiser-Meyer Olkin measure of sampling adequacy was .65, which is above the minimum recommendation of .60 and indicates that

the factor analysis should provide distinct and reliable factors (Field, 2013). Third, Bartlett’s test of sphericity was significant,  $\chi^2 (45, N = 309) = 509.28, p < .01$ , which denotes that the correlations between the variables are significantly different from zero. Finally, the diagonals of the anti-image correlation matrix were all above .50 and the communalities were above .30, which suggests that the variables share some common variance. Thus, based on these initial findings all 10 behaviors were included in the factor analyses.

Table 1: Mean habit strength, internal consistencies, and goal-congruencies (percentages) for the ten behaviors.

Behaviors	Mean ( <i>SD</i> )	Cronbach’s alpha	% Goal Congruent
Watching television	4.05 (1.25)	.96	40.80
Drinking soda	2.65 (1.52)	.98	6.10
Eating fast food	2.94 (1.29)	.96	7.10
Playing videogames	2.67 (1.41)	.97	14.60
Social media	4.70 (1.14)	.95	34.60
Attending class	5.15 (.82)	.91	98.40
Studying	4.26 (1.03)	.93	97.70
Exercising	3.72 (1.38)	.97	89.60
Eating fruits & vegetables	4.29 (1.15)	.96	90.30
Waking at same time	3.69 (1.33)	.96	65.70

Principal components analysis provided a preliminary understanding of the structure of the behaviors in order to determine if the behaviors have trait-like qualities. Direct oblimin rotation was used because it was predicted that any factors would be correlated with each other. Kaiser's criterion was used as a guideline for retaining factors (eigenvalues greater than 1). Although Kaiser's criterion is an arbitrary cut-off point, and may overestimate the number of factors, these problems can be minimized by having a sample size above 250, which is satisfied in this study (Field, 2013).

The initial factor analysis showed a three-factor solution with the first factor accounting for 24% of the variance, the second factor 18%, and the third factor 12% (Table 2). The three factors seem to display three types of behaviors: negative, positive, and goal-ambivalent behaviors. The rationale for labeling these factors derived from participants' responses to whether the 10 behaviors aligned with their goals. The majority of participants ranked the behaviors on the first factor as negative behaviors (on average 82.85% of participants rated the behaviors as incongruent with their current goals). A similar effect was found for positive behaviors with at least 89.60% of participants citing the behaviors as congruent with their current goals. Meanwhile, the third factor comprised behaviors that were positive for some people, but negative for others (excluding watching television). For example, only 65.70% of participants reported waking up at the same time aligned with their current goals.



Table 2: Factor Loadings for Exploratory Factor Analysis for Three-Factor Solution

<b>Behaviors</b>	<b>Negative</b>	<b>Positive</b>	<b>Goal-Ambivalent</b>
Watching television	<b>.61</b>	.29	-.24
Drinking soda	<b>.70</b>	-.23	.06
Eating fast food	<b>.78</b>	-.16	-.15
Playing videogames	<b>.67</b>	-.05	.33
Attending class	-.04	<b>.70</b>	-.05
Studying	.03	<b>.73</b>	-.09
Exercising	-.12	<b>.59</b>	.33
Eating fruits & vegetables	-.08	<b>.66</b>	.04
Waking at same time	.27	.23	<b>.64</b>
Social Media	.32	.21	<b>-.72</b>
Eigenvalues	2.14	2.10	1.27
% of variance	23.99	18.55	11.97

*Note:* Factor loadings over .40 appear in bold. Rotated using the Direct Oblimin method. Factor 1 = Negative Habits; Factor 2 = Positive Habits; Factor 3 = Goal Ambivalent Habits.

Ultimately, the three-factor model was rejected because of the theoretical complications with the goal-ambivalent factor. The third factor only contains two variables, and thus should be interpreted with caution. According to Yong and Pearce (2013) a factor needs to have at least three variables. The only time a factor with two variables should be considered reliable is when the variables are strongly correlated ( $r > .70$ ) but not correlated with other variables. These criteria were not met in this sample,

however, as social media and waking up at the same time were not significantly correlated,  $r(307) = .08, p = .16$ .

The data were then reanalyzed with an imposed limit of two extracted factors (Table 3). The two-factor solution accounted for 42.54% of the variability, with eigenvalues of 2.16 for negative habits and 2.12 for positive habits. Only one behavior (waking) had loadings below .40 on both factors. The two-factor structure theoretically describes the data adequately, but the data were also constrained to a one-factor solution to verify that a two-factor structure best fits the data (Table 4). The one-factor model only accounted for 24% of the variance and had three behaviors with loadings below .40. Thus, the two-factor structure was chosen as the best model.

Table 3: Factor Loadings for Exploratory Factor Analysis of the Two-Factor Solution

<b>Item</b>	<b>Negative Habits</b>	<b>Positive Habits</b>
Watching television	<b>.66</b>	.25
Drinking soda	<b>.67</b>	-.26
Eating fast food	<b>.80</b>	-.21
Playing videogames	<b>.57</b>	-.06
Social Media	<b>.49</b>	.14
Attending class	-.02	<b>.70</b>
Studying	.05	<b>.73</b>
Exercising	-.21	<b>.62</b>
Eating fruits & vegetables	-.09	<b>.66</b>
Waking at same time	.10	.26
Eigenvalues	2.15	2.10
% of variance	21.51	21.03

*Note:* Factor loadings over .40 appear in bold. Rotated using the Direct Oblimin method. Factor 1 = Negative Habits; Factor 2 = Positive Habits.

Table 4: Factor Loadings for Exploratory Factor Analysis for the One-Factor Solution

Item	Factor 1
Watching television	.32
Drinking soda	<b>.68</b>
Eating fast food	<b>.73</b>
Playing videogames	<b>.46</b>
Social Media	.27
Attending class	<b>-.49</b>
Studying	<b>-.45</b>
Exercising	<b>-.57</b>
Eating fruits & vegetables	<b>-.52</b>
Waking at same time	-.10
Eigenvalues	2.40
% of variance	24.00

*Note:* Factor loadings over .40 appear in bold.

Composite scores were then created for the two factors based on the mean scores from the items that loaded on each factor. A full list of descriptive statistics is provided in Table 5. Internal consistencies for the factors were measured using Cronbach's alpha. The reliabilities were moderate for negative behaviors and positive behaviors (Table 5). Alpha levels could have been increased, however, if social media and waking at the same time were removed. The two factors were also significantly negatively correlated,  $r(307) = -.15, p = .009$ .

Table 5: Descriptive statistics for the two types of habits (N = 309)

	No. of Behaviors	<i>M</i> ( <i>SD</i> )	Skewness ( <i>Z</i> )	Kurtosis ( <i>Z</i> )	Alpha
Negative	5	3.40 (.86)	.26 (1.90)	-.09 (-.32)	.65
Positive	4	4.36 (.76)	-.48 (-3.47)	.26 (.94)	.63

### Predicting Habit Types

Finally, given the results of the exploratory factor analysis, multiple regression was used to explore whether regulatory focus (promotion and prevention orientations) could predict differentiating engagement in negative and positive habits. The results indicated that regulatory focus explained a significant amount of variance for negative behaviors,  $R^2 = .04$ ,  $F(2, 306) = 6.63$ ,  $p < .01$ . Promotion significantly uniquely predicted negative behaviors ( $\beta = -.19$ ,  $p < .01$ ), but prevention did not ( $\beta = -.05$ ,  $p = .36$ ). A similar effect was found with positive behaviors,  $R^2 = .10$ ,  $F(2, 306) = 17.16$ ,  $p < .01$ . Promotion again predicted positive behaviors ( $\beta = .31$ ,  $p < .01$ ), but prevention was not a significant unique predictor ( $\beta = .04$ ,  $p = .43$ ). Promotion and prevention orientations were also analyzed in relation to each individual behavior, which can be seen in Tables 6 and 7. Overall, promotion was a better predictor of habit strength. For example, a promotion orientation predicts habit strength for drinking soda, eating fast food, playing videogames, exercising, eating fruits and vegetables, attending class, and studying. Conversely, prevention focus only predicted attending class.

Table 6: Results of multiple regression of prevention and promotion on negative habits.

Model	Predictor Variables	SE	$\beta$	$p$
Watching T.V.	(constant)	.47	--	.00
	Promotion	.12	-.06	.31
	Prevention	.09	.02	.75
Drinking Soda	(constant)	.56	--	.00
	Promotion	.14	-.19	.001**
	Prevention	.10	-.06	.32
Fast Food	(constant)	.48	--	.00
	Promotion	.12	-.14	.019*
	Prevention	.09	-.09	.107
Social Media	(constant)	.43	--	.00
	Promotion	.11	-.06	.302
	Prevention	.08	-.01	.922
Videogames	(constant)	.52	--	.00
	Promotion	.13	-.14	.017*
	Prevention	.10	-.02	.675

Note: \* $p < .05$ , \*\* $p < .01$ .

Table 7: Results of multiple regression of prevention and promotion on positive habits.

Model	Predictor Variables	SE	$\beta$	$p$
Exercising	(constant)	.50	--	.00
	Promotion	.12	.26	.00**
	Prevention	.09	-.07	.22
Waking	(constant)	.49	--	.00
	Promotion	.12	.12	.07
	Prevention	.09	.09	.14
Eating Healthy	(constant)	.42	--	.00
	Promotion	.10	.15	.01*
	Prevention	.08	.02	.72
Class Attendance	(constant)	.29	--	.00
	Promotion	.07	.16	.004**
	Prevention	.06	.20	.001**
Studying	(constant)	.36	--	.00
	Promotion	.09	.27	.00**
	Prevention	.07	.09	.11

Note: \* $p < .05$ , \*\* $p < .01$ .

## Chapter 7: Discussion

The primary aim of this study was to examine whether habits have trait-like qualities. Previous research has examined how to promote or break habits, but no study has explored whether endorsing one habit increases the likelihood that a person endorses another habit. Given that 40-45% of individuals' everyday behaviors are classified as habits (Fox, 2012), it is important to understand whether habits have trait-like qualities, or if habits are more idiosyncratic to the individual.

As predicted, exploratory factor analysis revealed evidence that positive and negative habits are two discrete groups of habits. First, all the predicted positive and negative habits, except waking up at the same time, loaded on one of these two factors. The two factors were also negatively correlated with each other, indicating their overlapping properties. These results suggest that participants who engage in one negative behavior are more likely to engage in other negative behaviors and the same is true for positive behaviors.

However, these results should be interpreted with some caution. The internal consistency for both of these two factors was relatively low (Cronbach's  $\alpha < .63$ ) and would only be slightly increased by removing social media. These low alpha levels are probably influenced by the fact that there are relatively few items on each factor and might be increased by adding more behaviors. In fact, Field (2013) notes that the calculation for determining alpha is largely influenced by the number of items being measured. Additionally, it is important to note that the factor analysis results are probably influenced by participants' range of endorsement of behaviors as either congruent or incongruent with their current goals. Specifically, watching television, using social

media, and waking up at the same time were behaviors that may be positive behaviors for some individuals but negative actions for others.

### **Predictors of Habit Factors**

It was originally predicted that if habits have trait-like qualities, habit strength could be predicted by regulatory-focus orientations. Specifically, it was thought that a prevention focus would be a better predictor of habit strength than a promotion focus. Surprisingly, the opposite effect was found. Individuals who are more promotion oriented are more likely to have stronger positive habits, whereas those with lower promotion scores typically have stronger negative habits. Conceptually, this makes sense because promotion orientated individuals are more motivated toward achieving future accomplishments and thus are probably more motivated to develop positive habits. However, it is surprising that prevention does not also strongly predict habit strength because those with higher prevention orientations might try to have stronger habits to reduce the anxiety of a potential loss. Promotion is also a better predictor of habit strength when examining the habits individually (e.g., drinking soda, eating fast food, etc.). However, these results should be viewed with caution because promotion and prevention are not the most reliable scales. There are some concerns regarding the reliability of the Regulatory Focus Questionnaire and, as such, future research should be conducted to determine if promotion is actually a strong predictor of habit strength (Summerville & Roese, 2008).

### **Limitations and Future Directions**

Although the present study serves as a baseline for better understanding whether habits have trait-like qualities, it should be mentioned that there are a number of



limitations in this study that should be addressed in future work. First and foremost, confirmatory factor analysis should be conducted. The results from the exploratory factor analysis indicate how many factors represent the data, but does not confirm or reject the hypothesized theory. Confirmatory factor analysis should thus be used to test the *a priori* predictions before any further conclusions are drawn. Specifically, it should be tested whether the two-factor structure derived from exploratory analysis is the best model through hierarchical confirmatory factor analysis. Hierarchical confirmatory factor analysis could assess if habits are the overarching manifest variable and which behaviors break down into the same subcomponents as in exploratory factor analysis.

Additionally, future studies should look at a larger range of behaviors and the consistency of the results across time. The number of behaviors that participants reported their habit strength on was largely restricted in the interest of preventing participant fatigue. In order to reliably measure habit strength for the 10 behaviors, the SRHI was used; however, this measure is comparatively long and thus constrained the number of behaviors participants could report. There are shorter measures of habit that could have been used, however, they are not as reliable (e.g., Response-Frequency Measure of Habit; Verplanken & Orbell, 2003). Moreover, many of the behaviors on the survey were constrained to the realm of school and health practices, which might have skewed the ultimate classification between positive and negative behaviors. For example, future works could look at habits in relation to interpersonal relationships, work, hygiene, etc.

Last, it would be interesting to have participants self-report their habits via a diary study. A diary study has the unique advantage of measuring participants' responses as they experience various events. Participants can either report their responses on a time-

based or event-based schedule (e.g., physiological change), which increases ecological validity by limiting retrospection bias (Lidia, Shrout, Laurenceau, & Bolger, 2012). As such, a diary study would provide a more accurate picture of habits' trait-like qualities in participants' natural contexts.

## **Conclusion**

This study examined whether habit strength has trait-like qualities and, indeed, there is some evidence to suggest that habit strength may be dispositional. The results from this study indicate that if individuals habitually engage in strong habits for some behaviors, they are more likely to have strong habits for other behaviors. Thus, when William James stated, "Of these habits, some are common to the race generally, while others are peculiar to the individual" (James, 1914, p. 22-23) he only depicted half the picture. Although some habits may be peculiar to the individual, habit strength seems to have trait-like qualities for certain types of behaviors.

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## **Appendix A: Fifteen Desire-Domains Adapted from Hofmann et al. (2012)'s Study**

1. Eating
2. Nonalcoholic drinks
3. Alcohol
4. Coffee
5. Tobacco
6. Other substances
7. Sex
8. Media use
9. Spending
10. Work
11. Social contact
12. Sports participation
13. Leisure
14. Sleep
15. Hygiene

## **Appendix B:List of Positive and Negative Habits**

### Positive Habits:

1. Exercising
2. Waking up everyday at the same time
3. eating fruits and vegetables
4. Attending class
5. Studying/working on homework

### Negative Habits:

1. Watching television (Cable, Netflix, Hulu, Youtube)
2. Drinking soda
3. Eating fast food
4. Using social media
5. Playing videogames/games on phone