Habit: Theory, Measurement, and the Role in Organisational Behaviour

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A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfilment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

Faculty of Management

I.H. Asper School of Business

University of Manitoba

Winnipeg

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ABSTRACT

Many daily behaviours, emotions, and thoughts are driven by habits. While the existing research on people at work has provided a detailed account for how deliberation affects decisions, choices, and responses, there is little theorizing and empirical exploration of how habits can influence organisations and their members. The focus of this dissertation is on habits within the domain of organisational behaviour. The nature and the role of habits are examined in three essays. First, the literature on habits relevant to people at work is reviewed, summarized, and evaluated. The overview of the literature provides the reader with a condensed and pertinent description of the habit definition, approaches to the study of habits, the key findings related to personal states associated with habit performance, and an analysis of gaps between the current state of habit research and the application of these findings to people at work. Second, a theory integrating habits with motivation in order to explain work outcomes is proposed. In a nutshell, the theory suggests a dual influence of motivation and automaticity on response consistency (response being any behaviour, emotion, or thought) which, in turn, is linked to work outcomes. The theory provides a framework for studying a ubiquitous phenomenon – habits – in organisational settings. Third, in response to the call for a different measurement of habits, a Habit Automaticity and Characteristics scale is proposed and evaluated. The results of four studies demonstrate a stable factorial structure of the new scale and provide some support for convergent and divergent validity. Last but not least, part of the habit theory and the Habit Automaticity and Characteristics scale are put to test in a study of a health and safety mindfulness habit. The results largely supported the theory in the context of health (i.e., general health and well-being) but not safety outcomes. The theoretical and practical implications of the theory, measurement and the test of the theory as well as the limitations and future directions are discussed after each individual essay and in the conclusion.

Keywords: habit, automaticity, mindfulness, health and safety.

ACKNOWLEDGEMENTS

Today is the day when I complete the dissertation and get one step closer to the end of my graduate school journey. This journey has shaped me as a scholar and changed me as a person. There were challenges, upsets, and doubts but they do not compare to the opportunities that I was given in the last six years. I found my life calling, made friendships, and learned valuable lessons. I would like to express my sincere gratitude to several people who tutored me, supported me, and helped me through this challenging process.

First and foremost, I would like to thank my advisor, Dr. N. Sue Bruning. She introduced me to the exciting field of organisational behaviour and was my mentor from the very first days. Her dedicated involvement in every step of the graduate program and the dissertation helped me in all the time of learning, researching, and writing. I am very grateful for her words of encouragement but also for the hard questions and constructive criticism that allowed me to grow in our every interaction.

I would also like to thank my dissertation committee members: Dr. Brianna Caza, Dr. Kelley Main, and Dr. Marian Morry. Without an exaggeration, there have been many ups and downs in the process of writing the dissertation, from failed data collections to the scheduling challenges. This project would have never been accomplished without their unfailing support, valuable advice, and insightful comments. I feel very fortunate to have had an opportunity to learn from and work with them in the program.

I express my sincere gratitude to my family whose support is so strong it knows no distance, no time difference, and no borders. They were there to help when the journey was rough and they were there to celebrate when it was exhilarating. Their love and support throughout the years are the reasons I have the courage to follow my dreams.

Last but not least, I would like to express a very special thank you to my husband, Matthew, for being patient about the emotions involved in this process, kind to me in my not-so-glorious moments, optimistic even in the darkest of times, and for celebrating the victories with me. The completion of this dissertation and my advancement in the academic career is a testament to your unconditional love and support.

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CHAPTER 1: INTRODUCTION

Habit is the most imperious of all masters.

- Goethe

Background

Habits are an integral part of our everyday lives. We can consciously form them or unwillingly fall into their traps, but the ubiquitous nature of a habit is undeniable. The significance of the phenomenon was recognized many centuries ago. One famous quote referring to a habit is believed to belong to Aristotle: “We are what we repeatedly do. Excellence, then, is not an act, but a habit”. Since Aristotle’s times, there have been multiple discussions on the nature and role of habits. One of the earliest known scientific accounts of habit belongs to William James, an American philosopher and a psychologist. James (1890) provides a broad overview of the nature and impact of habits. He discusses the neuroplasticity of habits, their gravity on daily choices, the conservative role that habits play in maintaining social stability, and the principles of habit formation. Even though James’ conclusions were based on logical observations or limited experiences rather than vigorous empirical examination, his ideas were deemed accurate in later empirical work. Most of the contemporary research on habits has been dedicated to the scientific study of the dynamics of habits, such as formation or change, and their impact on behaviours. Since they had a strong impact of the development of the field several names are worth mention. First and foremost, a measure of habits was needed for the empirical evidence to emerge. Bas Verplanken in collaboration with a number of his colleagues has made numerous contributions in developing and improving the measurement of habits from observed frequency to self-reports (Aarts, Verplanken, & Knippenberg, 1998; Verplanken & Aarts, 1999; Verplanken & Orbell, 2003). These measures enabled further exploration of habits. Wendy Wood is another major figure

in the research on habits. She has made numerous discoveries on the ubiquity of habits (Wood, Quinn, & Kashy, 2002), persistence of habits (Wood, Witt, & Tam, 2005), impact of habits on daily decisions, choices, and behaviours (Ouellette & Wood, 1998), and the habit-goal interface (Neal, Wood, & Drolet, 2013; Neal, Wood, Wu, & Kurlander, 2011; Wood & Neal, 2007) with her collaborators. Henk Aarts with a number of other researchers has focused on the latter topic of the habit-goal interface. Many of his studies investigate how habits and intentions predict future behaviour (Aarts et al., 1998; Verplanken & Aarts, 1999; Verplanken, Aarts, van Knippenberg, & Moonen, 1998). Phillippa Lally with her colleagues have established the length of time that habits take to form (Lally, van Jaarsveld, Potts, & Wardle, 2010), explored the experiences of people that are trying to form habits; including the strategies they use to form habits, the development of automaticity, the importance of cues (Lally, Wardle, & Gardner, 2011), and proposed practical tips for interventions (Lally & Gardner, 2013). Undoubtedly, there have been numerous other researchers who have made important contributions that will be discussed throughout the chapters in specific contexts. The names mentioned above, however, are the trailblazers in establishing the inquiry on habits. In recent years, there have been a few attempts to summarize and integrate the existing knowledge on habits. Ann Graybiel (2008) provides a review of the neuropsychological basis of habits highlighting the plasticity of the brain in changing habits and the impact of habit-related neural circuits on daily behaviours, emotions, and thoughts. Wood and Neal (2009) outline a number of findings on the role of habits in daily life, decisions, and choices from the perspective of consumer behaviour science. Wood and Rünger's (2016) review combines the findings in neurobiology with the findings in behavioural and cognitive psychology to provide a detailed account of up-to-date findings on habits. Wood (2017) provides a brief overview of key findings but emphasizes several areas within the personality and social psychology disciplines that can

contribute to the collective knowledge about habits from integrating habits, such as self-regulation, group discrimination, with lay theories of action. These reviews are important and serve to integrate existing knowledge and provide guidance to future inquiries.

In this work, the aim is to further contribute to the study of habits. In the next two sections, the focus, value, and objectives of the inquiry will be explained as well as a brief overview of the three essays that make up this dissertation will be provided.

Focus, Value, and Objectives

The focus of this dissertation is on habits within the domain of organisational behaviour. Most of the highlights of the existing research on habits presented in the previous section are all situated in health psychology. The habits that are mainly studied in health psychology are dieting, healthy eating, or exercising. Some research has also been conducted on the choice of commuting methods, such as car, train, or bike. Some findings from these contexts transfer well to the habits that may be of importance to organisational members. In particular, the general principles of the formation, change, or breaking of habits are not likely to differ significantly between various habits. However, the role of habits can vary depending on the context. Specifically, the consequences of habits that may be of importance to health psychologists are of a different nature than the consequences of habits that organisational behaviourists would want to consider such as habits related to work routines and performance, interactions with others and self-directed behaviours, emotions and thoughts.

Four objectives are pursued in this dissertation. One objective is to provide an overview of the literature on habits that is relevant to the study of people at work. While numerous books, chapters, articles, and essays have been dedicated to the topic, given the focus of this work there will be a concentration on the general findings that are extrapolated from different fields of

psychology and apply the ideas to work psychology. A few important discoveries that have been situated within organisations will be integrated with the observations from other cognate areas. The value of the literature review is to integrate distributed and diverse bits of knowledge and to analyze the information from an organisational behaviour perspective. Additionally, the literature review is helpful in identifying the gaps in knowledge that can be addressed through future research. The second objective is to fill in one such gap – the lack of attention to habits in organisations – by outlining a theory that allows the integration of habits into a wide variety of topics studied in organisational behaviour. Given the impact of habits established in health psychology, it is reasonable to suggest that habits can also play a big role in work life. However, the research on habits is impeded by the lack of a framework that integrates habits with other known constructs. Thus, the value of proposing a theory is in providing such a framework for future research. The third objective – to develop and validate a measure of habits – is tightly linked to the first two objectives. To test the proposed theory, habits need to be measured. The existing measures have some limitations (discussed later in detail). The value of the new measure is to overcome these limitations which could potentially open up new routes for research and stimulate interest from organisational behaviourists. The fourth objective is to test parts of the theory and the new measure in a work setting. The empirical partial test of the model provides important theoretical and practical implications for habits at work.

The Outline of the Dissertation

In order to achieve the objectives, three essays on the role of habits in organisations are presented in the dissertation. Each essay contributes to the knowledge on habits in different ways. The literature is reviewed with a focus on implications for organisational behaviour (objective 1) and a theory is proposed (objective 2) in Chapter 2. The proposed theory incorporates habits as a

predictor of work outcomes, but an operational definition of habits and a measurement tool is needed to test the theory. Chapter 3 is focused on the development and validation of a self-report scale in four studies (objective 3). A variety of samples ranging from students in a Mechanical Turk (MTurk) panel to healthcare employees were used to validate the instrument. The scale allows for a test of several propositions suggested in Chapter 2 and an empirical examination of the role of habits in work life (objective 4) which is the focal point of Chapter 4. An example of a health and safety mindfulness habit is used to test the propositions related to the role of habit automaticity in predicting work outcomes. Finally, Chapter 5 provides an overall discussion of the theoretical and empirical findings and concludes the dissertation.

CHAPTER 2: OUTLINE OF THE THEORY OF HABITS

Introduction

Many daily activities are recurrent, and so are our responses to them (George, 2009; Wood & Neal, 2009; Wood et al., 2002, 2005; Wood & Rünger, 2016). The repetitiveness of life prompts questions about the influence of repetitiveness on us. Habits represent a form of recurrent responses and are the focus of this work. Two goals are pursued in the chapter. One is to provide an overview of the literature on habits that is relevant to the context of organisational behaviour. To understand what habits are and the role they play, it is important to review theoretical and empirical work on the definition, function, emergence, and influence of habits. Putting the scattered pieces of knowledge together can greatly contribute to a better conceptual definition of habits, establish the groundwork for the development of a measurement instrument, and guide future research efforts. For the latter purpose, in particular, a clear framework is needed. Thus, the second goal is to propose such a framework in the form of a theory. The theory provides a rationale for how habits impact a variety of outcomes that are of interest to organisational scientists (and practitioners), such as performance, attitudes, and well-being. The theory also advances our understanding of the factors that prompt people to respond in a certain way. While factors such as motivation or affect have received a lot of attention as predictors of behaviours, emotions, and thoughts, there is far less attention (if any) to how habits might shape them. Integrating habits into the research would contribute to the scholarly work on the motivation-behaviour (thought or emotion) relationship. A practical value of the above-mentioned academic work is related to managing change and designing effective interventions. A theory of habits is helpful for understanding why such resistance can occur on the individual level and help inform the design of interventions that address the inertia of habits.

Chapter 2 is broken down into two major sections, the literature review and the proposal of a theory. The literature that is relevant to organisational behaviour will be reviewed, primarily in the disciplines of psychology and management. After the literature review, a theoretical model will be proposed that integrates motivation and habit systems in explaining responses such as behaviours, emotions, and thoughts. The chapter will conclude with a discussion of the theoretical implications and suggestions for potential future research routes.

Review of the Literature

The goal of this section is to provide a brief overview of key findings on habits in the field of psychology that are critical for future research on habits, particularly in the field of organisational behaviour. First, a definition of a habit will be established. The definition section will be followed by a review of two existing traditions of research on habits – behaviourist and cognitive. The two traditions focus on different aspects of habit formation, change, and implications for daily life as well as methodological approaches to the research on habits. Next, four key findings on the nature of habits will be reviewed, including the energy-saving quality of habits, the mastery of performance associated with habitual responding, the psychological experience underlying habitual performance, and the emerging attempts to distinguish between different kinds of habits. These topics were selected because they have strong implications for organisations and employees, and will guide the development of the theory in the upcoming section. The literature review will be concluded with the identification of current research limitations as applied to management, such as the lack of evidence for work-related habits, the lack of differentiation between different aspects of habits or different types of habits, and the absence of a framework that integrates habits into the context of organisational behaviour and provide a model for studying habits in organisations. Following the literature review, theoretical

propositions on the role of habits in organisations and a model for further empirical testing will be proposed.

Definition of Habits

A definition of the habit construct is needed to clearly outline the boundaries of further theoretical explanation. The term "habits" has been used unsystematically in different contexts. Various definitions of habits have been proposed over the years in the academic literature, and no single definition is predominant. Some examples are:

- "A habit, from the standpoint of psychology, is a more or less fixed way of thinking, willing, or feeling acquired through previous repetition of a mental experience." (Andrews, 1903)
- "Habits are relatively stable behavioural patterns, which have been reinforced in the past." (Verplanken, Aarts, van Knippenberg, & van Knippenberg, 1994)
- "They [habits] are tendencies to repeat responses given a stable supporting context." (Ouellette & Wood, 1998)
- "Habits are behavioural patterns learned through context-dependent repetition: repeated performance in unvarying settings reinforces context-behaviour associations such that, subsequently, encountering the context is sufficient to automatically cue the habitual response." (Gardner, de Bruijn, & Lally, 2011)

To a significant extent, this diversity represents the tension between the behaviourist and cognitive paradigms that will be reviewed in the following section. On the one hand, habits are often described as an *observable* product of a cue-response-reward association. This approach emphasizes the role of context, repetition, and reinforcement in describing the nature of habits, all of which have important implications for the process of habit formation and change. However, the

research evidence to support this view largely comes from the study of behaviours as a type of response, and the nature of measurements used within this approach (i.e., behaviour frequency or the frequency of association recalls between the cue and the response) would limit the ability to study emotion and cognitive processes that could also be habituated. On the other hand, habits are sometimes understood as an *unobservable* cognitive process that happens as the decision-making is shifted into an automatic rather than deliberate mode. Within the cognitive approach, habits are tendencies to act in a specific way due to automaticity but these tendencies are not senseless reactions. Instead, habits are dispositions to respond in a pre-learned manner but consciousness can interfere if there is a significant discrepancy between the response and the desired outcome. Even though emotions and thoughts are not studied extensively in the cognitive approach, the nature of the operational definition of habits within the cognitive paradigm (i.e., a mental process rather than observed outcome of automaticity) gives better grounds for studying emotions and thoughts. Considering that many emotion-cognitive processes are of interest to organisational scientists as they are linked to important outcomes, it is important to allow for the opportunity to integrate all three types of responses – behaviours, emotions, and thoughts – into future research on habits. Combining both the behaviourist and cognitive approaches (the approaches themselves will be discussed in more detail in the next sub-section), a definition of a habit should involve the cue-response-reinforcement component and the notion of automaticity. Thus, a *habit* can be defined *as a form of automaticity developed as a result of the reinforced repetitive direct association between the cue and the response that prompts an individual to respond to the cue in a learned way with little awareness, intention, control, and high efficiency.*

Habits are also distinct from routines with which they are erroneously used as synonyms in many academic and popular sources. Routines are repetitive, recognizable patterns of

interdependent actions carried out by multiple actors (Feldman & Pentland, 2003). Routines share some features with habits, such as repetition. Like habits, routines also help to save time and attention involved in making decisions (Feldman & Rafaeli, 2002). Routines, however, also have some unique characteristics, such as a shared understanding of what a routine is, interdependency between the people or groups preforming the routine, and the multiplicity of actors involved in routine performance (Feldman & Pentland, 2003). Routines connect and coordinate members of an organisation and provide a shared understanding of performance and the organisation (Feldman & Rafaeli, 2002). Routines, thus, represent a macro-level phenomenon that is akin to individual-level habits in some ways (i.e., repetition and time/attention-saving) but cannot be reduced to a sum of individual action due to their collective shared nature.

Now that the definition of a habit is specified and the possible confusion between habits and related constructs has been clarified, the differences between the two approaches to habits – behaviourist and cognitive will be discussed, as well as some key findings that have implications for work will be highlighted.

Behaviourist and Cognitive Approaches to Habits

The behaviourist perspective of habits provides an account of the role of repetition, rewards, and cues in habit formation. The behaviourist perspective of habits emerged in the late 19th century with the work of William James (1890), an American philosopher and psychologist who was among the pioneers of systematic writing on habits. James (1890) identified repetition as an essential factor contributing to the emergence of habits. He used the metaphor of water that hollows out traces on the surface as it flows; and just as water can make the traces deeper if it keeps flowing through them, a habit can be formed where repetition of a response occurs. Later,

the role of repetition was confirmed in empirical studies (Orbell & Verplanken, 2010; Wood & Neal, 2009) and is now considered a critical component of habit formation.

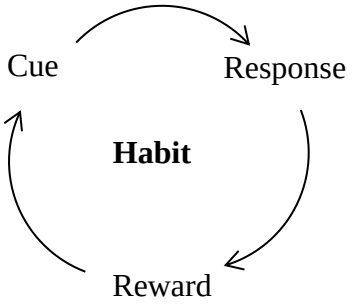
The role of rewards has been addressed in various reinforcement theories (for a review, see Wood & Rünger, 2016), such as operant conditioning theory (Skinner, 1938, 1948, 1963), stimulus-response theory (Miller & Dollard, 1941), and behaviour theory (Hull, 1943). According to these theories, responses that are followed by reinforcement are more likely to be repeated in the future while responses followed by punishment are likely to diminish in frequency and strength. As a result, responses that are reinforced would be expected to be repeated more frequently. Indeed, multiple studies on habit formation found that rewards are critical for adding motivational value to the response (Lally & Gardner, 2013; Neal, Wood, & Quinn, 2006; Wood & Neal, 2009). With the increased value of the response, it is more likely to be repeated which facilitates habit formation (Lally & Gardner, 2013). Rewards are particularly important during the early stages of habit formation; however, as the association between the cue and the response strengthens, rewards become less salient (Wood & Neal, 2009).

The cue is also an important component in the process of habit formation. A cue is a feature of the context preceding the response and serves as a trigger of that response. A wide range of features can serve as a cue (both external and internal): physical location (e.g., movie theatre; Neal, Wood, Wu, & Kurlander, 2011), time (e.g., lunchtime; Lally, Wardle, & Gardner, 2011), object (e.g. recycling bin; Holland, Aarts, & Langendam, 2006), activity (e.g., brushing teeth; Judah, Gardner, & Aunger, 2013), another person (e.g., co-worker), a psychological state (e.g., feeling stressed out; Webb, Sheeran, & Luszczynska, 2009), or goal (e.g., running; Neal, Wood, Labrecque, & Lally, 2012). The role of cues has also been discussed in early behaviourist theories on learning, such as stimulus-response theory (Miller & Dollard, 1941) and behaviour theory

(Hull, 1943); and their role in habit formation was also confirmed in more recent studies (Holland et al., 2006; Orbell & Verplanken, 2010; Verplanken & Wood, 2006; Wood et al., 2005).

These ideas have been popularized in a few recent self-development books. Journalist Charles Duhigg (2012), for example, describes the cue-response learning mechanism using a visually appealing "habit loop" depicted in Figure 1. The habit loop emphasizes the roles of stimuli (cue) and reinforcement in establishing a stable response (habit). Psychologist Jeremy Dean (2012) stresses how the repetition of daily life creates habits, intentionally and spontaneously. He also highlights the tight connection between the cue and the response in habits, and how to use that knowledge to break unwanted habits (e.g., to prevent the appearance of the cue). Numerous other self-development books that do not focus on the concept of habits but target specific habits (e.g., procrastination, performance, health, etc.) rely on a similar repeated cue-response-reward idea.

Figure 1. Habit Loop.



To summarize, one important lesson from the behaviourist approach is that habits become established as a result of reinforced repetition of a response paired with a cue. The four elements – cue, response, reinforcement, and repetition – are critical for habit formation. One of the limitations of this perspective is that it heavily relies on observable consequences of habit formation and leaves out the cognitive process that accompanies habit formation. As a result, there is little understanding about what happens on a cognitive level when habits are formed, changed,

or performed. Uncovering this invisible “black box” can provide insights into the nature of habits, help identify the reasons for their persistence, and direct research in other areas of social sciences, such as management.

Another approach to habits, labelled here as the “cognitive approach”, proposes that there is a psycho-cognitive process behind the cue-response-reward association that creates an inclination towards habituated responses (Aarts et al., 1998; Orbell & Verplanken, 2010). Importantly, this approach highlights the complementary relationship between the fast, automatic habit system and the slow, deliberate motivation system. The habit system interfaces with the deliberate motivational system in various ways: motivation prompts the formation of habits, activates or inhibits habits depending on their goal congruence, and triggers responses together with habits (Wood & Rünger, 2016). Some of the pioneering work uncovering the habit formation/learning process belongs to Edward Tolman and his work “Cognitive maps in rats and men” (Tolman, 1948). He used rat mazes to demonstrate that rats were able to choose paths to food based on their goal to reach food rather than simply using a previously reinforced path that is inefficient in the current maze. Tolman (1948) proposed that learning a new route was possible because of mental maps developed in the learning process that connect actions to goals (as opposed to mere cue-response linkages). While there have been several successful attempts to extrapolate these findings to humans, one of the most recent theories, the dual information processing theory (Evans & Stanovich, 2013), echoes these ideas and specifies the conditions of interaction between habitual and deliberate systems. Daily responses are largely habitual unless there is a signal for the deliberate system to intervene, such as in the case of a goal conflict. While there is evidence that deliberate systems may fail to intervene effectively when a habitual response is formed (e.g., Orbell & Verplanken, 2010), the dual information processing theory provides an important account

of the complexity of human behaviour, emotion, and thought, that is, motivation and habit systems are integrated and operate together to guide responses.

A critical lesson from the cognitive approach to habits is that the psycho-cognitive process behind habit formation is automaticity. Automaticity can be characterized in terms of awareness, intention, efficiency, and control (Bargh, 1994). The less the awareness, intention, and control and the greater the efficiency, the more automated the response. Habits can be characterized as a type of automaticity possessing all of the four characteristics, but to a varying extent (Orbell & Verplanken, 2010; Verplanken & Aarts, 1999). These four characteristics will be discussed in the paragraphs below.

Awareness, one of the components of automaticity, is the extent to which a person is cognizant of one of the three components of the habit loop process: the stimuli; the manifestation of the behaviour, emotion or thought; or the consequences of the stimuli. Generally, there is agreement that the awareness of habit initiation, performance, and consequences is reduced as the habit becomes more firmly established or is at different stages of development (Wood, 2017; Wood et al., 2002; Wood & Rünger, 2016). The extent to which the awareness is reduced is likely to vary between low (e.g., habits that are picked up incidentally) and medium (e.g., habits that are in the process of formation), possibly depending on factors such as maturity (new vs old habit), habit life stage (formation vs performance vs termination), or complexity (simple response vs cognitively demanding response). It should be made clear that habits are not completely unconscious and involve some level of awareness (Verplanken, Friborg, Wang, Trafimow, & Woolf, 2007; Wood et al., 2002).

Intentionality, the second component of automaticity, refers to the involvement in the initiation of the response (Bargh, 1994). Habits are triggered by cues, and as a result, do not require

active engagement of a person with the initiation of the response. Therefore, habits are unintentional. The lack of intentionality of habits should not be confused with their goal-orientation or purposefulness. Habits are performed without the deliberation at the time of habit initiation which indicates their unintentionality (Bargh, 1990); however, habits are still performed to achieve certain goals and are purposeful (Aarts & Dijksterhuis, 2000; Bargh, Lee-chai, Barndollar, Gollwitzer, & Trotschel, 2001; Bargh, Schwader, Hailey, Dyer, & Boothby, 2012; Danner, Aarts, & de Vries, 2007; Dijksterhuis & Aarts, 2010; Hassin & Bargh, 2009).

Efficiency refers to the amount of mental effort associated with the response (Bargh, 1994). Deliberate thought is costly in terms of mental effort and time, and thus, is not energy-efficient (Weiss & Ilgen, 1985; Wood et al., 2002). Processes that do not involve deliberation, such as habits, are not mentally draining because they bypass information processing and conscious decision-making, relying on previously learned associations (Ashforth & Fried, 1988; Baumeister & Alquist, 2009; Dijksterhuis & Nordgren, 2006). Habits are efficient because they save time and effort. First, habits save *time* spent on making a decision because they rely on a previously established response, so the response does not need to be contemplated; rather, the cue stimulates a habit sequence in memory and is ready to be put into action without the need to spend time on deliberation (e.g., Adriaanse, Gollwitzer, De Ridder, de Wit, & Kroese, 2011; Danner, Aarts, & de Vries, 2007; Sheeran et al., 2005). Second, habits also save the *effort* of conscious information processing, decision-making, and self-regulation. As mentioned, since they rely on choices made in the past and learning, they do not require effortful deliberation in the present.

Controllability of the response, the last component of automaticity, refers to the ability to stop the response after it has been initiated (Bargh, 1994). Much of the research on habits has focused on whether people can prevent a habit from being initiated, such as removal or vigilant

monitoring of the cue (Quinn, Pascoe, Wood, & Neal, 2010). There is little understanding of how a habitual response can be stopped *after* initiation. First, one needs to recognize the fact that a habitual response needs to be stopped, such as when the habit performance contradicts an individual's goal or is no longer helpful in achieving the goal. Dual process theory draws particular attention to the issue of intention-response congruence in automatic responses (Evans & Stanovich, 2013). According to this theory, deliberate and automatic systems run in parallel. In instances where the gap between the response and the goal does not exist or is small, the automatic system takes over because it is a more efficient system from the standpoint of energy costs. When there is an inconsistency between the automatic response and goals, the deliberate system intervenes. Many researchers agree that habits are rarely mindless to the point that a person cannot detect the discrepancy between the goals and the consequences of a habitual performance (Aarts, Paulussen, & Schaalma, 1997; Aarts & Dijksterhuis, 2000; Hassin & Bargh, 2009; Moors & De Houwer, 2006; Sheeran et al., 2005); however, without such awareness, the control over the response is not feasible. Second, even when the discrepancy between the habit and goal is realized, the performance of a habit may not necessarily be interrupted. Self-control theory suggests that in order to overcome a pull of habits there have to be sufficient mental resources that allow individuals to regulate their responses (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Vohs, & Tice, 2007). These resources are limited and, if drained, can reduce the ability to control responses (Baumeister et al., 2007; Schmeichel, Vohs, & Baumeister, 2003; Schroder, Ollis, & Davies, 2013; Tam, Bagozzi, & Spanjol, 2010). The efficiency of habits makes them a favourable response over deliberation, especially in deficient self-control conditions. Thus, both factors – the awareness of goal-habit discrepancy and self-control are needed for effective control of the habitual response.

In summary, behaviourist and cognitive approaches to habits have contributed greatly to the development of the concept. The behaviourist approach describes the cue-response-reinforcement learning process behind habit formation while the psycho-cognitive approach draws a picture of what happens on a cognitive level when the habit loop (cue-response-reinforcement) is established. Additionally, both approaches touch on a number of features associated with repetitive learning and automaticity, such as preservation of mental energy, mastery, and psychological comfort. These features are discussed in detail in the three following sections. They are important to consider as they help explain the role of habits in organisations.

Habits and Energy

Energy is a fundamental principle of life. The phenomenon of energy stands behind many well-known concepts in organisational behaviour, such as motivation, vitality, vigour, resources, attention, and self-control (Quinn, Spreitzer, & Lam, 2012). People need the energy to perform daily tasks ranging from simple functions to complex activities. Every physical or cognitive activity is reliant on the availability of energy. The limited resource theory (for review, see Baumeister, 2015) posits that energy is not endless: whenever one task is performed, there is less energy available for the next task. To maintain energy, one needs to either prevent depletion or restore energy. Numerous research studies have addressed the means for restoring energy through various means such as breaks, eating or drinking foods boosting physical energy, focusing attention, setting goals, experiencing positive emotions, or acquiring resources to counter-balance demands (Quinn et al., 2012); however, the means for preventing energy from getting depleted are not actively studied. Habits can be one means to efficiently manage energy in circumstances where the context allows repetition (Wood & Neal, 2009). Since habits rely on previously established

associations, they can be enacted without significant mental effort yet help achieve desired goals. Some empirical support for this idea comes from two studies.

In one study, Ohly, Sonnentag, and Pluntke (2006) recruited high-tech employees. They found that those who had important work activities habitualized were more creative and proactive at work. This finding is counter-intuitive because typically habits are believed to be an impediment to creativity. Ohly et al. (2006) suggest that the unexpected relationship is due to the efficiency associated with habitual performance – reduced cognitive and attention load, and performance time. Thus, habits allowed individuals to get tasks done faster and at lower mental energy cost. In a different study, Ohly, Göritz, and Schmitt (2017) focused specifically on fluctuations of energy during habits, and they found that performing a habit at one point in time was associated with higher energy in subsequent points in time. These results suggest that performing a task out of habit can even replenish lost energy. Altogether, some conceptual and empirical evidence supports the idea that the preservation of energy is one of the features of habits.

Habits and Mastery

Repetition is an important ingredient of habits, as previously discussed. Habits are by nature recurrent responses. Repetition associated with habits creates the conditions for mastering the response: the more a response is repeated, the more skilful a person becomes with it (Ericsson, 1998; Glăveanu, 2012). Habits, therefore, are performed with more competence, skill, and mastery than non-habitual responses. Additionally, in the case of non-habitual responses, attention has to be directed to the basic steps required to complete the response which limits the ability to advance performance and achieve higher levels of mastery. Since one can focus attention on improving and perfecting the performance rather than figuring out basic steps, with habits, a higher level of learning can be reached. Glăveanu (2012) draws on the examples of creative performances: “In

this craft [Easter egg decoration] the performance cues that most nonexpert decorators attend to have to do with how straight the lines are, if the model is symmetric, if colours have the proper shade, and so forth. On the contrary, experienced artisans who mastered the habit of drawing on the egg can "free" their attention from technical details, focus on aesthetic qualities and thus seize all opportunities for adding a personal element to the model being depicted". Habitual responses, thus, are characterized by a more masterful performance (Glăveanu, 2012).

Habits and Psychological Security

Habitual responses have also been linked to a positive psychological experience. In one study, participants across four contexts (flight, neighborhoods, university classroom, laboratories) were asked to report their feelings of safety, confidence, and well-being (Avni-Babad, 2011). Those who were in familiar settings (i.e., were habitually exposed to one of the four contexts, such as a frequent flyer, long-term resident of the area, etc.), reported feeling more safe and comfortable. The Avni-Babad's (2011) study does not define habits in the way that habits are defined in this chapter, but nonetheless, it provides some empirical support for the idea that repetition can be associated with some positive experiences. Similar results were shown in a diary study among students who reported less stress and more control when involved in habitual responses than non-habitual ones (Wood et al., 2002). The positive feelings such as comfort, safety, or the lack of stress likely emerge because habits occur in familiar circumstances (by definition, they are repeated responses in a similar circumstance). Uncertainty or novelty can often trigger anxiety while habitual responses are comforting. This comforting experience is strongly related to self-efficacy, defined as the judgement of one's own abilities to successfully accomplish a task, achieve a goal, or deal with a situation (Bandura, 1971, 1982). One of the factors influencing self-efficacy is past performance: frequent or great successes in the past instil confidence in future

performances. When a habit is in the formation stage, the experience of success can also be a form of reinforcement for the response. After the automaticity of the habit is established, the repetition of the response makes one intimately familiar with the habit which increases one's self-efficacy whenever such a habit is performed.

Emerging Typologies

Habits have been mostly examined as a unidimensional concept without consideration of the different bases for the habit typology. However, some attempts to empirically distinguish between different types of habit and habituation are becoming evident. For example, one distinction has been made on the basis of the target of habituation (context versus content) using a sample of nurses (Baba & Jamal, 1991). Nurses who worked permanent day/evening/night shifts were identified as having high context habituation because an element of their context (i.e., time of work) was structured and stable. Nurses working on rotating schedules had low context habituation because their time off work could vary significantly from day to day. Context habituation was distinguished from content habituation. While context habituation referred to the stability of context in which work activities were performed, content habituation was akin to the idea of task routinization in Hackman and Oldham's (1975) job characteristics theory. Task routinization refers to the perceived repetitiveness of work content, such as tasks, duties, and responsibilities. The findings indicated that nurses who had high context habituation were satisfied with their jobs, committed to the organisation, less overloaded and stressed. The opposite was true for the nurses with high content habituation (Baba & Jamal, 1991). The target of habitation appears to be a meaningful basis for differentiation between the habit types as it may be related to significant differences in work outcomes.

Another important step to differentiate between different kinds of habits was taken by Turner and Cacciatori (2016). They propose differentiation on the basis of two dimensions: context variability (the extent to which a habit is performed in different situations) and deliberation (the degree to which consciousness is involved in habit performance). Habits that show little variability between contexts and involve little to no deliberation are "automatic habits". They are usually simple activities, such as smiling to a customer, recording events and reminders in one's calendar, proofreading emails before sending, that can be learned to the point that deliberation is no longer needed. When the context varies but there is little deliberation, a different kind of habit emerges – "skilled habit". It is experienced as a "feel for the game", a gut feeling, an intuition. In the case where an activity takes place in a stable environment yet still involves deliberation, a "contested habit" is formed. With contested habits, if the habitual response is incongruent with the individual's goals, deliberation can inhibit a habitual response (Wood & Rünger, 2016). Habits that emerge in varying circumstances and involve deliberation are "infused habits". They are reflective and flexible. When performing infused habits people are oriented towards both their learned responses to similar situations and the emergent properties of the situation. While the proposed frameworks are theoretical and lack empirical support, they provide ideas to guide future research efforts. Additionally, more bases for a habits typology should be examined to better consider factors that can influence the relationship between habits and work outcomes.

Evaluation of the Literature

The existing research on habits in psychology and management has made a giant leap towards a better understanding of habits. It is a solid step but there is more work ahead. In this section, limitations of the current state of research on habits will be reviewed with a goal to provide routes for future studies that aim to extend the knowledge on habits.

The first limitation is that most of the existing evidence on the mechanism of habit formation and change comes from studying behaviours as a type of response – exercising, dieting, commuting, and so on. However, not only behaviours but also thoughts and emotions can be habitualized (Andrews, 1903; Dijksterhuis & Nordgren, 2006; Verplanken et al., 2007; Wood et al., 2002). Habituation of emotions and thoughts follows the same principles as habituation of behaviours through the cue-response-reinforcement associative learning that prompts automatic activation. For example, worrying or thinking negatively about aspects of the self might be considered to be a mental habit if an individual develops it as an adaptive response to certain situational stimuli and applies it on a regular basis (Verplanken, 2012; Verplanken & Tangelder, 2011; Watkins, 2008). Future research should look more into emotions and thoughts as a type of response and to empirically establish whether habituation is similar or different between the different types of responses.

A second limitation is that habits are generally viewed without much distinction between the types. Yet, intuitively, not all habits are the same kind: some are bad and some are good, some are simple and others are complex, some are important and some may be unimportant. Some literature suggests that habits can be distinguished on the basis of the target of habituation (Andrews, 1903), the usefulness of habits for long-term consequences (Jager, 2003), or the extent to which deliberation and mindfulness are involved in a habitual response (Turner & Cacciatori, 2016). Different types of habits can have different consequences for performance, attitudes, and well-being. Without distinguishing the types, we will limit our understanding of the relationships between habits and important outcomes.

A third limitation is the lack of a framework to study habits in the context of organisations. As a first step, it is essential to outline how habits relate to work outcomes. Many current theories

are dominated by motivation theories, deliberate choice and decision-making. While these theories explain a large portion of daily life, they also ignore the fact that many work situations are repetitive which creates conditions for other driving factors, such as habits (George, 2009; Weiss & Ilgen, 1985). A theory that bridges the gap between deliberate and habitual explanations of responses could provide a more accurate account of human behaviours, emotions, and thoughts in addition to explaining their impact on work outcomes. As a second step, habits need to be discussed in social contexts. Currently, individual habits are studied in isolation from the environment in which they develop, operate, and/or change. However, contextual features such as organisational culture, policies, practices, or habits of other individuals could significantly influence individual habits.

In other words, this is a critical point to step back and work on the development of a theory that would outline a clear role of habits in organisations. Ideally, such a theory will grow to include a comprehensive model of antecedents, outcomes, explanatory mechanisms (mediators), and boundary conditions (moderators) of habits. It is also essential to develop and test methodology for measuring habits to gather empirical evidence related to the conceptual model. The following section attempts to integrate existing pieces of evidence about habits and argue for the importance of a comprehensive theoretical framework of habits in organisations.

Towards a Theory of Habits in Organisations

Consideration of habits in organisations is needed for two reasons. First, many theories of organisational behaviour rely on the assumption that individuals deliberately process information, make decisions, weigh options, engage in and perform tasks. The research generated by these theories has been productive and significant. However, it is entirely focused on conscious cognitive activity and ignores the fact that because of the repetitiveness of daily life many responses to

organisational events are habitual (George, 2009; Weiss & Ilgen, 1985). Some studies have made indirect attempts to measure habits by measuring the frequency of responses. For example, scales such as work engagement (Schaufeli & Bakker, 2003), emotional labour (Brotheridge & Lee, 2003), leadership (Bass & Avolio, 1990) and others, often use a Likert-type frequency scale ranging from “Never” to “Always”. Habits themselves (not just frequency or repetition which is only a proxy for habits as discussed in Chapter 3) have not yet been the central research question. Adding habits to the consideration of decision-making, choices, and responses can provide a better account of human behaviours, emotions, and thoughts.

Second, building evidence around the context of habits in the workplace could inform intervention designs that aim to implement change. Going through changes requires people to break away from established, habitual ways of acting, thinking, and/or feeling. Changing habits requires an understanding of the inertia involved in the maintenance of habits and effective ways of overcoming it. While some evidence for successful methods of changing or breaking habits exists in psychology, with behaviours such as commuting, strategies to change or break habits is yet to be broadly established in the field of organisational behaviour.

A challenge of advancing the study of habits in organisations is that there is no theoretical framework that integrates accumulated knowledge with current topics and practices in organisational behaviour. Habits play an important role in shaping daily behaviours, emotions, and thoughts, and by creating a theory for analyzing individual habits and developing an empirical tool the field could be advanced. In the following sections, first, components of the theory are identified and, second, several propositions are put forward. The section is concluded with a discussion of implications of the proposed theory.

Approaches to Theory-Building: Process vs Variance

There are two major approaches, process and variance, to building a theory that can influence the components involved in the theory and the delineation of relationships between them (Burton-Jones, Mclean, & Monod, 2011; Ledford, 1985; Morris, 2005). The process approach to theory building is concerned with explaining how outcomes emerge over time. The variance approach is focused on predicting different levels of the outcome variable(s) from the independent variable(s). Both approaches have been used in the study of habits. The process approach has been used in studies on the establishment of the "habit loop", the cue-response-reinforcement association, and changes in habits (e.g., Kaushal & Rhodes, 2015; Lally & Gardner, 2013; Neal et al., 2012). The main goal of the process-oriented type of research was to establish the causal order of cue, response, and the reinforcement, and to examine how habits develop and change over time. These findings established the importance of habits in understanding repetitive behavioural, emotional, and cognitive (thought) responses to contextual cues and followed by reinforcement. These process explanations provided critical guidance for habit formation and change.

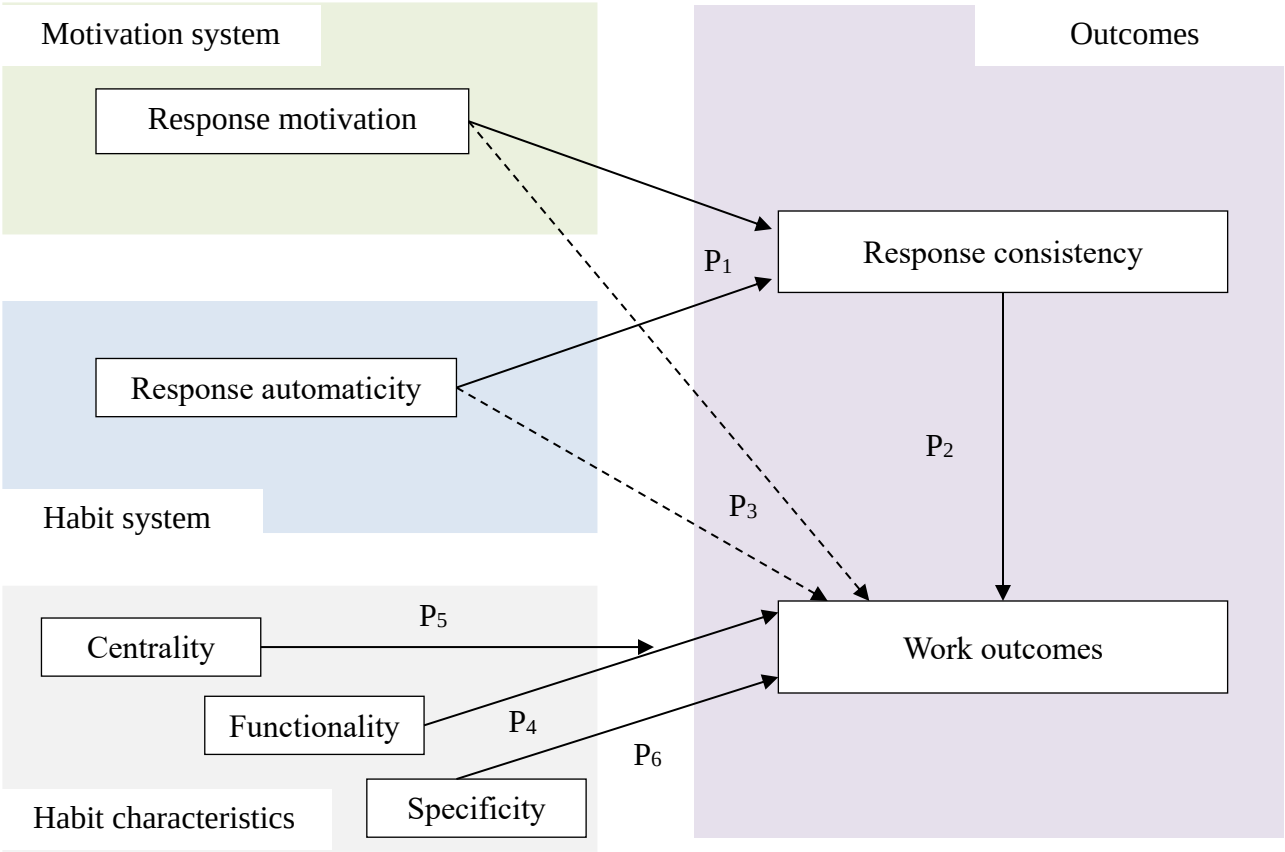
The variance approach has been used in the studies of habit-goal interference (e.g., Danner, Aarts, & de Vries, 2008; Sheeran et al., 2005) and of the outcomes associated with habit performance (e.g., Avni-Babad, 2011; Ohly et al., 2017, 2006). The main goal of the variance-oriented type of research is to identify how different levels of habituation may influence related outcomes, such as goals, energy, well-being, and/or creativity. Since one of the goals of this chapter is to develop a theory that integrates habits into the organisational realm, the intent is to demonstrate that habits can influence the outcomes that are valuable in organisations, such as employee performance, attitudes, and well-being. The nature of this inquiry is to identify how the

outcomes can vary depending on habit automaticity and characteristics; thus, the variance approach is most appropriate.

Components of the Theory

The theoretical model proposed in this chapter is graphically depicted in Figure 2. The model describes how habits can influence work outcomes beyond motivation. While motivation has been extensively researched as a determinant of behaviours, emotions, and thoughts in organisations, the role of habits is not fully understood in that context. In addition to explaining how the automaticity of habits can influence work outcomes, it also depicts how the three characteristics of habits are conceptualized to impact work outcomes. In this section, the major components of the theory are discussed; namely, the motivation system, the habit system, the response and the response consistency, work outcomes, and habit characteristics. The relationships between these systems and characteristics will be explained following the basic presentation of the model.

Figure 2. Model Linking Habits to Work Outcomes.



Motivation system. Much of the organisational behaviour research on topics related to individual behaviours, emotions, and thoughts has relied on the assumption that responses are largely driven by motives, goals, intentions, and desires. The generic formula of a motivated response is the stronger the motivation for the response (however defined – needs, goals, reasons, or desires), the more likely a person is to enact it. In turn, the responses people engage in eventually leads to higher-order outcomes, such as attitudes or performance. For example, the motivation to engage in organisational citizenship behaviours is related to behaviours such as helping colleagues, going above and beyond job descriptions or obeying the company rules which, in turn, influence performance evaluations, job commitment, and satisfaction with the job. Motivation has been

empirically proven to be an important predictor of individual responses. However, there are instances in which motivation cannot fully account for the response performance; for instance, people can persist even when their energies are depleted (Hagger, Wood, & Stiff, 2010) or fail to persist despite having formed intentions or positive attitudes towards the response (Ajzen, 2011). Where motivation cannot fully explain the occurrence of the response, habits can provide an additional explanation. However, the role of habits has received little conceptual and empirical examination in organisational behaviour research and needs to be conceptually and empirically established.

Habit system. Habits should be considered for at least two reasons. First, many work activities, such as problem-solving, decision-making, emotion regulation, or dealing with hassles, are mentally demanding and thus deplete mental resources (Demerouti & Bakker, 2011). As energy is reduced, the motivation to continue engaging in these activities weakens (Muraven, Tice, & Baumeister, 1998). To sustain energy and continue performing work tasks, a response system that does not rely on consciousness and effort is needed, such as habits. Second, day-to-day life is repetitious (George, 2009; Weiss & Ilgen, 1985). People face similar situations, tasks, and people on a regular basis. This repetition is conducive to creating mental shortcuts, such as habits. As discussed earlier in the chapter, a habit is an automatic response to a cue formed as a result of the reinforced repetitive direct association between the cue and the response. The automaticity of habits means that they are moderately low on awareness, intentionality, and control and high on efficiency. Since automaticity shifts the control over the response to the automatic system, it facilitates consistent responses. The automatic system does not rely on fluctuating factors, such as motivation. As a result, the likelihood of the response increases.

Response and response consistency. In this model, responses are discrete, individual units of behaviours (e.g., complying with safety protocols, communicating about issues, helping a colleague), emotions (e.g., feeling anger during an encounter with a challenging customer, feeling hope when dealing with a work issue, liking the work team), or thoughts (e.g., worrying, creating, problem-solving). When a response is repeated invariably across contexts (e.g., time or space), it can be characterized as consistent.

Work outcomes. When accumulated through consistent repetition, these responses stimulate broader first-level (immediate) or second-level (distal) outcomes that are frequently explored in organisational behaviour, including various kinds of behaviours, performances, attitudes, and well-being states. The type of work outcomes to be considered in the model would depend on the context of research. For instance, when studying customer interaction habits, outcomes such as performance or customer satisfaction would be considered. When studying creativity habits, innovative attitudes or creative performance could be of interest.

Habit characteristics. While habits have been generally viewed without a distinction between different habit types, some previous research has demonstrated that not all habits are the same (Baba & Jamal, 1991; Turner & Cacciatori, 2016). To establish a foundation for distinguishing between the different kinds of habits, three features are proposed that can serve as a basis for habit differentiation.

Functionality of habits refers to the extent to which habits are helpful in achieving goals. Habits have often been characterized in terms of being “good” or “bad”. “Bad” habits are those that have negative long-term consequences despite having (at times) good short-term consequences (Jager, 2003), while “good” habits do not lose the connection with the long-run outcomes. Typical “good” habits that have been explored in research are exercise, healthy diet,

and recycling (e.g., Allom & Mullan, 2012; Brug, de Vet, de Nooijer, & Verplanken, 2006; Holland et al., 2006; Tappe, Tarves, Oltarzewski, & Frum, 2013; Verplanken & Melkevik, 2008), while typical "bad" habits are smoking, drinking, or negative thinking (e.g., Norman & Conner, 2006; Orbell & Verplanken, 2010; Sheeran et al., 2005; Verplanken & Tangelder, 2011). It appears that whenever habits are referred to as "good", they are conducive to achieving goals that are beneficial to the individual in the long run. On the contrary, habits referred to as "bad" are disruptive of these goals, and therefore, are dysfunctional.

Centrality is the extent to which the habit is linked to the fundamental aspects of daily functioning. Habits can be central or peripheral depending on the role they play in life or work processes (Gersick & Hackman, 1990). Central habits have a strong influence on outcomes while peripheral habits may not matter much. For instance, since failure to consistently implement safety procedures can result in adverse events a habit of following safety procedures is central to an employee working in a hazardous environment. The same habit could be less central to someone working in a safe environment where the risks of safety events are low and occasional violations of safety would not result in catastrophic consequences.

Specificity is the extent to which a habit has repetitive content (high specificity) versus the repetitive structure with altering content (low specificity). In one of the earlier writings about the nature and function of a habit, a distinction was made between specific and general habits (Andrews, 1903). When a habit is highly specific, there is a tendency to repeat the exact same response. When a habit is not specific, the structure of the response is repeated in a similar manner but the context might alter depending on the circumstance. For instance, a Point of Care Risk Assessment (PCRA) done at a hospital prior to interactions with a patient to prevent the spread of a respiratory disease is an example of a non-specific habit. The PCRA habit follows the

same structure from interaction to interaction (e.g., evaluation of the likelihood of contact between the patient and the environment, fluid sprays, skin contact, etc.) but because every patient is different, there will always be some variations in the procedure and the outcome of the assessment.

Testable Propositions

Automaticity, motivation, and response consistency. Consistent response repetition can be driven by two factors – motivation and habits. Motivation has received a lot of attention in psychology and management literatures and has generally been successfully linked to intentions to perform a response as well as the actual behaviour (emotion or thought), especially in the case of strong intrinsic motivation (e.g., Deci & Ryan, 2008). Prediction of responses from motivation only is limited for two reasons. First, not every response that an organisation perceives as important is intrinsically motivating. Even with issues such as personal safety, employees might fail to see how, for example, washing hands 100% of the time can prevent them or others from getting severely ill. Second, in practice, motivation that can withstand fluctuations in regulatory resources is difficult to cultivate. Day-to-day operations consist of little tasks, activities, thoughts, and emotions – they cannot all become driven by a genuine interest or external rewards. Additionally, even when responses are motivating on average and employees might have the willingness to support them, studies show that intention and attitudes do not necessarily translate into behaviours (e.g., Holland, Verplanken, & van Knippenberg, 2002; Sutton, 1998; Verplanken & Aarts, 1999). Considering habits as an additional factor for predicting response consistency can help account for the instances where motivation is present in general yet the response is not consistent (i.e., due to fluctuations in motivations) or motivation is low yet the response is consistent (i.e., due to the activation of habits that is independent from motivation system). Evidence suggests that habits are shielded against the impact of temporary and non-constant factors such as job demands, moods, or

motivations (e.g., Danner, Aarts, & de Vries, 2008; Gardner, 2009; Mittal, 1988; Verplanken, Aarts, van Knippenberg, & Moonen, 1998; Verplanken, Aarts, van Knippenberg, & van Knippenberg, 1994) and are performed with greater consistency than non-habitual activities. Without questioning the role of motivation in influencing behaviours, emotions, or thoughts, it is proposed here that habits are just as important of a factor. Specifically, it is expected that habits will predict the response consistency beyond motivation.

Proposition 1: Automaticity predicts consistency beyond the role of motivation.

Response consistency and work outcomes. Response consistency is a desirable characteristic for many work-related responses. For example, workplace safety behaviours are only effective if employees are consistently compliant with the policies, healthy and safe practices and regulations across work situations, tasks, and schedules. As mentioned, response consistency has been indirectly approached in previous studies through the measurement of the response frequency (i.e., with scale anchors such as “Always” - “Never”) but never directly. In this model, the issue of response consistency is approached directly as response consistency is included as a separate construct. It is anticipated that with an increase in response consistency there will be an increase in the likelihood, frequency, or general level of a positively associated work outcome (depending on the conceptualization of the work outcome). For instance, using the example of safety behaviours, the greater the consistency of behaviours such as washing hands, discussing errors, vigilantly monitoring the environment, the more likely one is to avoid at-risk behaviours (response consistency influencing a general level of safety outcome) and the better safety performance one will attain (response consistency influencing a general level of safety outcome). When the response and the outcome are negatively related, the response consistency will have the opposite impact on the likelihood or general level of the work outcome. For example, the less likely one is to become

injured or ill (response consistency negatively influencing likelihood) and the fewer incidents one will have (response consistency negatively influencing frequency).

Proposition 2: Response consistency will be associated with the likelihood or general level of a relevant work outcome in a way that an increase in response consistency will increase the likelihood or general level of positively associated outcomes and decrease the likelihood or general level of negatively associated outcomes.

Response consistency is maintained by either strong motivation or high habit automaticity (or an interaction of both). Therefore, motivation and habits have an indirect influence on work outcomes by increasing the consistency of the associated response. Response consistency is expected to mediate the relationship between motivation, habits, and work outcomes.

Proposition 3: Response consistency will mediate the relationship between response automaticity, response motivation, and work outcomes.

Habit characteristics and work outcomes. Each individual habit represents a small bit of daily life. As such, if each instance of habit performance is considered independently their impact may seem negligible. However, the little impact that habits have on daily actions, thoughts, and emotions accumulates exponentially over time creating tangible consequences. The role of the little activities, especially habits, should not be overlooked. They are the threads that create the fabric of daily life in the organisation. What people do, think, and feel on a regular basis creates different outcomes. Additionally, it is possible that not every response can be habitualized to the same extent. The *kinds* of habits employees engage in can significantly influence higher-order work outcomes.

First, the functionality of the habit matters for the outcomes that a person experiences. Functionality is the extent to which habits are helpful in achieving goals. Some habits are almost

universally recognized as functional. For example, a habit of taking initiative would typically be identified as a good, functional habit while a habit of procrastination would generally be considered a bad, dysfunctional habit. It should be noted that the perceptions of functionality may vary from context to context and from person to person as the ideas of what the goals are and the means to their achievement might vary. For instance, when a supervisor decides to work on improving employee well-being based on stress reports from the latest employee survey, he or she might bring in a yoga trainer for lunchtime exercise to help employees develop a good exercise habit to reduce stress; if some employees view these exercise sessions as a competition for more important goals (e.g., relaxing alone, eating lunch slowly, seeing friends during the break) or if they do not think that yoga is helpful in reducing stress, they will view it as a dysfunctional habit as it is not helping them achieve their goals or the goals set by the supervisor. These gaps in perceptions are a different issue that is important to address for practical reasons but they are not a focus of this model. It is assumed that all parties agree on what habits are functional and dysfunctional towards achieving mutually selected goals. The existence or absence of these habits will influence the experienced work outcomes. For example, if several habits identified as helpful for reducing stress (e.g., exercising, detaching from work during breaks, expressing emotions about work in healthy ways), the presence of these habits will result in a positive work outcome of reduced stress and improved well-being while the absence of these will result in increased stress and poor well-being.

Proposition 4: Presence of functional habits will be positively associated with positive work outcomes while the presence of dysfunctional habits will be positively associated with negative work outcomes.

Second, centrality can moderate the impact that habits have on work outcomes. Centrality is the extent to which the habit is linked to the fundamental aspects of daily functioning. Habits that are peripheral might not matter much, even if they are dysfunctional, as they are not crucial to work processes. However, central habits can make a lot of difference. For instance, a habit of reporting concerns about safety in an organisation – which is a functional habit – can be critical to a manufacturing or healthcare facility. People are constantly in a potential risk situation if issues are not addressed; therefore, sending safety reports daily or weekly is a central habit. Some other organisations, however, such as a retail store, might not be as dependent on the reports about safety, so the same habit would be peripheral for a different organisation. In the former case, lacking the functional habit can have worse outcomes (injuries, illnesses, absences, etc.) than in the latter case. It should be noted, however, that centrality can vary from the perspectives of people in different roles within the organisation. A supervisor and an employee can have different ideas about the importance of the same habit. For the purposes of this model, it is the centrality of the person performing the response that is the focus (e.g., if it is safe behaviour on the floor, then the centrality of that habit to the employee should be considered). At the same time, it would be of great practical importance to understand the gaps in the perceived centrality of habits between different groups of people.

Proposition 5: Higher habit centrality will strengthen the moderating relationship between functionality and work outcomes.

Third, specificity of habits may be related to the work outcomes. Specificity is the extent to which a habit has repetitive content (high specificity) versus the repetitive structure with altering content (low specificity). For instance, Baba and Jamal (1991) in their study on routinization of context (i.e., shift schedule) versus content (i.e., tasks) found that the former one improves

satisfaction, commitment, and subjective experience of stress, while the latter one has the opposite effect. This observation suggests that less specific habits (i.e., those that are low on content routinization) can also improve employee well-being and attitudes while highly specific habits can decrease them. There is no direct evidence on how specificity would relate to performance. On the one hand, it can be speculated that highly specific habits lack an adaptive mechanism and, as a result, might become inefficient but still be performed due to inertia which, in turn, would negatively influence performance. Indeed, given the similarities between habituation of content and task routinization, the research on the adverse effects of task routinization support the proposition that habituation of content can create a feeling of boredom, lack of challenge, and meaningless work. On the other hand, Glăveanu (2012) suggested that habits free up cognitive resources by reducing attention, memory, and information-processing demands. As a result, a person can focus on more advanced aspects of the task. This explains why routinization of tasks has been found to be positively associated with creativity (Ohly et al., 2006). Given the available evidence, the relationship between specificity and work outcomes may not be linear. It appears that having highly specific habits is restrictive to the point that activities can become boring, mundane, and lack the room for creativity or change. Having habits with little specificity can also be limiting as the cognitive demands involved in solving problems, processing information, making decisions, completing daily tasks, and so on would be overwhelming. Therefore, a quadratic relationship between specificity and work outcomes is suggested so that a habit is most beneficial for work outcomes when it is moderately specific and less beneficial if it is too high or too low on specificity.

Proposition 6: High specificity and low specificity of a habit will be negatively associated with work outcomes while moderate specificity will be positively associated with work outcomes.

Theoretical Implications

The model presented in this chapter has clear implications for a variety of topics studied within the field of organisational behaviour, and especially research focusing on predicting outcomes of specific behaviours, emotions, or thoughts. Motivation has been studied from different angles – as needs, interests, reinforcement, goal striving, self-regulation, and others. The basic premise has been that whenever motivating factors are present (e.g., a goal has a high value, a task is interesting, a behaviour is reinforced with a valuable reward, etc.), a person will engage in an associated response. Undoubtedly, motivation plays a crucial role in understanding human behaviours, emotions, and thoughts. At the same time, there are cases when motivation fails to explain responses. In this chapter, steps towards integrating an additional factor – habits – are taken to explain a broader set of responses. Habits have been argued to be a major driving force of behaviours, emotions, and thoughts because of the repetitive nature of daily life (Ouellette & Wood, 1998; Wood, 2017; Wood & Rünger, 2016). The model proposed in this chapter suggests that habits can account for previously unexplained variance in response consistency.

Additionally, much of the management literature equates habits with boring, mundane, simple bits of work; habitual activities are, thus, typically associated with outcomes such as a lack of creativity, learning, or motivation. Such a view overlooks what habits actually are and oversimplifies their role in organisations. Some habits can, indeed, create unfavourable conditions for work, such as dissatisfaction due to the excessively repetitive content of the job (Baba & Jamal, 1991). But some habits can have positive consequences, such as a feeling of comfort and

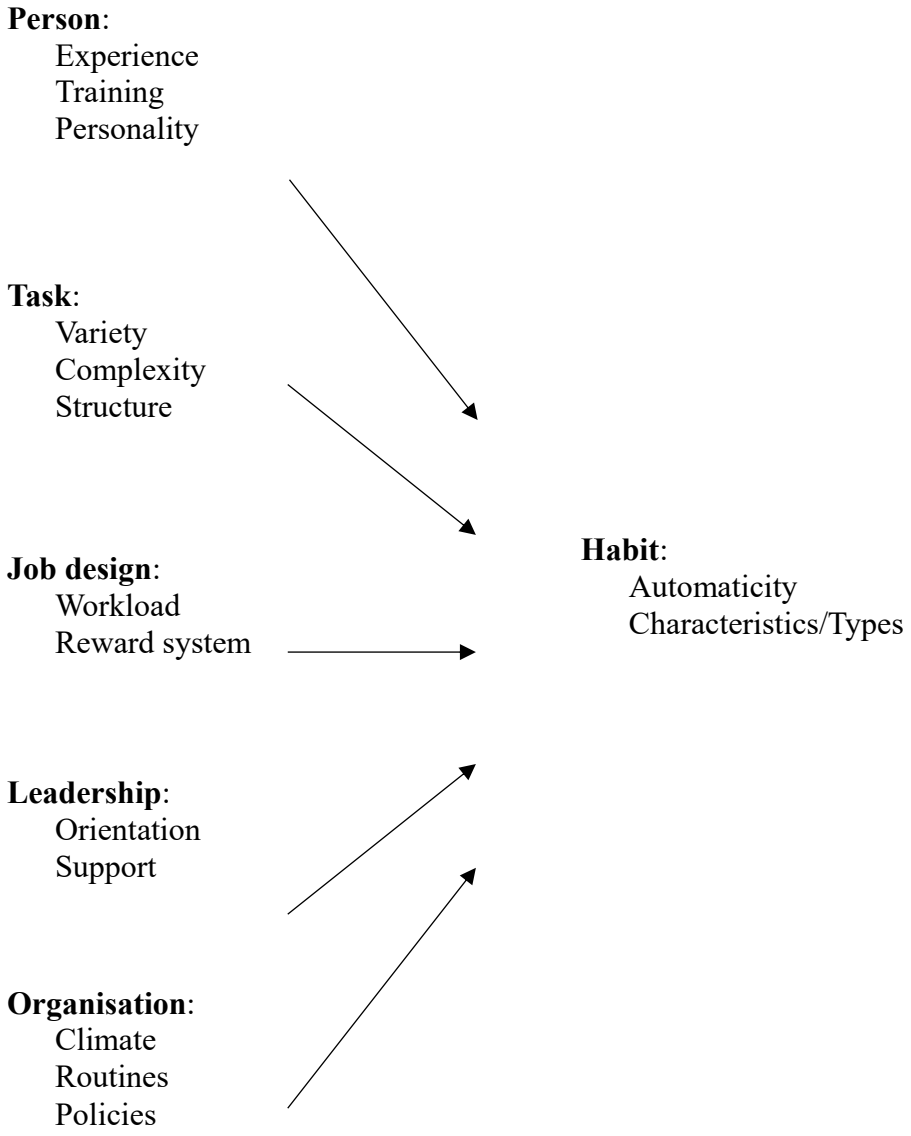
confidence (Avni-Babad, 2011; Baba & Jamal, 1991), mastery (Glăveanu, 2012), and even creativity (Ohly et al., 2006). This work urges researchers to reconsider the understanding of habits as minute, simple, boring aspects of work and consider them as a cognitive resource and a significant driving factor of daily behaviours, emotions, and thoughts. As reviewed, habits can vary along at least three characteristics: functionality, centrality, and specificity. These characteristics can influence the outcome (i.e., functional or moderately specific habits are expected to create more positive work outcomes) and the magnitude of the impact of habits (i.e., central habits are anticipated to have a stronger impact on work outcomes than peripheral habits). The contribution of this chapter is in delineating the three continuums along which habits can vary and explaining how these characteristics relate to work outcomes thus provide a more nuanced account of habits and set the groundwork for a future empirical examination of different work habits. Additionally, habitualized elements of work can balance other more demanding tasks to create an overall effective work design (George, 2009). Future research on job design should consider studying different variations of habits to uncover the nature of their relationship with work outcomes.

Future directions

This chapter has identified many questions in need for further investigation. A natural progression of this work is an empirical test of the model. The model proposed a dual contribution of motivation and automaticity to the consistency of responses and, consequently, work outcomes. While some theoretical evidence to support these relationships was discussed in the review of the literature and theory development section, the lack of empirical research on habits makes it challenging to understand the role that habits play in organisational life. Future studies could attempt to assess the relationships proposed in this chapter.

Another important area of future theorizing and research on habits would be to identify work-related antecedents, explanatory mechanisms, and boundary conditions to the effects of habits and habit characteristics on work outcomes. For instance, as depicted in Figure 3, some potential factors to be considered include person (e.g., experience, training, or personality), task (e.g., variety, complexity, or structure), job (e.g., workload or reward system), leadership (e.g., orientation or support), and organisation (e.g., climate, routines, or policies) variables. These variables could influence the degree to which certain responses are habitualized (i.e., their automaticity) as well as the form that they take (i.e. their characteristics). It would of particular practical and theoretical significance to explore how macro-level features of context (e.g., leadership, climate, routines, practices and policies) shape individual-level habits, and how this cross-level influence translates into the outcomes for both individuals and organisations. These insights could inform leaders in organisations about their own actions that they need to consider because those actions get translated into day-to-day action of employees. The accumulative effect the small changes can have can be observed, as well as allow the organisational scientists to bridge the macro-micro gap in understanding human behaviours (emotions and thoughts).

Figure 3. Variables to be Considered in Future Research on Habit Automaticity and Characteristics.



It would also be interesting to examine other ways to describe the various aspects or types of habits, including a systematic typology of habits similar to the one proposed by Turner and Cacciatori (2016). Since little information is available in the theoretical literature a particularly helpful approach would be to conduct exploratory qualitative research across various contexts to investigate variation in habits. If more characteristics or types of habits exist, adding them to the model and exploring their influence on work outcomes would deepen our understanding of habits and could promote a better differentiation between desirable and undesirable habits.

Finally, while the focus of the proposed model is on the influence of one individual habit, further theorizing and empirical research is also needed to determine how various individual habits interact and co-exist to comprise a composite of habits that define the daily life of a person. In other words, it could be of great theoretical and practical significance to investigate combinations of various habits in different contexts and to propose the mechanisms that could be driving the distinctions between these habits.

Chapter Conclusion

There were two goals established for the chapter. One was to contribute to the theoretical literature on habits in the field of organisational behaviour and another one was to develop a framework for studying habits in organisations. To achieve these goals, two steps were taken. In the first step, the available literature in the fields of psychology and management was reviewed and discussed. Psychology has greatly contributed to outlining the boundaries of the concept (i.e., as a type of automaticity distinguishable from other types of automaticity) and identifying factors that prompt the formation of habits (cue, reinforcement, and repetition). These insights are valuable for the further development of a habits theory; however, there are some limitations to consider. Specifically, all of the above-mentioned discoveries were made in research focused on a

single response type – behaviours, and it is not clear whether the same principles hold for emotions and thoughts. Moreover, the applicability of these findings to organisational behaviour is limited to the focus on behaviours unrelated to work life. Finally, habits are generally considered without any differentiation in functionality, centrality, or specificity. To overcome these limitations, the second goal – developing a theory of habits in organisations – was proposed. The theory integrated motivation and habit systems as well as accounted for habit characteristics to explain the role that habits play in response consistency and work outcomes. The model suggests that habit automaticity (the main "ingredient" of habits) predicts response consistency above and beyond motivation. In turn, consistency associated with habits (which is, at least partly, a result of their automatic nature) contributes to enactment of various behaviours, emotions, and thoughts (e.g., safety behaviour, anger, or creativity) that are linked to broader work outcomes (e.g., safety performance, customer satisfaction, or creative performance). Additionally, some characteristics (i.e., functionality and specificity) of habits are expected to have a direct influence on the outcomes while others (i.e., centrality) expect to moderate that influence.

The proposed theory sets the stage for developing a comprehensive account of the role of habits in organisations. At least three additional areas should be considered in future research. First, the antecedents to habits within the organisational context need to be considered. Specifically, the answers to the following questions are pending: What are the factors that cue people to certain responses and factors that prompt repetition? How do social (e.g., leadership practices, peer habits) and physical (e.g., the layout of the building, functionality of offices/rooms) environments influence the types of habits formed? Do habit formation practices influence the characteristics of habits that become developed? Answers to these questions would deepen our

understanding of habits but requires extensive theoretical and empirical effort and, potentially, cross-disciplinary collaboration.

Second, the distinction between personal outcomes (i.e., feelings of confidence, mastery, ease, security, or enjoyment) and work outcomes (i.e., performance, attitudes, and well-being) associated with habits could be added for even further expansion of the model. The purpose of such distinctions is to differentiate between habits that may have positive personal outcomes yet still be negatively related to work outcomes. For example, having a habit of using social media during work might have positive personal outcomes, such as the satisfaction of a need to connect with others, but it at the same time creates distractions from work which would result in decreased work outcomes.

Third, as mentioned before, the lack of empirical examination is a major limitation of the current research on habits. In addition to the lack of a conceptual framework, the measurement of habits has been a stumbling block in empirical work. Clarification of the measurement of habits is an essential step to overcome this limitation.

The following chapter, Chapter 3, aims to overcome the latter issue – the lack of an appropriate measure of habits. In order to test the theory proposed in Chapter 2 and further continue the empirical examination of habits, it is important to have the ability to capture the phenomenon of habits, namely the state of habituation as well as the three proposed habit characteristics. Thus, the next step is to develop and validate such a measure.

CHAPTER 3: DEVELOPMENT OF THE MEASUREMENT SCALE

Introduction

Several theoretical propositions were put forward in the previous chapter. Further testing of these propositions relies on the ability to capture the constructs included in the proposed relationships. As discussed, the lack of an appropriate measurement tool of habits and their characteristics is one of the limitations of current research on habits in organisational behaviour. The goal of this chapter is to fill this gap by developing and validating a scale that would be useful for future research on habits in work settings.

Currently, there are three measures of habitual behaviour. These measures have been used in past research and were useful for establishing some habit-related mechanisms and relationships. However, a number of factors limit the usefulness of these measures for organisational behaviour research.

One measure of habits is focused on the behavioural frequency and asks respondents to estimate the *past behaviour frequency* (Danner et al., 2008; Verplanken et al., 1998). This measure was one of the first attempts to empirically capture a habit. Over the years, a number of conceptual and methodological issues have been identified in relation to the measure of habit as a self-reported frequency of past behaviour. Concerns arise, in particular, when past behaviour frequency is included as one of the predictors on par with psychological constructs such as attitudes, subjective norms, or intentions. Firstly, it violates the principle of correspondence as the predictor and criterion are measured at different levels of generality in terms of time and context (Ajzen & Fishbein, 1977; Sutton, 1998). For instance, asking people about their attitudes towards various ways of commuting to work specifies the action (commuting) and target (bus vs bike vs car) but does not specify the context in which it happens (e.g., distance from work, weather, mood, etc.) or time (e.g., every day, every week, once in a while, etc.) while the behavioural measure of past behaviour includes all four components (e.g., Bamberg, Ajzen, & Schmidt, 2003). Attitudes,

subjective norms, and intentions, therefore, are not correspondent with the measure of habit as a solely behavioural construct. Secondly, since past frequency, intention, and future behaviour are usually measured on scales with different magnitudes and formats a past behaviour frequency measure violates the scale correspondence principle (Ajzen, 2011; Sutton, 1998). Intentions, like many other constructs, are evaluated frequently on a Likert-type scale, while actual behaviour is usually a report of either performance or no performance. Sutton (1998) highlights that the lack of scale correspondence between the predictor and a criterion can lead to attenuated correlations. Thirdly, past behaviour frequency does not constitute an antecedent of behaviour *per se*. It is rather a proxy for a psychological state related to the habit strength (Ajzen, 2011). Finally, a frequency-based measure may be difficult to apply to emotions and thoughts. As discussed in Chapter 2, much of the research has focused on behaviours as a type of habit; however, emotions and thoughts can also be habitualized. A cognitive-based rather than behaviour-based measure may be more appropriate to capture a wider spectrum of habits.

Another measure of habit is the *response frequency measure* (RFM). It builds on the idea that frequent repetition in stable circumstances results in the acquisition of mental representations of cue-response links in the form of schemas or scripts that are easily accessible in memory every time a relevant cue is recognized (Verplanken & Aarts, 1999). For example, when an employee turns on a computer in the morning, it might activate a “morning script” of activities. Depending on what this particular employee does most frequently at work in the morning (e.g., planning the day, checking email, confirming a meeting, etc.), it becomes a built-in part of their morning script (Verplanken et al., 1997). Such a script represents a habit when there is invariance of responses observed across time, meaning that the same response is selected in (almost) every instance even in the presence of other options (Verplanken et al., 1997). Scripts are most easily accessible and will generally be selected from other options when a choice is offered. It has been extensively used in studies on travel mode choice, and shown to be moderately correlated with the past behaviour

frequency measure, and had an acceptable test-retest reliability (Verplanken et al., 1998; Verplanken et al., 1997). Correlation of RFM with the actual behaviour, however, was still quite low. Additionally, much like with the past behaviour frequency measure, RFM is more suited for studying behaviours but may be limited in the studies of habitual emotions and thoughts.

Finally, the *Self-Report Habit Index* (SRHI) was suggested as an alternative to the behaviourist paradigm and was designed to measure habit as a mental construct rather than a behavioural measure (Verplanken & Orbell, 2003). The SRHI consists of 12 items capturing automaticity and frequency of behaviour as well as the extent to which a person identifies himself or herself with this behaviour. The argument behind creating a measure of habit as a mental construct is strong from both theoretical and empirical standpoints. Empirically, as mentioned earlier, past behaviour is only a proxy of habit strength (Ajzen, 2011). Theoretically, a habit is more than a simple repetition of the past, it is reflected on neurological, cognitive, and behavioural levels (Orbell & Verplanken, 2010; Verplanken & Melkevik, 2008; Verplanken, 2006; Wood et al., 2005). The SRHI has become popular in recent studies, however, there are a number of issues associated with it. In particular, the automaticity component of the SRHI was suggested to be the "active ingredient" of habituation (Gardner, Abraham, Lally, & de Bruijn, 2012; Mittal, 1988). Thus, the remainder of the items might be adding unwanted "noise". Additionally, the scale combines automaticity and repetition even though they are not the same constructs, repetition is an antecedent to habit formation. SRHI also conflates the habit itself with related concepts such as possible consequences of not performing a habit or identifying oneself with the habit (Sniehotta & Presseau, 2012). SRHI is better suited than other published alternatives for the study of all types of habits – behaviours, emotions, and thoughts, and it has been used at least once in a study of negative self-thinking and correlated moderately with the reported number of negative thoughts and perceived frequency of negative thoughts (Verplanken et al., 2007). However, the presence of "noisy" items is still a deficiency of the scale that needs to be addressed.

Table 1 summarizes some of the features of existing measures and compares them to the proposed measure. Based on the discussion above, a measure of habits that could improve the existing scales would have the following characteristics: (1) the cumulative habit score would be composed of automaticity solely as it is the core component of a habit; (2) items measuring antecedents of habit automaticity (repetition, cue stability) or consequences (identity) would not be included in the composite score; (3) it would allow the measurement of all three types of responses – behaviour, emotion, and thought; and (4) it could be used outside of a laboratory in a real-life setting. Moreover, in Chapter 2, three habit characteristics are discussed – functionality, centrality, and specificity – and the proposed scale operationalizes these characteristics.

Table 1

Comparison of the Proposed Habit Measure to the Existing Measures

	Past behaviour frequency (Verplanken et al., 1998)	Response frequency (Verplanken & Aarts, 1999)	Self-Report Habit Index (Verplanken & Orbell, 2003)	Habit automaticity and characteristics scale
Scale correspondence	No	No	Yes	Yes
Predictor correspondence	No	No	Yes	Yes
Reliance on memory	Yes	No	Yes	Yes
Proxy vs direct measure	Proxy	Proxy	Direct	Direct
Type of response	Behaviour	Behaviour	Behaviour	Behaviour, emotion, or thought
Focus	Repetition	Repetition Automaticity	Repetition Automaticity	Automaticity

Following the recommendations for scale development of Hinkin (1995, 1998), a four-step procedure was implemented: 1) item generation and face validity, 2) item reduction, 3) confirmation of the factorial structure, and 4) evaluation of psychometric properties. The face validity check step was assessed via a think-aloud technique that was not listed in Hinkin's (1995, 1998) guide but has been recommended for the development of new scales (Fonteyn, Kuipers, & Grobe, 1993; Gardner & Tang, 2013). After the item generation, four studies were conducted to complete these steps: the think-aloud study as Study 1 for improving the face validity of the scale, initial evaluation of the factor structure and item reduction in Study 2, additional exploration of the factor structure using a modified scale in Study 3, and finally, confirmatory factor analysis, convergent and discriminant validity in Study 4.

Item Generation

The proposed scale consists of two independent components: habit automaticity and habit characteristics. Conceptual and operational definitions of both components are discussed in the following section. The goal was to generate a minimum of four items per subcomponent of the scale to ensure that a sufficient number of items remain in the scale after item reduction and scale validation (Hinkin, 1998).

Habit Automaticity

Automaticity is the ability to process information, emotion, or act without much intention, awareness, control, and in a cognitively efficient manner (Bargh & Chartrand, 1999; Moors & De Houwer, 2006). Automaticity has been recognized as a key component or "active ingredient" of habit (e.g., Gardner et al., 2012; Verplanken, 2006; Wood & Rünger, 2016). Automaticity includes four dimensions – intentionality, awareness, controllability, and efficiency (Bargh, 1994). *Intentionality* is referred to as the involvement in the initiation of the response. *Awareness*, one of the components of automaticity, is the extent to which a person is aware of the presence, interpretation, or the consequences of the response cue. *Controllability* of the response refers to

the ability to stop the response after it has been initiated (Bargh, 1994). *Efficiency* refers to the amount of mental effort associated with the response (Bargh, 1994). The items for all four dimensions were generated to represent the construct in full. Some of the SRHI (Verplanken & Orbell, 2003) items (i.e., items reflecting automaticity) were used for generating items for the present scale. They are listed in Table 2.

Table 2

Initial Habit Automaticity Scale Items

Dimension		**Items**
[Response X] is something…		
Intention	1.	…I do even when I don't have an explicit intention to do so.
	2.	…I don't need to think much about whether I need to do it or not*.
	3.	…I engage in without giving it too much thought.
	4.	…I engage in almost involuntary.
	5.	…I do even when I don't feel a strong motivation to do so.
	6.	…I rarely give any consideration about whether or not I need to do.
	7.	…I do rather than ponder over.
	8.	…I didn't need to think much about it the last time I did it.
Awareness	1.	…I am not entirely sure what makes me do it.
	2.	…I would find difficult to pinpoint the reason for deciding to do it.
	3.	…I was mentally invested in when deciding whether I want to do it or not. (R)
	4.	… I engage in without fully realizing that I am doing it*.
	5.	…I sometimes cannot even remember being stimulated to begin.
	6.	…I cannot recall many details about when and how I did it.
	7.	…I do without much awareness.

Dimension		Items
Control	1.	…that is harder for me to not do rather than do.
	2.	…I would have trouble overriding my tendency to do it.
	3.	…that would be difficult to restrain me from doing*.
	4.	…that would be hard to control.
	5.	…that is not under my conscious control.
Efficiency	1.	…I could only do when I am not busy with anything else. (R)
	2.	…I have to fully focus on to do it well. (R)
	3.	…I cannot do while daydreaming at the same time. (R)
	4.	…that if I get distracted from mentally, I will not be able to do properly. (R)
	5.	…that requires a lot of mental energy*. (R)
	6.	…that really drains me mentally. (R)

* Modified SRHI (Verplanken & Orbell, 2003) item.

Habit Characteristics

Functionality of habits refers to the extent to which habits are helpful in achieving goals. Since perception changes depending on current goals, it is up to an individual to decide whether a particular habit is functional or dysfunctional. For example, staying at work late might be functional from the standpoint of an individual trying to achieve a promotion but the same behaviour would be dysfunctional from the standpoint of a person whose priority is to find work-life balance. Five items were proposed to measure functionality (see Table 3).

Gersick & Hackman (1990) discuss the centrality of habits in relation to group processes. Central habits were conceptualized to be the heart of a group's work and peripheral habits being of much lesser concern to the group. This idea can be applied to individual habits. *Centrality* is the extent to which the habit is linked to the fundamental aspects of daily functioning. For instance, the tendency to find positives in different life situations is a central habit since it has profound consequences for the well-being of an individual. An end of day habit of cleaning computer files used during the day might be a useful habit but it is unlikely to have a profound impact on the performance of an individual. Of course, the centrality of a habit is highly contextual; the same habit can be either central or peripheral in two different contexts. In the example of computer files clean up, such a habit might be unimportant for a salesperson but can be critical for a data manager. Therefore, centrality is not an objective characteristic, and it is up to individuals involved in the performance of a habit or experiencing the consequences of the habit to determine whether it is central or peripheral to them, their life, or the organisation. Items for the centrality dimension are presented in Table 3.

Specificity is the extent to which a habit has repetitive content (high specificity) versus the repetitive structure with altering content (low specificity). A habit of experiencing anxiety when faced with challenges is an example of a highly specific habit because it is the content (i.e., certain emotion) that is repeated while a habit of creating a to-do list is an example of a low specificity habit as it shapes the activity (creating the list) but it does not specify the content (what goes into the schedule). The items measuring habit specificity are presented in Table 3.

Table 3

Initial Habit Characteristics Scale Items

Dimension	Items
[Response X] is something…	
Functionality	1. …that serves a purpose in my life.
	2. …facilitates my ability to reach a specific goal.
	3. …that brings me closer to one of my objectives whenever I do it.
	4. …that gets me one step closer to my target.
	5. …I do purposefully.
Centrality	1. …that is an important aspect of my life/work.
	2. …that is one of the central activities in my life /work.
	3. …is crucial to me.
	4. …that would feel missing if for any reason I stopped doing it.
	5. …that is fundamental to my life /work.
	6. …that is an important part of who I am.
	7. …central to my life /work.
Specificity	1. …that has repetitive content.
	2. …that I have a very specific way of doing.
	3. …where there is not much variation in how I do it.
	4. …that is slightly different every time. (R)
	5. …that mostly follows the same logic from time to time but the content changes somewhat. (R)
	6. …that I have a rather general way of doing. (R)

Dimension	Items
	7. …that provides structure for my activity but does not specify *what* I do. (R)

Study 1: Think-Aloud Study

At the item generation stage, theory guides the content of each item. However, there might be a significant gap in the meaning that a researcher communicates through the theory-generated item and the meaning that a naïve respondent assigns to it. A "think aloud" technique can be used to minimize such gap. In a think-aloud study, participants are asked to verbalize their thoughts about the task being performed, such as answering questions in a survey (Fonteyn et al., 1993). The think-aloud technique has been applied to examine an existing measure of habits – SRHI and was helpful for identifying some content validity issues (Gardner & Tang, 2013). It provided insight into what the participants were thinking while they read the statements and questions, and offered an opportunity to improve the wording of items to ensure that the intended meaning corresponded with the participant's interpretation of the item. The think-aloud technique was used in Study 1 to improve the face validity of the proposed measure of habits.

Participants

Twenty students from a university student participant pool were recruited to participate in the study. Fifty percent of the participants were males. Recruitment was continued until a saturation point where no new information was offered through additional participant comments. Participants received 1 bonus course credit in exchange for their participation.

Procedure

Participants were invited to participate one at a time on a sequential basis. They were seated in a room with a researcher and, after signing a consent form, were given the following instructions:

> We will shortly begin a study to see whether a specific activity can be done regularly. For this study, we have developed a questionnaire about the ease and importance with which that activity is done. We want to check that people understand the statements in the way

that we mean them. To do this, I am going to ask you to think aloud as you complete the questionnaire.

What I mean by 'think aloud' is that I want you to tell me everything you are thinking as you read each statement and decide how to answer it. I would like you to talk aloud constantly. I don't want you to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. If you are silent for any long period of time, I will ask you to talk. Please try to speak as clearly as possible, as I shall be recording you as you speak.

Do you understand what I want you to do? This session will be audio-recorded for the purposes of analysis. Do you consent to have your responses audio-recorded? Imagine you are answering on a scale from 1 – Strongly disagree to 5 – Strongly agree.

Participants were then given a copy of the questionnaire that included one of the following activities: Writing a to-do list, Feeling fear before an important exam, or Being mindful throughout the day (these were randomly assigned). Participants' verbalizations were audio-recorded as per their consent. Upon completion, they were thanked for their participation. Ethics approval was granted by the university's research ethics board. The scales used in the study are provided in the Appendix A, and the consent form for the study is provided in the Appendix B.

Data Analysis

Audio-recordings were analyzed upon completion of data collection. Data analysis involved two steps. In the first step, audio recordings were carefully scanned three times for identification of categories of issues. As a result of the analysis, eight response categories emerged. In the second step, audio recordings were scanned again for counting the types of issues mentioned for every item. The issues were then aggregated across twenty participants. As a result, problematic items were altered and the scale was revised for further quantitative analysis.

Results and Discussion

The think-aloud study yielded some fruitful results. First, the eight categories that resulted included:

(1) Confusing wording. The category was assigned in one of the following instances: a participant claimed that the wording was confusing or hard to understand, a participant read a statement two or more times, or a participant indicated that he or she could not understand the statement.

(2) Misinterpretation. The category was assigned to cases when a participant commented on the interpretation of the item meaning and the meaning did not match the intended purpose of the item.

(3) Makes think too much. The category was assigned when a participant explicitly indicated that the statement made him or her think hard about the answer or when a participant took more time than usual to evaluate the statement.

(4) Intentional bias. The category was assigned when a participant justified the response by indicating that he or she always acts out of intention, would not do the activity without having a motivation, or that he or she always had a reason for engaging in an activity if they do it. While the intentionality bias may not be critical for some scales, it interferes with the automatic nature of concepts such as habits.

(5) Confusion of activity performance with its initiation. The category was assigned when the items evaluating the initiation of the activity were evaluated from the perspective of doing the activity (rather than the act of initiating it).

(6) Confusion of activity performance with its outcome. The category was assigned when a participant evaluated the statement thinking of its outcomes rather than the process of the activity.

(7) Dependency on the circumstances. The category was assigned when a participant indicated that the evaluation of the item depends on the circumstance or the context. These items tended

to be evaluated neutrally because of such dependency which does not reflect a neutral opinion but rather an undecided opinion. It potentially adds error to the measurement.

(8) Does not apply. The category was assigned when a participant explicitly identified that the item cannot be evaluated because it did not apply to him or her or when he or she indicated that the wording of the item is too extreme to apply to them although he or she could understand the statement.

The initial pool of items was refined based on the participants' vocalizations of their thoughts in the process of evaluating items. Based on the responses from the participants, the gap was reduced between the researcher's intended meaning of the item based on theory and the meaning that a naïve respondent attributed to the item. Table 4 details the issues identified for every item and the changes made to improve the scale validity.

Table 4

Summary of the Issues Identified with the Original Scale Items and Proposed Changes

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
1	Intention	…I do even when I don't have an explicit intention to do so.	4	1, 2, 7, 8[a]	I usually [*Response X*] without planning for it in advance. (R)
2		…I don't need to think much about whether I need to do it or not.	8	1, 2, 3, 5, 6, 8	Usually, I just [*Response X*] without overthinking it. (R)
3		…I engage in without giving it too much thought.	3	5, 7, 8	I often start [*Response X*] without giving it too much thought. (R)
4		…I engage in almost involuntarily.	3	1	[*Response X*] is almost like a reflex for me. (R)
5		…I do even when I don't feel a strong motivation to do so.	8	4, 8	REMOVE
6		…I rarely give any consideration about whether or not I need to do it.	4	1, 7, 8	If I have to [*Response X*], I almost never contemplate it. (R)

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
7		…I do without pondering over the need to do that.	10	1, 2, 3, 8	Usually, I [*Response X*] without much thought about why I do it. (R)
8		…I didn't need to think much about it the last time I did it.	5	1, 8	REMOVE
9	Awareness	…I'm not entirely sure what makes me do it.	8	1, 2	REMOVE
10		…I would find difficult to pinpoint the reason for deciding to do it.	8	1, 2, 3	REMOVE
11		…I was mentally invested in when deciding whether I wanted to do it or not.	10	1, 2, 3, 5, 6, 7, 8	[*Response X*] is not really a decision for me, it is somewhat of an instinct. (R)
12		…I engage in without fully realizing that I am doing it.	0		I engage in [*Response X*] without fully realizing that I am doing it. (R)

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
13		…I sometimes cannot even remember being stimulated to begin.	7	1	The moment I start [*Response X*] is so subtle that I usually can barely realize it. (R)
14		…I cannot recall many details about when and how I did it.	3	1	REMOVE
15		…I do without much awareness.	0		I [*Response X*] without much awareness. (R)
					I usually do not think much about the consequences of *[Response X]*, I do it as a reflex. (new item) (R)
16	Control	…that is harder for me to not do rather than do.	12	1, 3	I [*Response X*] even when I'm being lazy.
17		…I would have trouble overriding my tendency to do it.	1	1	I would have trouble suppressing my wish to [*Response X*]. (R)

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
18		… would be difficult to restrain me from deciding to do it.	7	1, 3, 5, 6	Regular [*Response X*] requires extreme measures of discipline from me. (R)
19		… that would be hard to control my decision to do it.	3	1, 8	[*Response X*] requires a lot of willpower. (R)
20		…that is not under my conscious control.	5	1, 2, 7	[*Response X*] is something I find hard to control. (R)
21	Efficiency	…I could only do when I am not busy with anything else.	4	1, 2	[Response X] and multitasking would be very problematic for me. (R)
22		…I have to fully focus on to do it well.	2	1,	[*Response X*] requires my undivided attention. (R)
23		… I cannot do while daydreaming at the same time.	8	3, 7, 8	REMOVE
24		…that if I get distracted from mentally, I will not be able to do properly.	6	1, 2, 5, 7, 8	[*Response X*] is tiring. (R)

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
25		…that requires a lot of mental energy.	1		[*Response X*] requires a lot of mental energy. (R)
26		…that really drains me mentally.	2	5, 6	REMOVE
					[*Response X*] is effortless for me. (new)
27	Functionality	…that serves a purpose in my life.	6	4, 7, 8	REMOVE
28		…facilitates my ability to reach a specific goal.	9	1, 2, 3, 7, 8	[*Response X*] facilitates the achievement of long-term goals.
29		…that brings me closer to one of my objectives whenever I do it.	4	1, 2, 8	REMOVE
30		…that gets me one step closer to my target.	2	1	[*Response X*] helps me achieve my goals.
31		…I do purposefully.	7	1, 2, 8	REMOVE

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
					[*Response X*] has significant long-term benefits.
					[*Response X*] benefits me but in the short-run only. (R)
					[*Response X*] has many positive outcomes for me in the future.
32	Centrality	…that is an important aspect of my life/work.	6	3, 8	[*Response X*] is important for some aspects of my life.
33		…that is one of the central activities in my life /work.	6	1, 8	[*Response X*] is needed for my day-to-day activities.
34		…is crucial to me.	6	8	[*Response X*] is core to some things I do.
35		…that would feel missing from my life if for any reason I stopped doing it.	5	1, 3, 8	A day without [*Response X*] would feel somewhat uncomfortable.
36		…that is fundamental to my life /work.	2	2, 7	[*Response X*] is a basic thing I do.

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
37		…that is an important part of who I am.	2	8	REMOVE
38		…central to my life/work.	2	1	[*Response X*] is a major element of some activities I do.
39	Specificity	…that has repetitive content.	7	1, 2	I do [Response X] in the same way from time to time. (R)
40		…that I have a very specific way of doing.	5	1, 2	Circumstances do not matter much for how I [Response X].
41		…where there is not much variation in how I do it.	2	1, 7	There is almost no variation in terms of how I [Response X].
42		…that is slightly different every time.	2	7, 8	I do [Response X] in the same way from time to time. (R)
43		…that mostly follows the same logic from time to time but the content changes somewhat.	3	1, 3	I [Response X] in a similar manner but how I do it differs a lot across situations. (R)

N	Sub-scale	Original item	# of issues	Categories of issues	Suggested changes
44		…that I have a rather general way of doing.	10	1, 2, 8	REMOVE
45		…that I follow the general structure of even though the content of what I do differs significantly.	9	1, 3, 8	There are significant differences in how I [Response X] from time to time.

[a.] (1) Confusing wording; (2) Misinterpretation; (3) Makes think too much; (4) Intentional bias; (5) Confusion of activity performance with its initiation; (6) Confusion of activity performance with its outcome; (7) Dependency on the circumstances; (8) Does not apply.

The think-aloud study highlighted potential scale implementation problems. One of the problems was the format of the scale with the stem "*[Response X] is something that…*" being displayed at the top of the scale. With thirty-eight items in the scale, it was difficult for participants to glance back at the stem every time they were responding to the item. Potentially, it could only be an issue in the think-aloud study where people are asked to verbalize their thoughts, so they have to re-read the response stem every time they read each item. It could also be a consequence of the length of the scale (thirty-eight items) where people were having a hard time remembering the beginning of the sentence. Full sentences were used in the next study rather than stem-item format to reduce possible confusion. Another issue was that a number of respondents were concerned about the degree of item repetitiveness and their response consistency across the similar items. The concern about consistency could create a strong bias and interfere with future analysis as item correlations would be elevated due to method bias rather than true associations. Items were randomized in the consecutive studies and instructions that reduce the concern for consistency were added.

Study 2: Exploratory Factor Analysis

After the initial alteration of scale items from the results obtained in Study 1, the next step was to examine the dimensionality of the scale and reduce the number of items included in the scale using exploratory factor analysis (EFA). The items that reflected the latent factors best were selected while the items adding noise were dropped (as summarized in Table 4).

Participants

Data was collected from two pools of participants. One pool involved 346 students. The mean age in the sample was 22 years old (SD = 4.4 years), 51% were males. They received a 0.5 bonus course credit in exchange for their participation. The second pool involved 88 healthcare

professionals. The mean age was 42 years old (SD = 13 years). Fourteen percent were males. They received $3 CAD gift cards in exchange for submitting questionnaires.

Procedure

Students were recruited via the university's student pool recruitment system. After reading and signing the consent form, they were directed to the online questionnaire that included the habits scale and demographic information questions. Healthcare facility participants were recruited in person or via email. They filled out questionnaires online or on paper. Participants were randomly assigned to one of the three responses. For the student sample, the responses were: "Taking class notes" (behaviour), "Being mindful throughout the day" (thought), or "Focusing on the positive when facing difficulties" (emotion). For the healthcare sample, the responses were: "Washing hands before seeing a patient" (behaviour), "Being mindful about health and safety" (thought), or "Imitating positive emotions before seeing a patient" (emotion). It is necessary to test a variety of habits to make sure that the results of the scale validation hold across different types. Every participant responded to the questions concerning one type of habit. Ethics approval was granted by the university's research ethics board. The scales used in the study are provided in the Appendix C, and the consent forms for the study are provided in the Appendices D and E.

Data Analysis

Exploratory factor analysis (EFA) was conducted using IBM SPSS Statistics 20. One of the major applications of EFA is the search for latent factors (Conway & Huffcutt, 2003). Since the goal was to identify latent factors as opposed to reducing data (Preacher & MacCallum, 2003), principal axis factoring (PAF) was selected over principal component analysis (PCA). The full instrument consists of a number of non-interchangeable dimensions, therefore, reduction of individual items is not meaningful (Conway & Huffcutt, 2003; Field, 2012). Rather, the latent

factors that could be formed from the variables were examined and compared to the theoretically developed dimensions. To rotate the factors, oblique rotation (promax, kappa = 4) was used. Because the factors were expected to correlate with each other oblique rather than orthogonal rotation was used (Costello & Osborne, 2005). The number of factors was determined based on the Keiser–Guttman criterion (eigenvalues greater than one). The factor solution was evaluated from the perspective of the meaningfulness of factors (items loading on expected factors), factor loadings (loadings of 0.40 or greater and no cross-loadings between the factors exceeding 0.30), and extraction communalities (extraction communalities exceeding initial communalities and greater than 0.40) following rule-of-thumb guidelines for factor selection and retention (Hair, Anderson, Tatham, & Black, 1995; Tabachnick & Fidell, 2001) Factors that were evaluated as poorly constructed (i.e., items with wrong loadings, weak loadings, cross-loadings, small extraction communality, or extraction communality lower than initial communality) were either revised or removed from further consideration as per suggestions from Costello & Osborne (2005).

Results

Habit automaticity. Habit automaticity was theorized to consist of four dimensions: intention, awareness, efficiency, and control (Bargh, 1994). Empirically, however, only two conceptually justifiable dimensions emerged based on the Keiser-Guttman criterion. An additional third factor emerged which could be due to the noise in the data and a large number of repetitive items in each subscale. A scree plot confirmed the solution. Intention and awareness loaded strongly on one factor explaining 25.7% of the variance (eigenvalue = 5.40) while efficiency and control loaded on the second factor explaining 17.8% of the variance (eigenvalue 3.75). The "noise" factor explained 7.2% of variance (eigenvalue = 1.51). The fact that four dimensions of automaticity, theoretically distinct, loaded on two factors might indicate that participants do not

perceive the proposed differences in the subdimensions. It is also conceivable that even in theory the dimensions that loaded together are more closely related than theorized. Specifically, responses that are intentional are more likely to be within a person's awareness while unintentional responses are naturally outside of one's awareness. Similarly, responses that do not require cognitive control are efficient while the responses that require regulation become less efficient.

The EFA revealed that further alteration of the scale was needed. The two most common issues were the loss of communalities after the extraction of the factors ($h^2_1 > h^2_2$) or the lack of contribution to the communality after the extraction ($h^2_1 = h^2_2$). When the initial communality (h^2_1) is greater or equal to the extracted (h^2_2) communality, it means that the latent factors fail to explain the variance in the variables. It could potentially be due to the repetitiveness of items within each dimension (yet respondents answering somewhat differently to them). Additionally, there were a number of items with low communalities ($h^2_2 < .40$). Low communalities indicate that the item correlated poorly with the latent factor. Poorly correlated items that are nonetheless assigned to one factor could reduce the variance explained by that factor. Some items also loaded on the wrong factor or loaded on more than one factor (cross-loading of .30 or more). These items could fail to clearly load on one factor because they were too ambiguous or too similar to the items in the other factor. They needed to be revised to be conceptually associated with one dimension only or removed from further consideration. The results of the factor analysis, as well as recommended actions for every item, are presented in Table 5. The overall conclusions for the habits automaticity scale are that (1) the number of items needed to be reduced to minimize the noise, and (2) items needed to be clarified to avoid ambiguity in interpretation or overlap with other subscales. Only three items per dimension were retained to deal with the issue of item repetitiveness. Another EFA study was required after the revisions.

Table 5

Habit Automaticity Factor Loadings and Recommended Actions after the Analysis

#	Item	F1	F2	F3	h_1^2	h_2^2	Action	Comment
I1	Usually, I just *[Response X]* without overthinking it.	0.27	0.15	*0.62*	0.38	0.47	Remove	Loaded on the "noise" factor
I2	I often start *[Response X]* without giving it too much thought.	0.52	0.16	*0.65*	0.62	0.71	Remove	Loaded on the "noise" factor and cross-loaded with F1
I3	*[Response X]* is almost like a reflex for me.	*0.79*	0.17	0.17	0.68	0.68	Revise	$h_1^2 = h_2^2$
I4	If I have to *[Response X]*, I almost never contemplate about it.	*0.55*	0.09	0.14	0.36	0.33	Remove	$h_2^2 < 0.4$
I5	I usually *[Response X]* without planning for it in advance.	*0.67*	0.26	0.21	0.56	0.56	Revise	$h_1^2 = h_2^2$
I6	Usually, I *[Response X]* without much thinking of why I do it.	*0.71*	0.22	0.19	0.63	0.58	Revise	$h_1^2 > h_2^2$

A1	I engage in *[Response X]* without fully realizing that I am doing it.	0.62	0.17	0.45	0.59	0.61	Merge with A3	Cross-loaded with F3
A2	The moment I start *[Response X]* is so subtle that I usually can barely realize it.	*0.61*	0.05	0.14	0.39	0.39	Remove	$h_2^2 < 0.4$
A3	*[Response X]* is not really a decision for me, it is somewhat of an instinct.	*0.78*	0.23	0.14	0.66	0.68	Merge with A1	
A4	I *[Response X]* without much awareness.	*0.62*	0.26	0.27	0.53	0.51	Revise	$h_1^2 > h_2^2$
A5	I usually do not think much about the consequences of *[Response X]*, I do it as a reflex.	*0.77*	0.20	0.17	0.68	0.66	Revise	$h_1^2 > h_2^2$
E1	*[Response X]* is effortless for me.	0.45	0.14	0.39	0.38	0.38	Merge with E5	Cross-loaded with F3 $h_2^2 < 0.4$e

E2	*[Response X]* requires my undivided attention.	0.08	*0.62*	0.09	0.44	0.40	Remove	$h_1^2 > h_2^2$
E3	*[Response X]* and multitasking would be very problematic for me.	0.07	*0.64*	0.16	0.44	0.44	Revise	$h_1^2 = h_2^2$
E4	*[Response X]* requires a lot of mental energy.	0.16	*0.77*	0.18	0.59	0.65	Revise	$h_1^2 = h_2^2$
E5	*[Response X]* is tiring.	0.21	*0.73*	0.06	0.54	0.57	Merge with E1	
C1	I *[Response X]* even when I'm being lazy.	0.37	0.00	0.09	0.19	0.15	Remove	$h_2^2 < 0.4$
C2	*[Response X]* is something I find hard to control quite often.	0.23	-0.55	-0.12	0.37	0.37	Merge with C3	$h_2^2 < 0.4$
C3	I would have trouble suppressing my wish to *[Response X]*.	*0.50*	-0.20	-0.03	0.34	0.29	Merge with C2	Loaded on F1 instead of F2 $h_2^2 < 0.4$

C4	*[Response X]* regularly requires a lot of willpower for me.	0.28	*0.75*	0.03	0.61	0.64	Retain	
C5	Regular *[Response X]* requires extreme measures of discipline from me.	0.21	*0.73*	-0.06	0.54	0.58	Retain	
F1 = Intention and awareness; F2 = Efficiency and control; h_1^2 = Initial communality; h_2^2 = Extraction communality.								

Habit characteristics. It was proposed earlier that habits can be characterized in terms of their functionality, centrality, and specificity. Indeed, centrality, functionality, and specificity all loaded on different factors based on the Keiser-Guttman criterion and scree plot. The three habit characteristics explained 37.4% of the variance. There was a fourth factor that also emerged in the analysis on which only two items loaded. As with the habit automaticity scale, it could be a "noise" factor which emerged due to various errors and biases associated with the developing scale. Clarifying the items and eliminating ambiguity were expected to improve the factor structure. Centrality (eigenvalue = 4.17) explained 24.5% of the variance, functionality (eigenvalue = 1.50) explained 8.9% of the variance, and specificity (eigenvalue = 1.24) explained 7.3% of the variance. The "noise" factor (eigenvalue = 0.671) explained 4% of the variance. The results are presented in Table 6. In the process of the EFA, several issues were identified. One of the most common problems was low factor scores on multiple items. While a common rule-of-thumb cut-off is 0.40, low factor loadings can indicate that the item has a weak correlation with the factor meaning that it may not describe the factor well. Some factor loadings were above the recommended 0.40 but they were relatively low compared to how other items within the same subscale loaded on the factor which indicates relatively poorer fit. Items with low factor loadings needed to be revised to make sure they clearly relate to the latent factor or they needed to be removed. Additionally, several items either had low extraction communalities or had the extraction communalities smaller than the initial communalities. Both are indicators of poor item to factor correlations. The wording of the items needed to be clarified and made unambiguous. Similar to the habit automaticity scale, the noise in the data can be associated with the repetitiveness of the items. Each subscale was reduced to three items. Another EFA study was required after the revisions.

Table 6

Habit Characteristics Factor Loadings and Recommended Actions after the Analysis

#	Item	F1	F2	F3	F4	h_1^2	h_2^2	Action	Comment
CN 1	*[Response X]* is important for some aspects of my life.	0.39	0.23	0.17	0.00	0.24	0.23	Merge with CN2	$h_1^2 > h_2^2$
CN 2	*[Response X]* is needed for my day-to-day activities.	*0.75*	0.15	-0.02	0.01	0.45	0.58	Merge with CN1	
CN 3	*[Response X]* is a major element of some activities I do.	*0.59*	0.22	-0.32	0.12	0.45	0.52	Merge with CN5 and CN6	Relatively low factor loading
CN 4	A day without *[Response X]* would feel somewhat uncomfortable.	*0.62*	0.12	0.04	0.17	0.40	0.43	Revise	Relatively low factor loading
CN 5	*[Response X]* is a basic thing I do.	*0.62*	0.24	-0.01	0.26	0.48	0.50	Merge with CN3 and CN6	Relatively low factor loading
CN 6	*[Response X]* is core to some things I do.	*0.57*	0.23	-0.11	0.28	0.44	0.47	Merge with CN3 and CN5	Relatively low factor loading

F1	*[Response X]* benefits me but in the short-run only.	0.12	0.42	0.22	-0.22	0.25	0.28	Remove	$h_2^2 < 0.4$
F2	*[Response X]* has many positive outcomes for me in the future.	0.35	*0.57*	0.05	-0.07	0.42	0.46	Revise	Relatively low factor loading
F3	*[Response X]* helps me achieve my goals.	0.21	*0.57*	-0.25	0.15	0.43	0.46	Merge with F4	Relatively low factor loading
F4	*[Response X]* facilitates the achievement of my long-term goals.	0.20	*0.76*	-0.12	0.11	0.53	0.64	Merge with F3	
F5	*[Response X]* has significant long-term benefits for me.	0.18	*0.75*	-0.02	0.07	0.50	0.60	Retain	
S1	*[Response X]* is the same from time to time.	0.36	0.20	0.03	0.26	0.25	0.24	Revise	$h_1^2 > h_2^2$
S2	I *[Response X]* in a similar manner but what I do differs a lot across situations.	-0.08	-0.05	*0.62*	-0.02	0.30	0.40	Merge with S5 and S6	Relatively low factor loading

S3	There are significant differences in *[Response X]* from time to time.	-0.06	-0.01	*0.56*	0.10	0.27	0.33	Merge with S4	$h_2^2 < 0.4$
S4	The way I *[Response X]* fluctuates significantly across situations.	0.14	0.00	*0.69*	0.06	0.35	0.49	Merge with S3	
S5	Circumstances do not matter much for *[Response X]*	0.15	0.02	0.06	*0.65*	0.32	0.44	Merge with S2 and S6	Loaded on F4 instead of F3
S6	There is almost no variation in terms of *[Response X]* from time to time.	0.24	-0.01	0.10	*0.68*	0.35	0.53	Merge with S2 and S5	Loaded on F4 instead of F3
F1 = Centrality; F2 = Functionality, S3 = Specificity; h_1^2 = Initial communality; h_2^2 = Extraction communality.									

Discussion

Two goals were pursued in Study 2. One was concerned with exploring the dimensionality of the scales measuring habit automaticity and habit characteristics. For automaticity, four dimensions are typically used to define it: awareness, intention, efficiency, and control. However, only two meaningful factors emerged: intention collapsed with awareness and efficiency collapsed with control. As discussed, the lack of distinctiveness between the dimensions could be due to a close relationship between these dimensions. Since the habit automaticity scale aims to evaluate automaticity as a unified construct rather than separate dimensions, it would be appropriate to collapse all dimensions into a single scale. Additionally, some changes to the scale were made to minimize ambiguity and improve the psychometric properties. For the habit characteristics, three meaningful factors emerged as expected: functionality, centrality, and specificity. Some modifications to the problematic items were made in both scales. In the next study, Study 3, another EFA analysis was conducted to check whether the modifications significantly improved the structure of the scale.

The second goal was concerned with reducing the number of items in the scale. Having a large number of items is problematic for a number of reasons. First, respondents become aware of repetition of some items and become conscious about the consistency of their responses across the repetitive items. Second, they may become annoyed by having to think about the same aspect over and over again. This repetition becomes particularly evident in the number of missed items as they get close to the end of the scale. Having significant and systematic missing data can potentially reduce the power of the study using the scale or decrease the accuracy of the scale. Finally, there is an issue of practicality. The aspiration is to use these scales in research in various settings. In research in organisations, employees, in many cases, volunteer their time to respond to surveys.

Having a scale that takes up a large portion of the participant's time could demotivate employees to take part in studies, and reduce the validity and reliability of the scale through hurried or inattentive responses. When a scale can be shortened without losing its validity and weakening the psychometric properties, it should be done for the sake of saving participants' time and preventing their boredom with studies. The items on both habit automaticity and habit characteristics scales were removed or merged together to address the issue of the repetitiveness of items and the size of the scale.

The following revised habit automaticity and characteristics scale is proposed as a result of Study 2 (I – Intentionality, A – Awareness, E – Efficiency, C – Control, F – Functionality, CN – centrality, S - Specificity):

[Response X] is something that…

I1. I do without justifying why I do it to myself.

I2. I just do without thinking about it.

I3. I need to carefully think about before doing it. (R)

A1. I can start doing and not even notice.

A2. I can be doing without even realizing it right away.

A3. has consequences for me that I do not always realize.

E1. is effortless for me.

E2. requires a lot of mental energy. (R)

E3. requires no mental exertion on my part.

C1. would take a lot of willpower to not do.

C2. I can't easily restrain myself from doing.

C3. I can easily quit doing. (R)

CN1. is an important part of my day-to-day activities.

CN2. is central to my work and/or life.

CN3. would feel missing from my life if I couldn't do it.

F1. helps me achieve important goal(s) in my life-work.

F2. is beneficial for my success in life/at work.

F3. serves an important purpose in my life/work.

S1. I do in a specific fixed way.

S2. do the same way every time.

S3. I do differently every time.

Study 3: Exploratory Factor Analysis after Modification

In the first two studies, the original pool of items was modified and reduced. Specifically, the wording of the items was changed and several items were collapsed or removed. The goal of Study 3 was to reiterate the findings of the previous studies on a new sample (i.e., confirm the findings after minor alterations in the habit automaticity and characteristics scales).

Participants

Data for Study 3 was collected from 684 Amazon Mechanical Turk (MTurk) participants. To ensure high quality of data, attention check questions were included in the questionnaire. After filtering out participants who failed attention checks (43% of the original sample), 294 individuals were retained in the final sample for data analysis. The average age was 36 years (SD = 12 yrs.), 53% were males. 63% were full-time employed, and 19% were part-time employees. The rest were unemployed, retired, student, or other. The vast majority of the sample had education extending beyond a high school diploma (88%). 95% claimed that English is their native language; the rest claimed to have intermediate English language fluency or higher.

Procedure

Participants were first directed to the consent form explaining the purpose of the study and the procedure. They were told that their answers might be screened for quality and rewards may be withdrawn if attention checks were failed. Upon consent, they were directed to the questionnaire. The questions were concerned with one of the following habits (randomly assigned) – helping my colleagues (behaviour), using my phone while at work (behaviour), reflecting on the day (thought), fully focusing on the task at hand (thought), faking a positive emotion (emotion), or approaching tasks with confidence and positive attitude (emotion). All participants who participated in the study received a reward of $0.50 USD ($0.64 CAD) regardless of whether they passed or failed the attention check. At the end of the study, they were debriefed about the minor deception regarding rewards being withdrawn in case attention checks were failed and were thanked for their participation. Ethics approval was granted by the university's research ethics board. The scales used in the study are provided in the Appendix F, and the consent form for the study is provided in the Appendix G.

Data Analysis

The same analytical strategy as in Study 2 was used. EFA was conducted using IBM SPSS Statistics 20. Similar to the previous study, PAF was used as the extraction method. The number of factors was determined based on the Keiser–Guttman criterion (eigenvalues greater than one). The factor solution was evaluated from the perspective of the meaningfulness of the factors (items loading on expected factors), factor loadings (loadings of 0.40 or greater and no cross-loadings between the factors), and extraction communalities (extraction communalities exceeding initial communalities and extraction communalities greater than 0.40) as per suggested guidelines (Hair et al., 1995; Tabachnick & Fidell, 2001). Factors that were evaluated as poorly constructed (i.e.,

wrong loadings, weak loadings, cross-loadings, small extraction communality, or extraction communality lower than initial communality) were recommended to either be revised or removed from further consideration.

Results

Habit automaticity. Two factors emerged in the EFA: the factor that included intention and awareness items (eigenvalue = 4.621) explained 38.5% while the factor that included control and efficiency items (eigenvalue = 1.381) explained 11.5% of the variance. Since the first factor explained more variance than the second factor, these results are similar to Study 2 results. The correlation between the factors is strong (r = .54), so the two factors could be merged together into one factor in the future – automaticity. The EFA results revealed that eight items can be retained based on the criteria discussed above with two items representing each of the four dimensions of automaticity. Four items are recommended to be removed from further consideration due to low commonalities and a drop in the extraction commonality. More specifically, three items (I3, A2, and C3) had communalities below 0.40 which indicates poor item to factor correlations meaning that items may not be descriptive of the latent variable (i.e., intentionality, awareness, and control respectively). One item (E3) representing the efficiency dimension had a slight drop in extraction communality compared to initial communality. Since all dimensions should be represented equally in a scale, the efficiency item with the worst communality was deleted. Two items (C1 and C2) were retained despite having some issues. One item (C1) had an extraction communality lower than the initial communality and the extraction communality was below 0.40. Another item (C2) had a stronger loading on the intention and awareness factor than efficiency and control factor. These two items did not have significant issues in the previous study so the above-mentioned issues could be sample specific, thus the decision to retain them in the future model test study. Given that

at least two items need to be retained for control to equally represent the dimension in the scale, the items with the best fit were retained. The results of the factor analysis, as well as recommended actions, are presented in Table 7.

Table 7

Habit Automaticity Factor Loadings after Modification

	Item	F1	F2	h_1^2	h_2^2	Action	Comment
I1	I do without justifying why I do it to myself.	0.78	0.06	0.61	0.65	Retain	
I2	I just do without thinking about it.	0.61	0.34	0.68	0.72	Retain	
I3	I need to carefully think about before doing it.	0.08	0.46	0.36	0.26	Remove	$h_2^2 < 0.4$
A1	I can start doing and not even notice.	0.79	0.06	0.70	0.68	Retain	
A2	has consequences for me that I do not always realize.	0.30	-0.32	0.11	0.09	Remove	$h_2^2 < 0.4$
A3	I can be doing without even realizing it right away.	0.80	0.08	0.70	0.72	Retain	
E1	is effortless for me.	0.27	0.63	0.63	0.64	Retain	
E2	requires a lot of mental energy.	-0.31	0.98	0.56	0.73	Retain	
E3	requires no mental exertion on my part.	-0.01	0.77	0.62	0.59	Remove	$h_1^2 > h_2^2$

C1	would take a lot of willpower to not do.	0.68	-0.23	0.41	0.34	Retain	$h_1^2 > h_2^2$
C2	I can't easily restrain myself from doing.	0.70	-0.11	0.41	0.43	Retain	Loaded on F1 instead of F2
C3	I can easily quit doing.	0.46	-0.10	0.28	0.17	Remove	$h_2^2 < 0.4$
F1 = Intention and awareness; F2 = Efficiency and control; h_1^2 = Initial communality; h_2^2 = Extraction communality.							

Habit characteristics. Two factors emerged as a result of the analysis: one factor combined centrality and functionality items (eigenvalue = 4.116) explaining 45.7% of the variance while the other factor included specificity items (eigenvalue = 1.166) explaining 13.0% of the variance. The fact that functionality and centrality loaded on one factor could be due to the strong correlation between the two: habits that are highly functional (i.e., helpful in achieving a goal) are also likely to be central from the perspective of an individual. Unlike the habits automaticity scale, the items from the three habit characteristics dimensions aim to measure different constructs and cannot be merged together. Following recommendations, a minimum of three items per scale is supposed to be retained (Hinkin, 1995). Some criteria for retaining the factors were met (i.e., factor loadings above 0.40 and the lack of cross-loadings) while some were not (extraction communality score below 0.40 or below initial communality scores). For some items (CN2, F2, and F3) the drop from initial to extraction communality was minor and given the strong factor loadings should not present significant issues. The specificity scale presented several challenges. Two items had low communality scores (S1 and S2) and one item had a weak factor loading (S2). A decision was made to modify the item with low communality and low factor loading (S2; revised to "I do differently from time to time") and retain other variables to test whether the factor structure holds on other samples. The results are presented in Table 8.

Table 8

Habit Characteristics Factor Loadings after Modification

		F1	F2	h_1^2	h_2^2	Action	Comment
CN 1	is an important part of my day-to-day activities.	0.85	0.05	0.70	0.74	Retain	
CN 2	would feel missing from my life if I couldn't do it.	0.68	0.09	0.52	0.50	Retain	$h_1^2 > h_2^2$
CN 3	is central to my work and/or life.	0.84	0.08	0.71	0.75	Retain	
F1	serves an important purpose in my life/work.	0.89	-0.05	0.71	0.77	Retain	
F2	helps me achieve important goal(s) in my life-work.	0.80	-0.04	0.69	0.62	Retain	$h_1^2 > h_2^2$
F3	is beneficial for my success in life/at work.	0.77	-0.08	0.63	0.57	Retain	$h_1^2 > h_2^2$
S1	I do in a specific fixed way.	0.15	0.49	0.31	0.30	Retain	$h_2^2 < 0.4$
S2	I do differently every time.	-0.28	0.28	0.13	0.12	Revise	$h_2^2 < 0.4$
S3	do the same way every time.	-0.05	0.97	0.34	0.91	Retain	
F1 = Centrality and functionality; F2 = Specificity; h_1^2 = Initial communality; h_2^2 = Extraction communality.							

Discussion

The goal of Study 3 was to test the changes made to the scale based on the findings of the previous study. It appeared that, once again, only two meaningful factors emerged (intentionality

collapses with awareness and efficiency collapses with control), and the two factors correlated with each other. These results suggest that even though automaticity can consist of four independent dimensions theoretically, they may not be empirically distinguishable. Instead, automaticity may be described by four features yet represent a uni-dimensional construct. Indeed, a scale consisting of eight items emerged. Not only does it explain as much variance in the latent construct as the Study 2 version consisting of 21 items but it is also shorter which makes it more practical for administration in research studies. The following items were retained:

[Response X] is something that…

I1. I do without justifying why I do it to myself.

I2. I just do without thinking about it.

A1. I can start doing and not even notice.

A2. I can be doing without even realizing it right away.

E1. is effortless for me.

E2. requires a lot of mental energy. (R)

C1. would take a lot of willpower to not do.

C2. I can't easily restrain myself from doing.

The habit characteristics scale was also reduced to a nine-item scale. Centrality and functionality merged together, so more examination of the relationship between the two dimensions is needed. Supposedly, they may be correlated so strongly that they fall under one latent construct. The specificity scale presents some challenges in terms of finding the right operational definition. One minor change in the wording of an item was suggested to improve the item to factor correlation. The following items were retained for further analysis:

[Response X] is something that…

CN1. is an important part of my day-to-day activities.

CN2. is central to my work and/or life.

CN3. would feel missing from my life if I couldn't do it.

F1. helps me achieve important goal(s) in my life-work.

F2. is beneficial for my success in life/at work.

F3. serves an important purpose in my life/work.

S1. I do in a specific fixed way.

S2. do the same way every time.

S3. I do differently from time to time.

Study 4: Confirmatory Factor Analysis, Convergent and Divergent Validity

The final steps of scale validation were the replication of the factor structure using confirmatory factor analysis (CFA) and evaluation of the psychometric properties of the scale, such as convergent (the extent to which the scale correlates with similar measures) and divergent validity (the extent to which the scale does not correlate with dissimilar measures). Using a diverse MTurk sample, CFA was first conducted followed by the assessment of the validity.

Participants

Data for Study 4 was collecting from 1083 Amazon MTurk participants. To ensure high-quality data, attention check questions were included in the questionnaire. After filtering out participants who failed attention checks (77% of the original sample), 249 individuals were retained in the final sample for data analysis. CFA guidelines suggest a minimum of 200 responses for a reliable analysis (Hinkin, 1998), so this sample was an adequate size. The average age was 36 years (SD = 11 years) 54% were males. 67% were full-time employees, 14% were part-time

employees, and the remainder were unemployed, retired, student, or other. The vast majority of the sample had education extending beyond a high school diploma (87%). Ninety-three percent claimed that English was their native language; the rest claimed to have intermediate English language fluency or higher.

Procedure

The procedure was almost identical to the procedure in Study 3. The only exception was a higher reward of $1.50 USD ($1.92 CAD) because there were additional questions for the purposes of evaluating convergent and divergent validity that required more time to answer. Ethics approval was granted by the university's research ethics board. The scales used in the study are provided in the Appendix H, and the consent form for the study is provided in the Appendix I.

Measures

Habit Automaticity and Characteristics Scale. The items from Study 3 were used. Responses were recorded on a 7-point scale (1 – "Strongly disagree" to 7 – "Strongly agree").

Self-Reported Habit Index (SRHI). SRHI, a 12-item measure developed by Verplanken and Orbell (2003), was used to establish the convergent validity of the Habit Automaticity and Characteristics Scale as both measure a similar construct – self-reported habit. However, it is expected that the correlation will not be perfect as the Habit Automaticity and Characteristics Scale only measures the automaticity component of habits while SRHI includes other correlates of automaticity, such as identity, ease of performance, and so on. SRHI is unidimensional and showed high-reliability scores with coefficient alphas of 0.80 and higher, high test-retest reliability, and convergent validity (Verplanken & Orbell, 2003). Sample items are "I do frequently", "I do automatically", and "I do without having to consciously remember". Responses were recorded on

a 7-point scale (1 – “Strongly disagree” to 7 – “Strongly agree”). The internal reliability of the scale was satisfactory in this study (α = .95).

Past response frequency. Past response frequency is included for establishing divergent validity of the Habit Automaticity and Characteristics Scale. Frequency of past responses is a proxy to habits but it does not reflect the nature of habits (i.e., automaticity) itself, thus, it is expected to correlated weakly with the measure of automaticity. The frequency of the response in the past was measured using a single item “How often did you [Response X] in the last three days?” (Danner et al., 2008). Responses were measured on a 5-point scale (1 – “Never” to 5 – “Regularly”).

Perceived instrumentality. Perceived instrumentality is the perception of the utility of a response in attaining goals (Miller, DeBacker, & Greene, 1999). Perceived instrumentality is expected to converge with functionality because both reflect the extent to which a response is helpful in achieving goals. Three items were used to measure it, such as “I [*Response X*] because it plays a role in reaching my future goals” and “I [*Response X*] because it is important for becoming the person I want to be”. It is a scale with an established factor structure and high Cronbach’s alpha of 0.91 (Miller et al., 1999). Responses were recorded on a 7-point scale (1 – “Strongly disagree” to 7 – “Strongly agree”). The internal reliability of the scale was satisfactory in this study (α = .79).

Intrinsic valuing. Valuing underlies the concept of the incentive for the activity (Csikszentmihalyi & Nakamura, 1989; Deci & Ryan, 2008). Intrinsic valuing involves incentives associated with pure enjoyment of activity and satisfaction from the process. Intrinsic valuing is expected to diverge from functionality because responses useful for achieving goals may or may not be intrinsically enjoyable. Sample items for intrinsic valuing are “[*Response X*] is enjoyable”

and “I find [*Response X*] personally satisfying”. The scale measuring intrinsic valuing has been frequently used in studies on motivation and self-regulation with sufficient evidence for a stable factor structure and Cronbach’s alpha between 0.84 and 0.89 for both scales (Miller, Behrens, & Greene, 1993; Miller et al., 1999). Responses were recorded on a 7-point scale (1 – “Strongly disagree” to 7 – “Strongly agree”). The internal reliability of the scale was satisfactory in this study ($\alpha = .88$).

Task significance. Centrality was expected to converge with task significance because both measure the impact of the task or a response on an organisation. Task significance was measured with three items, such as “When I [*Response X*], it affects the well-being of other people in very important ways”, “Many people are affected by whether I [*Response X*] or not”, and “Being mindful of my health and safety is very significant and important in the broader scheme of things.”. Responses were recorded on a 7-point scale (1 – “Strongly disagree” to 7 – “Strongly agree”). The scale has been validated numerous times and has an established high reliability and validity (Fried & Ferris, 1987; Sims, Szilagyi, & Keller, 1976; van Saane, Sluiter, Verbeek, & Frings-Dresen, 2003). The internal reliability of the scale in this study was just below the “rule-of-thumb” cut-off point of .70 ($\alpha = .68$) which could indicate that the items within the scale did not correlate as strongly as expected which is likely a function of the sample given the well-established properties of the scale. Future studies could try to replicate these findings to see if higher internal reliability affects the correlation. Considering that it is only .02 below the cut-off value, it should not create significant differences in results.

Perceived social norms. Perceived social norms, or normative beliefs, are subjective perceptions of when a person thinks others expect compliance. Perceived social norms are expected to diverge from centrality as an activity that is central to someone’s work or life may not

necessarily be important from a societal point of view. Normative beliefs are a part of the theory of reasoned action (TRA) or theory of planned behaviour (TPB) and has well-established validity and reliability (Ajzen, 2002; Vallerand, Deshaies, Cuerrier, Pelletier, & Mongeau, 1992). The construct was measured using four items in line with the measurement in TRA/TPB research: "My supervisor thinks that I should [*Response X*]", "My co-workers think I should [*Response X*]", "My friends think I should [*Response X*], and "People I care about think I should [*Response X*]". Responses were recorded on a 7-point scale (1 – "Strongly disagree" to 7 – "Strongly agree"). The internal reliability of the scale was satisfactory in this study ($\alpha = .84$).

Task routineness. Task routineness is the extent to which individuals do their job in a repetitive manner (Diefendorff, Richard, & Gosserand, 2006). Since both reflect a degree of repetitiveness in the task or a response it was expected to converge with specificity. Three items were adapted from Withey, Daft, and Cooper (1983) to fit the format of the questionnaire (statements rather than questions) and to measure a response rather than a job overall. The items are as follows: "[*Response X*] is the same from day-to-day", "[*Response X*] is very routine" "[*Response X*] is very repetitious", "There is an identifiable sequence of steps that can be followed to [*Response X*]", and "I can rely on established procedures to accomplish [*Response X*]". Responses were recorded on a 7-point scale (1 – "Strongly disagree" to 7 – "Strongly agree"). (Fried & Ferris, 1987; Sims et al., 1976; van Saane et al., 2003). The scale reliability reported in previous studies was 0.81 with established convergent and discriminant validity (Rousseau & Aubé, 2010; Withey et al., 1983). The internal reliability of the scale was satisfactory in this study ($\alpha = .70$).

Skill variety. Specificity was expected to diverge from skill variety as specificity does not necessarily imply a simple response. Skill variety was measured with three items, such as "I have

a chance to [*Response X*] in a number of different ways, using a wide variety of different skills and talents" and "I get to use a number of complex skills when [*Response X*]". Responses were recorded on a 7-point scale (1 – "Strongly disagree" to 7 – "Strongly agree"). The scale has been validated numerous times and has an established high reliability and validity (Fried & Ferris, 1987; Sims et al., 1976; van Saane et al., 2003). The internal reliability of the scale in this study was just below the "rule-of-thumb" cut-off point of .70 ($\alpha = .67$) which could indicate that the items within the scale did not correlate as strongly as expected. Therefore, the results for the correlation between skill variety and specificity should be interpreted with caution.

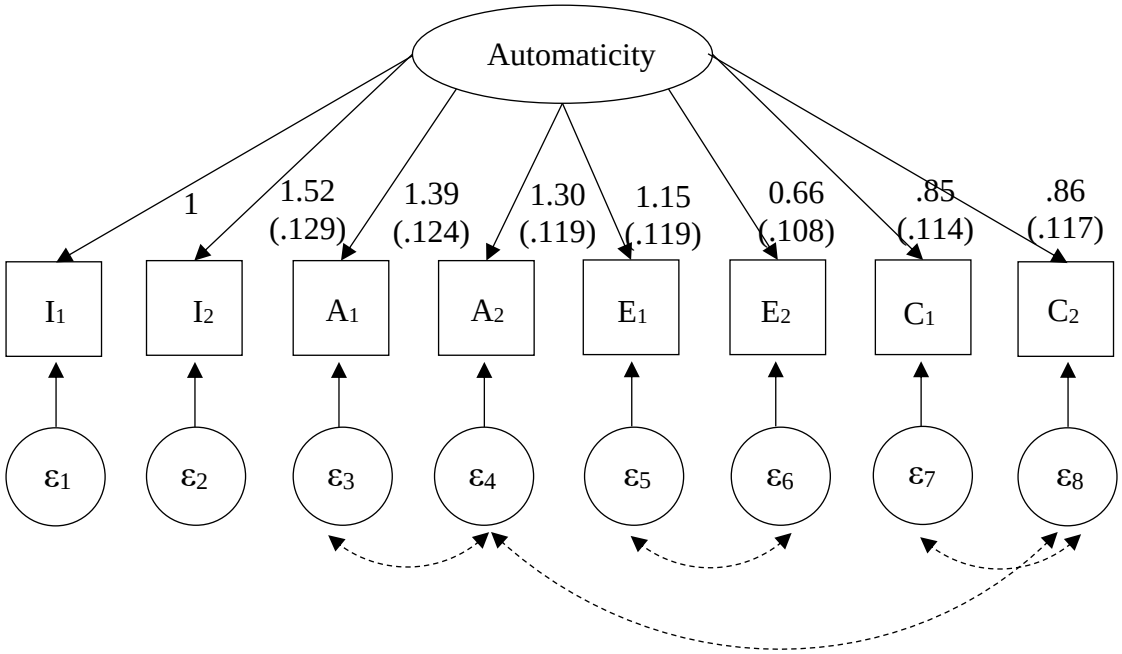
Data Analysis

CFA was conducted using SPSS Amos 18 to confirm and adjust the factor structure of habit automaticity and the task characteristics scales. Paths from errors to the observed variables were fixed to 1. One path to each factor from one of the observed variables was fixed to 1. All other parameters were freed. The model was estimated using the maximum likelihood (ML) algorithm. Convergent and discriminant validity were estimated using Pearson's correlation coefficients in IBM SPSS 20.

Results

Confirmatory factor analysis of the habit automaticity scale. First, a model for the eight-item habit automaticity scale was fitted. The measurement model and the fit statistics are presented in Figure 4. All indicators point to a good fit: CFI/TLI $\geq .95$, RMSEA $\leq .06$, and SRMR $\leq .08$ (Hu & Bentler, 1999; Brown, 2006). To eliminate the areas of localized strain (as indicated by the modification indexes), correlations between error terms were allowed. Since automaticity is presented as a unidimensional construct, it is acceptable to allow error term correlations.

Figure 4. Final Measurement Model of Habit Automaticity.



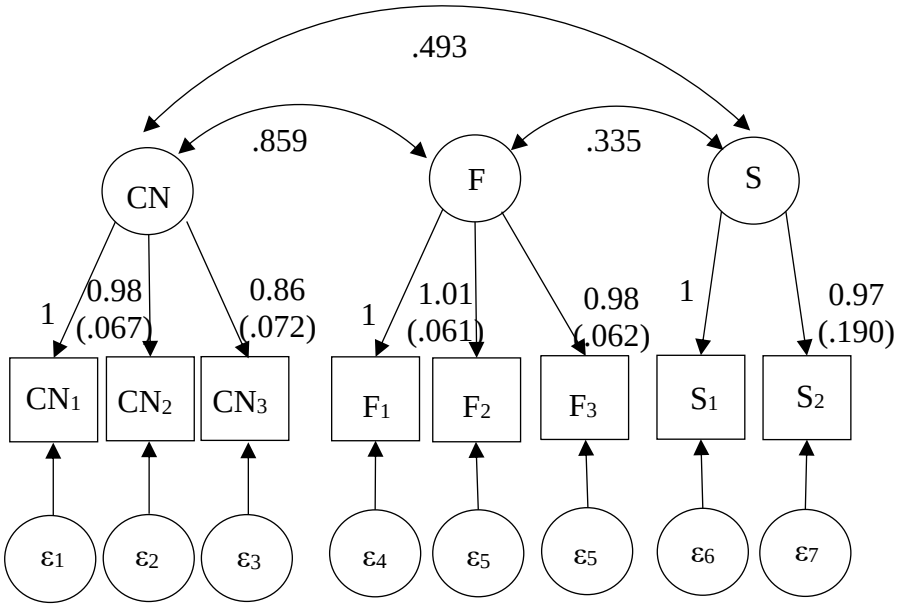
χ^2 = 20.147 (p = 214), df = 16, CFI = .996, TLI = .993, RMSEA = .035, SRMR = .031

Note. I = Intention; A = Awareness; E = Efficiency; C = Control. Unstandardized parameter estimates (standard deviations in parentheses) are presented on the figure. All paths are significant at p < .000.

Confirmatory factor analysis of the habit characteristics scale. Next, a model for the habit characteristics scale was fitted. The CFA of the three-dimensional model with nine items yields some mixed results. Specifically, the initial nine-item scale had unsatisfactory parsimony indicators (RMSEA and SRMR) due to the fact that one item ("I do differently every time") was not significantly related to the latent variable of specificity. After removing that item, the fit of the model improved. The measurement model and fit statistics are presented in Figure 5. All indicators point to a good fit: CFI/TLI ≥ .95, RMSEA ≤ .06, and SRMR ≤ .08 (Hu & Bentler, 1999; Brown,

2006). As speculated in Study 3, centrality and functionality indeed, have a strong correlation with each other. However, the CFA analysis confirmed that they represent two different (yet highly dependent) characteristics of habits. Specificity is the scale that faced the most challenges in the process of establishing its factor structure. More testing of the three-item scale could help identify whether it needs further modifications or if it represents a construct that is difficult to capture. Potentially, it could be a characteristic that needs to be evaluated objectively by experts rather than through self-reports from naïve respondents.

Figure 5. Final Measurement Model of Habit Characteristics.



χ^2 = 37.902 (p = .003), df = 17, CFI = .978, TLI = .964, RMSEA = .077, SRMR = .045

Note. I = Intention; A = Awareness; E = Efficiency; C = Control. Unstandardized parameter estimates (standard deviations in parentheses) are presented on the figure. All paths are significant at p < .000. Correlations between the factors are presented below double-arrow paths.

Convergent and divergent validity of the habits scale. Guidelines for the multi-trait multi-method convergent and discriminant validation are followed with some alterations (Campbell & Fiske, 1959). The authors suggest measuring each trait of interest with several methods to compare the extent to which these methods converge or discriminate and the extent to which different traits converge or discriminate. Habit automaticity was the only subscale that could be measured by two methods – past behaviour frequency (behavioural construct) and SRHI (mental construct). There is no alternative methodology developed to measure other subscales – functionality, centrality, and specificity – at this point in time. As an alternative, they are measured with one method (self-reported scales) but are compared with similar items for convergent validity and theoretically unrelated items for divergent validity.

Since both aim to capture a similar phenomenon on a cognitive level – habits automaticity was expected to converge with SRHI. Indeed, the habit automaticity scale correlated strongly ($\rho = .92$, $p < .000$) with SRHI. These results provide support for the convergent validity of the habit automaticity scale. It should be noted that such a strong correlation could also pose an issue of an overlap with an existing construct. While the overlap exists, the advantage of the proposed automaticity scale is twofold. First, it assesses pure habit automaticity rather than a composite habit score which could eliminate some of the noise or imprecisions in the scale. Since it involves general automaticity-related statements as well as statements related to frequency, identity, and past behaviour the SRHI is intended to be a more comprehensive evaluation of habits. Frequency and past behaviour, however, are conditions for habits to form but not necessarily the essence of habits. For example, a habit can be performed once per week or every day or several times per day – the frequency *per se* does not determine whether the response is automatic or not; rather, it is determined by the cue-response-reinforcement association. Past behaviour has been proven to

predict future behaviour; however, it may happen due to a variety of factors other than a habit, such as preferences, lack of motivation to process new information, biases, etc. Identity may be involved in the formation of habits (e.g., "I am a good citizen of my organisation, so I will help my colleagues) but can also be a consequence of habits (e.g., "I help my colleagues, so I'm a good citizen of my organisation"). As such, it may be problematic to include identity as a part of a composite habit measure. The proposed scale explicitly includes four components of automaticity but no antecedents or consequences of automaticity. Second, SRHI has been primarily evaluated using one type of response – behaviours. It is not clear how the factorial structure and the psychometric properties of the scale change when it is used to measure other types of responses, such as emotions and thoughts. The proposed measure has been assessed on behaviours, emotions, and thoughts.

Another utilized measure of habit strength is past behaviour (or past response) frequency. As mentioned before, frequent repetition is associated with habit formation but is not equivalent to a habit. A habit is a mental construct of a cue-response-reinforcement association that emerges as a result of repetition in a stable context while the frequency of past responses is a behavioural measure of repetition. Recurrence of responses can be associated with various reasons that are not habits, such as motivation (i.e., wanting to repeat the response) or pressure (i.e., having to repeat a response). It can only be speculated that the observable frequency of a behaviour is due to habits and no other factors. It was expected, therefore, that automaticity would diverge from the past behaviour frequency measure. Since the correlation between the two was not significant ($\rho = .00$, $p = .941$) the results supported that automaticity and past behaviour frequency are different constructs, thus evidence for divergent validity.

Centrality refers to the extent to which a habit is an important part of someone's life or work. Conceptually, centrality is similar to the idea of task significance which refers to the extent to which a task impacts others in an organisation (Hackman & Lawler, 1971). The two constructs were expected to show a significant positive correlation in support of the convergent validity. Indeed, a moderate correlation between centrality and task significance was found ($\rho = .51$, $p < .000$). In support of discriminant validity, centrality was expected to have a weaker correlation with the social norm for the response as an activity that is central to someone's work or life may not necessarily be important from a societal point of view. However, centrality positively and moderately correlated with social norm ($\rho = .45$, $p < .000$). This could be due to the fact that habit centrality reflects the values of a person which, in turn, could reflect social norms. Even though this finding was not expected, it provides some interesting routes for further inquiry: What cultivates the centrality of a habit? Are there discrepancies between perspectives on habit centrality (e.g., from the standpoint of a supervisor and an employee, or a service provider and a client)? TPB and TRA (Ajzen, 1991; Ajzen & Fishbein, 1977; Ajzen & Madden, 1986) also suggest that norms about behaviours are important predictors of intentions, and consequently, behaviours. Having strong norms about a response can contribute to the perceptions of centrality of that response. For instance, if an organisation puts a lot of emphasis on safety, then employees are likely to view safe performance as a valuable outcome. Behaviours contributing to safety, such as safety participation and compliance, therefore, would be considered central to achieving that goal.

Functionality is the extent to which a person perceives habits to be helpful in achieving goals. To demonstrate convergent validity, functionality was compared against a similar construct of perceived instrumentality. Perceived instrumentality is a goal-related construct reflecting the extent to which an activity is perceived to be directed towards attaining a specific goal (Miller et

al., 1999). Functionality was expected to converge with perceived instrumentality because it also reflects the extent to which a habit is helpful in achieving the desired state. As expected, a strong correlation between functionality and perceived instrumentality was found ($\rho = .82$, $p < .000$) which supports the convergent validity of the scale. Functionality was expected to diverge from intrinsic valuing which is the extent to which the task is enjoyable on its own, without any tangible or intangible rewards attached (Deci & Ryan, 2008). Since functional habits (i.e., useful, helpful in achieving goals, "good" habits) might or might not be enjoyable, there should not be a strong correlation observed between the intrinsic valuing and functionality. Nonetheless, a moderate correlation was observed between functionality and intrinsic valuing ($\rho = .54$, $p < .000$). This finding could be, at least partially, due to the positive and self-motivating focus of habits that people were asked to evaluate (e.g., helping my colleagues, reflecting on the day, fully focusing on the task at hand, approaching tasks with confidence and positive attitude). While these habits are functional, they can also be viewed as intrinsically enjoyable or satisfying.

Specificity differentiates between habits that are highly repetitive in content (high specificity) and habits that only have a repetitive structure with varying content (low specificity). Amongst the concepts often studied by organisational scientists, task routineness is the one that seems to have most convergence with specificity. Tasks high on routineness are repetitive in nature (Rousseau & Aubé, 2010) which is similar to specific habits. As expected, there was a positive correlation between specificity and task routineness ($\rho = .60$, $p < .000$) which contributes to the evidence for convergent validity. As for discriminant validity, specificity should not be confused with low skill variety. Skill variety refers to the idea of the set of skills, abilities, and knowledge needed to perform a task. Specific habits, even though repetitive in nature, can still require a range

of skills to be performed, so habit specificity was expected to be distinct from skill variety. Indeed, there was no significant correlation between specificity and skill variety (ρ = .10, p = .157).

Table 9

Convergent and Divergent Validity Results

			1	2	3	4
1	Automaticity	SRHI	.92*			
		Past behaviour frequency	.00			
2	Centrality	Task significance		.51*		
		Social norm		.45*		
3	Functionality	Perceived instrumentality			.82*	
		Intrinsic valuing			.54*	
4	Specificity	Task routineness				.60*
		Skill variety				.10

* p < .00

Comparison of the scale with the SRHI. It is important to consider the incremental value of the proposed automaticity sub-scale relative to a previously developed measure of habits. SRHI (Verplanken & Orbell, 2003) shares some features with the proposed scale, such as reliance on self-reports, which captures habituation of unobservable emtoions and thoughts in addition to observable behaviours, and focuses on automaticity as the core of the measurement. As mentioned in the introduction, SRHI has a limitaton related to the fact that it includes not only automaticity but various correlates of automaticity, such as frequency of the reponse, identity, and consequences of not perfroming the habit which adds “noise” to the measurement (Sniehotta & Presseau, 2012).

Table 10 summarizes the results of the EFA analysis (principal axis factoring with promax (kappa=4) rotation) of the SRHI scale using the data collected for Study 4. The results indicate that automaticity-related items (F1) load on one factor explaining the vast majority of variance in the latent construct (66.8%) while all other items (F2) load on the second factor explaining only a small portion of variance (6%). These findings point to the fact that non-automaticity items may not be needed in the scale measuring habits. Additionally, the analysis of commonalities after extraction indicates that many items, mostly the ones reflecting automaticity, explain less variance after the extraction than before which means that the latent factor fails to explain the variance in those items. It is possible that SRHI measures an important construct related to the antecedents, correlates, or consequences of habituation but not the core, "active" ingredient of habit which is automaticity (Gardner et al., 2012; Mittal, 1988). The incremental validity of the proposed scale is yet to be established in future studies; however, the evidence presented in this section confirms some of the previously mentioned concerns about the purity of the SRHI.

Table 10

Exploratory Factor Analysis of the SRHI Scale

	SRHI items	F1	F2	h_1^2	h_2^2
	Response X is something that…				
1.	I do frequently.	-0.05	**0.97**	0.80	**0.86**
2.	I do automatically.	**0.78**	0.18	0.85	**0.86**
3.	I do without having to consciously remember.	**0.86**	0.04	0.76	**0.78**
4.	that makes me feel weird if I do not do it.	0.33	0.40	0.61	0.47
5.	I do without thinking.	**0.86**	0.05	0.79	**0.80**
6.	that would require effort not to do it.	**0.63**	0.14	0.59	0.55
7.	that belongs to my daily routine.	-0.11	**0.92**	0.69	**0.71**
8.	I start doing before I realize I'm doing it.	**0.83**	0.07	0.80	0.79
9.	I would find hard not to do.	**0.58**	0.29	0.74	0.67
10.	I have no need to think about doing.	**0.75**	-0.18	0.40	0.39
11.	that's typically "me."	0.28	**0.64**	0.75	**0.76**
12.	I have been doing for a long time.	0.04	**0.83**	0.70	**0.73**

h_1^2 = Initial communality; h_2^2 = Extraction communality.

Discussion

Two goals were pursued in Study 4. One was to confirm the factor structure of the habit automaticity and characteristics scales. The second goal was to evaluate convergent and divergent validity of the scale. Both goals were achieved.

The automaticity scale factor structure was confirmed in this study. Additionally, evidence for convergent and divergent validity of the scale was provided. The automaticity scale demonstrated convergent validity with SRHI and divergent validity with the past behaviour measure. The proposed scale of automaticity may be more accurate at capturing automaticity than the SRHI automaticity subscale because it incorporates all four automaticity dimensions and, thus, has better construct validity. Additionally, unlike SRHI, it measures automaticity purely without mixing it with habit antecedents (frequency), consequences (identity), and generic items. It should be noted that the SRHI (Verplanken & Orbell, 2003) was used as a basis for generating some items in the new automaticity scale, specifically for items I2, A1, and C1 in the final version of the scale. Based on these results, the following items are suggested to be retained and used in future research on habits and automaticity:

[Response X] is something that…

I1. I do without justifying why I do it to myself.

I2. I just do without thinking about it.

A1. I can start doing and not even notice.

A2. I can be doing without even realizing it right away.

E1. is effortless for me.

E2. requires a lot of mental energy. (R)

C1. would take a lot of willpower to not do.

C2. I can't easily restrain myself from doing.

Further, some support was found for the measurement of habit characteristics. A three-dimensional model yielded a satisfactory fit after deleting one of the specificity items that was not related to the latent factor. Both centrality and functionality had a strong convergent validity with

their respective constructs (i.e., task significance and perceived instrumentality) but showed a limited divergent validity from the constructs they were expected to differ (i.e., social norm and intrinsic valuing respectively). A possible explanation for the lack of discriminant validity was in the nature of habits that the participants were randomly assigned. Most offered habits were positive and intrinsically motivated which could have affected the results. A wider range of habits needs to be included in future studies that examine functionality and centrality as well as evaluate additional psychometric properties of the scale. Additionally, there could be more overlap between centrality, functionality and some job characteristics than previously thought. Future studies could examine these and other overlaps in more detail. The specificity scale demonstrated both convergent and divergent validity (with task routineness and skill variety respectively). The following scale is suggested for future use:

[Response X] is something that…

CN1. is an important part of my day-to-day activities.

CN2. is central to my work and/or life.

CN3. would feel missing from my life if I couldn't do it.

F1. helps me achieve important goal(s) in my life-work.

F2. is beneficial for my success in life/at work.

F3. serves an important purpose in my life/work.

S1. I do in a specific fixed way.

S2. do the same way every time.

Chapter Conclusions

It has been argued that habits play an important role in work life. A theoretical model linking habits to work outcomes has been proposed in Chapter 2. Being able to measure habits is

crucial to the ability to test the proposed propositions. In this chapter, the existing measures are discussed and a new scale to measure habits and their characteristics was proposed and evaluated in four studies. The new scale – the Habit Automaticity and Characteristics Scale – is a self-report measure with eight items capturing a unidimensional construct of habit automaticity and nine items capturing three distinct habit characteristics. The advantage of the new scale over existing scales is twofold. One is related to addressing the methodological concerns of the previously used scales of habituation, such as using a proxy of habituation rather than measuring habituation directly (in the case of past behaviour frequency or RFM), including correlates of habituation in the scale rather than measuring habituation purely (in the case of SRHI), and focusing the applicability of the scale on behaviours while making it difficult to use for emotions and thoughts (in the case of past behaviour frequency or RFM). The habit automaticity subscale of the new measure was refined through the subsequent studies and was found to have a good factor structure, convergent and discriminant validity. It can be used in future studies. The second advantage of the new measure is that it captures three habit characteristics. Aside from addressing the methodological concerns associated with existing measures, there is a more comprehensive way to extend the operational definition of habits – that is exploring, identifying, and defining new aspects of habits that might be helpful in explaining habitual responses. Three new aspects were identified through the conceptual literature – functionality (the extent to which a habit serves a certain purpose), centrality (the extent to which a habit is core to the functioning of the individual), and specificity (the extent to which a habit has repetitive content) that have not been captured by any of the previous scales. These characteristics have been linked to work outcomes in Chapter 2, thus, it is important to develop a proper instrument to measure them in order to empirically test the relationships between habit characteristics and work outcomes. The scale assessing habit

characteristics was refined in four studies and found to have a satisfactory factor structure and validity. However, given the overlap between functionality and centrality as well as the issues identified with specificity, more assessment of habit characteristics is recommended, particularly through the use of different methods (e.g., self-report, expert evaluation, indirect measurement). Since habit characteristics are not examined in the subsequent parts of the dissertation, future work on the habits characteristics component of the Habit Automaticity and Characteristics Scale is beyond the scope of this work.

The main contribution of Chapter 3 is in developing and testing a scale that enables future researchers to study behaviours, emotions, and thoughts in organisations using a short and simple scale that captures habit automaticity and characteristics from the perspective of an individual. The scale can be used to capture a momentary state of habituation and habit characteristics in cross-sectional sectional or longitudinal studies that focus on establishing the correlations, process, or influence of habits and their characteristics on work outcomes. The automaticity sub-scale of the Habit Automaticity and Characteristics Scale was used in the study reported in Chapter 4 where the propositions related to the relationships between habit automaticity and work outcomes are tested using a case of a mindfulness habit and health and safety outcomes of healthcare professionals. The example of mindfulness habit was selected because there has been an increasing attention to mindfulness in recent years (e.g., Glomb, Duffy, Bono, & Yang, 2011; Weick & Sutcliffe, 2006; Weick et al., 2008) and the recognition that it is an important contributor to workers' abilities to focus on the present, concentrate on the task at hand, and pay attention to their surroundings. In healthcare, where the environment is dynamic, complex, and dangerous, maintaining mindfulness at all times can be challenging. It has been proposed that habitual

mindfulness can persist in the face of these demands (Vogus & Hilligoss, 2015), and thus, it can contribute to better health and safety of healthcare workers.

CHAPTER 4:

MINDFULNESS HABIT IN OCCUPATIONAL HEALTH AND SAFETY

Introduction

In 2014 there were over 239,00 lost time claims (time off work after the day of injury as a result of that injury) in Canada nation-wide with health and social services in the lead representing about 17% of those time loss claims (Association of Workers' Compensation Boards of Canada, 2016). The Occupational Safety and Health Administration reported 253,700 work-related injuries and illnesses in the United States in 2011 (equal to 6.8 work-related injuries and illnesses for every 100 fulltime employees), and healthcare was the highest ranked industry in terms of an occupational injury risk (OSHA, 2013). The personal and societal costs associated with workplace injuries are daunting. For instance, the Workers Compensation Board of Manitoba paid $222,100,000 in claim costs in 2014 (WCB, 2015). The total costs of occupational injuries and fatalities in the Canadian economy amount to approximately $9.7 billion every year (Gilks & Logan, 2010). In addition to estimated financial costs, one in four workers feel extremely stressed from work (Shields, 2006) with healthcare being the most stressful occupation (Wilkins, 2007). Prolonged stress and continuous exposure to occupational risks are associated with long-term detrimental effects on productivity, well-being, and health (Spielberger, Vagg, & Wasala, 2003).

Creating a healthy and safe work environment has been a focus of organisational behaviour researchers for over half a century when it was first recognized that feeling secure and comfortable is an important component of job design (Barling & Griffiths, 2003). A variety of factors associated with occupational health, safety, and well-being have been examined in the past (Christian, Bradley, Wallace, & Burke, 2009; Trougakos & Hideg, 2009). One factor that has recently received attention in health and safety research is mindfulness (Hopkins, 2002; Reb &

Choi, 2014; Weick, Sutcliffe, & Obstfeld, 2008). In this chapter, the focus will be on the role of mindfulness in occupational health and safety and the application of the theory of habits to examine how mindfulness as a habit can benefit employees. Specifically, the research question addressed in this chapter is related to the relationship between mindfulness habits and health and safety outcomes. While the role of group-level mindfulness (i.e., safety organizing or collective mindfulness) has been examined and found to have a positive association with safety operations (Hales & Chakravorty, 2016; Vogus & Sutcliffe, 2007; Weick & Sutcliffe, 2006; Weick et al., 2008), the role of individual-level mindfulness is still unclear and needs to be empirically explored. Additionally, as proposed in Chapter 2, automaticity of the mindfulness habit can play an important role in the consistency of mindfulness and the health and safety outcomes associated with the mindfulness habit. In the next few sections, a mindfulness habit is discussed in the context of health and safety and then a set of hypotheses are proposed for the associations between mindfulness habit automaticity, mindfulness consistency, and health and safety outcomes. To test the hypotheses, a survey was administered to a sample of healthcare professionals. At the end of the chapter the study results are reported and discussed.

Mindfulness Habit in Health and Safety

There are a myriad of factors that can contribute to the occurrence of safety events, both situational (e.g., job risks, HRM practices, safety systems, management safety commitment, etc.) and personal (e.g., personality; safety attitudes, safety motivation; compliance with heath and safety policies and procedures; and knowledge). The focus of this study is on a personal factor – mindfulness. *Mindfulness* is the process of drawing novel distinctions which result in greater sensitivity to the environment, openness to new information, creation of new categories for structuring perception, and enhanced awareness about problem-solving options (Langer &

Moldoveanu, 2000). It is frequently identified as having eyes and mind on the task and the environment. Mindfulness has been recognized as a personal resource important for everyday practice for many professionals, but especially for employees of High-Reliability Organisations (HROs – organziations where errors can have catastrophic consequences; Weick & Sutcliffe, 2006; Weick et al., 2008). Being fully aware of one's surroundings is important because it allows more effective identification of cues associated with health and safety risks. Without mindfulness, the mind wanders and becomes busy with unrelated thoughts that inevitably take the focus away from the task/environment at hand. For instance, over 42,000 workers per year become injured as a result of fall accidents in Canada (AWCBC, 2016). About 88% of health and safety specialists believe that being mindless, inattentive, and distracted significantly increases the risk of slipping, tripping, and falling when a hazard is present (SafeStart, 2014). If someone is mindful, they are more likely to notice uneven flooring, spilt liquids, warning signs, other people walking around, the impact of stress levels on decision-making, and signs of psychological distress. Since it allows one to simply become aware of risks, understand their effects, and focus on flawless performance, mindfulness is a critical step in the identification and reduction of the risks associated with hazardous occupations.

The nature of healthcare organisations, and many other organisations working in dynamic and complex environments, is that people often become overloaded with information, decisions, and tasks, so that their attention "splits" between all the demands they face. As a result, they often resort to "auto-pilot" (Sylvestre, 2011). Being consistently mindful – regardless of shift, task, or the environment – is critical to counteract attention overload and automatic responses but is challenging due to the high cognitive demands of mindful attention combined with the work duties of healthcare personnel. Habitualizing mindfulness practice, however, can help reduce the

laboriousness of the mindfulness process and improve mindfulness consistency (Vogus & Hilligoss, 2015).

As argued in Chapter 2, while motivation undoubtedly plays a role in the regular practice of responses, responses are often dependent on self-regulatory resources. The first two hypotheses suggest an empirical test of Proposition 1 in Chapter 2. Having habits in place can ensure that a desirable response occurs even when the energy is depleted and the conscious choice of a desirable response is unlikely (Bargh & Chartrand, 1999; Wood & Neal, 2009). It is believed that such persistence is possible due to the automaticity of habitual responses. Habit automaticity does not rely on available cognitive resources that are needed to support attention and control (Wood, Labrecque, Lin, & Runger, 2014; Wood & Rünger, 2016). Habit automaticity is learned over time as a result of repetitive response occurrences that are paired with a cue and initially reinforced. When the cue to mindfulness appears in the context (e.g., the start of the shift, working alone, doing a routine task), mindfulness is triggered without effortful deliberation or reliance on available self-regulatory resources. Mindfulness habit automaticity is expected to be positively associated with mindfulness consistency.

H1: Mindfulness habit automaticity will be positively associated with mindfulness consistency.

Additionally, since the research on automaticity and its role in response persistence is in its early stages, one of the urgent questions is whether it is worth considering automaticity as an additional factor in predicting response consistency. In other words, the question is whether automaticity helps to explain any significant portion of the variance in response consistency unaccounted by motivation. Some previous research indicates that highly habitualized responses can occur even when motivation is low (Neal, Wood, & Drolet, 2013; Verplanken, Aarts, van

Knippenberg, & Moonen, 1998; Webb, Sheeran, & Luszczynska, 2009). This suggests that there are occurrences when automaticity drives the response, not motivation. Thus, habit automaticity is expected to explain additional variance in response consistency beyond motivation.

H2: Mindfulness habit automaticity will be positively associated with mindfulness consistency after controlling for mindfulness motivation.

Mindfulness Consistency in Health and Safety

It was argued in Chapter 2 that the consistency of the response has implications for the work outcomes. In this section, a set of hypotheses proposing an empirical test of Proposition 2 is put forward. Mindfulness habits are an unexplored but potentially critical contributor to employee health and safety. Throughout the day, there are many situations where mindfulness habits could be related to the identification and reduction of health and safety threats. Being mindful consistently as opposed to sporadically could have a dramatically different impact on safety behaviour and the number of safety incidents. Safety behaviour has been conceptualized as having two components – safety compliance and safety participation (Neal, Griffin, & Hart, 2000). Safety compliance is the extent to which employees conform to the core activities that need to be carried out in order to perform the job safely (e.g., using protective equipment when working with hazardous materials or following safety procedures when in contact with patients). Safety participation refers to the activities that do not directly contribute to personal safety but they contribute to a safer environment (e.g., talking to others about risks and hazards). Knowledge and skills have been found to be important predictors of both safety compliance and participation (for a meta-analysis, see Christian et al., 2009). A closer reference to mindfulness is made in two studies of nuclear plant operators where the researchers found that dispositional mindfulness was an important predictor of safety compliance and participation (Zhang, Ding, Li, & Wu, 2013;

Zhang & Wu, 2014). These findings are extended by proposing that the consistent practice of mindfulness will contribute to safety behaviours beyond dispositional mindfulness. Similarly, since safety behaviours are linked to safety events (Christian et al., 2009), it is also anticipated that mindfulness consistency is associated with fewer safety events, such as near-misses (unplanned events that did not result in injury, illness, or damage but had the potential to do so) and consequently, fewer injuries (events that result in a cut, bruise, fracture, sprain, or more severe injuries) and illnesses (events that result in skin disease, respiratory disorders, poisoning, influenza, or common colds). The following hypotheses are put forward for safety and physical health outcomes.

H3a: Greater mindfulness consistency will be positively associated with increased safety compliance.

H3b: Greater mindfulness consistency will be positively associated with increased safety participation.

H3c: Greater mindfulness consistency will be negatively associated with near-misses.

H3d: Greater mindfulness consistency will be negatively associated with injuries.

H3e: Greater mindfulness consistency will be negatively associated with illnesses.

Mindfulness can also be linked to psychological health in two ways. First, it has the potential to increase employees' safety. Safety events are traumatic and often result not only in physical damage but also in psychological stress (Neal & Griffin, 2004). Increasing employees' safety can contribute to their psychological health and work engagement. Since mindfulness can help to prevent safety events, it can improve the perception of safety. Second, mental and neurobiological processes underlying mindfulness have been found to be positively related to the improvements in physical and psychological health (Glomb et al., 2011). Paying attention to the

present and becoming aware of ongoing experiences has been linked to improved self-regulation, better social relationships, greater performance, and resilience (Glomb et al., 2011). Specifically, it is proposed that mindfulness consistency will be positively related to the indicators of mental health (i.e., perception of one's own abilities to concentrate, make decisions, enjoy day-to-day life, etc.) and work engagement (i.e., perception of work as inspiring, meaningful, and interesting).

H4a: Greater mindfulness consistency will be positively associated with better mental health.

H4b: Greater mindfulness consistency will be positively associated with better work engagement.

The hypotheses discussed in the previous section suggest that mindfulness habit automaticity is positively related to mindfulness consistency; and in turn, mindfulness consistency is associated with a number of health and safety work outcomes. In addition to that association, it was discussed in Chapter 2 that the response consistency serves as a mediator between habit automaticity and work outcomes. The final hypothesis explicitly proposes the empirical test of Proposition 3 in Chapter 2 related to the mediation of the relationship between mindfulness habit automaticity and work and safety outcomes through the effect of response consistency. That is, while mindfulness habit automaticity may not be directly associated with any benefits, it is expected to be associated with a consistent practice of mindfulness which, in turn, is believed to be associated with beneficial health (psychological and physical) and safety outcomes.

H6: Mindfulness consistency will mediate the relationship between mindfulness automaticity and work outcomes.

Method

Participants

Two-hundred-thirty-one MTurk participants and seventy-eight Prolific participants were recruited to take part in the study. The data was collected from two different platforms due to the limited number of healthcare participants available in each platform. Additionally, the slight differences in the samples' demographics suggests the combined sample was inclusive of a more diverse population of healthcare workers than either sample alone. Participants who failed attention checks or had response values that deviated from the mean by more than two standard deviations were deleted from the dataset. Additionally, participants holding jobs that do not involve direct caregiving (e.g., administrative positions) were also removed from the sample. As a result, 202 responses (65% of the original data) were retained for further analysis, one-hundred-twenty-five MTurk participants and seventy-seven Prolific participants. The comparison of demographics is reported in Table 11. The two samples were statistically different in terms of age, $F(2, 200) = 5.59$, $p = .02$, gender, X^2 $(1, N = 202) = 18.82$, $p = .00$, and experience $F(1, 196) = 4.40$, $p = .04$. The average age across samples was 34.4 years old (SD = 10.7 yrs.). Males were 30% of the sample. The majority of participants reported a college degree (22.8%), professional training and/or certification (17.3%), an undergraduate (35.6%) or graduate (17.4%) degrees. Average experience in healthcare was 9.2 years (SD = 8.4 yrs.). The vast majority were employed full-time (81.7%), while others were employed part-time (16.3%) or as casual (2%) employees. Hospitals (59.9%) and nursing or personal care homes (21.3%) were the most common employment settings.

Table 11

Comparison of Demographic Characteristics of Mturk and Prolific Samples

	Mturk	**Prolific**	**Test of difference**
Age	M = 35.8 years (SD = 11 yrs.)	M = 32.2 years (SD = 10 yrs.)	F (2, 200) = 5.59, p = .02
Gender	Male – 18%	Male – 48%	X^2 (1, N = 202) = 18.82, p = .00
Education	College – 29.6% Professional training – 17.6% Undergraduate degree – 35.2% Graduate degree – 12.8% Other – 4.8%	College – 11.7% Professional training– 16.9% Undergraduate degree – 36.4% Graduate degree – 24.7% Other – 10.3%	X^2 (4, N = 193) = 8.34, p = .08
Experience	M = 10.3 years (SD = 8.8 yrs.)	M = 7.7 years (SD = 7.4 yrs.)	F (1, 196) = 4.40, p = .04
Employment status	Full time – 85.6% Part time – 12.8% Casual – 1.6%	Full time – 75.3% Part time – 22.1% Casual – 2.6%	X^2 (2, N = 202) = 3.37, p = .19

	Mturk	Prolific	Test of difference
Type of healthcare organisation	Hospital – 56% Nursing/personal care home – 24% Doctor's office – 11.2% Other – 8.8%	Hospital – 66.2% Nursing/personal care home – 16.9% Doctor's office – 9.1% Other – 7.7%	X^2 (3, N = 200) = 2.17, p = .54

Procedure

Participants in both samples were treated identically. They were provided with a short description of the study and, if interested in participating, were then directed to the consent form. After reading the consent form and agreeing to participate in the study, participants were directed to the online questionnaire. The questionnaire contained variables described in the literature review. The scales and the items were presented to respondents in a randomized order. At the end of the questionnaire, the participants were thanked for their participation and given a unique survey code that served as a confirmation of study completion. All participants were awarded an equivalent of $3 CAD ($2.5 USD or £1.5 GBP). The study was approved by the university research ethics board. The scales used in the study are provided in the Appendix J, and the consent form for the study is provided in the Appendix K.

Measures

Mindfulness habit automaticity. Mindfulness habit automaticity is the degree of awareness, intention, control, and effort involved in the process of maintaining a presence, focus, and alertness to health and safety hazards. The automaticity scale proposed, assessed, and refined in Chapter 3 was used to measure mindfulness automaticity. Participants were asked to evaluate statements that started with a stem "Being mindful throughout the day is something that…". Eight items captured awareness ("I do without justifying why I do it" and "I just do without thinking about it"), intention ("I can start doing and not even notice" and "I can be doing without even realizing it right away"), control ("would take a lot of willpower to not do" and "I can't easily restrain myself from doing"), and efficiency ("is effortless for me" and "requires no mental exertion on my part"). The responses were measured on a 5-point Likert scale (1 – "Strongly

disagree" to 5 – "Strongly agree") and were averaged to calculate the automaticity score. The internal reliability of the scale (Cronbach's α) was .76.

Mindfulness motivation. The Situational Motivation Scale (SIMS) was used to measure mindfulness motivation (Guay et al., 2000). Participants were prompted to evaluate twelve statements in response to the question "Why do you engage in mindfulness during work?". The scale was used because it captures four different types of motivation: intrinsic (3 items, e.g., "Because I think that it is interesting"), identified regulation (3 items, e.g., "Because I think that it is good for me"), external regulation (3 items, e.g., "Because I am supposed to do it"), and amotivation (3 items, e.g., "I don't know; I don't see the benefits"). The properties of the scale have been previously assessed and deemed satisfactory (Guay et al., 2000). The items were recorded using a 5-point Likert scale (1 – "Not at all" to 5 – "To a very great extent"). The internal reliabilities of the scales (Cronbach's α) were .62 for intrinsic motivation, .72 for identified regulation, .64 for extrinsic motivation, and .80 for amotivation.

Mindfulness consistency. Consistency refers to the extent to which a person repeats a response in different contexts without considerable fluctuations. Mindfulness consistency was measured using nine items created for the purposes of this study. Participants were asked to respond to a stem "Please, evaluate how mindful you are…" followed by items representing consistency across time ("At the beginning of the shift", "Halfway through the shift", "At the end of the shift"), task ("When preparing to see a patient", "When transferring a patient", "When working with bodily fluids or medications"), and situations ("When walking in a hallway of the facility", "When working alone", "When working with a colleague"). Items were evaluated on a 5-point Likert scale (1 – "Not at all" to 5 – "To a very great extent") and were averaged to calculate the consistency score. The internal reliability of the scale (Cronbach's α) was .86.

Work outcomes. Health and safety outcomes include several indicators. Safety outcomes were measured using a safety behaviour scale and self-reports of near-misses and incident-related injuries/illnesses. Safety behaviour was measured using a previously validated scale (Neal et al., 2000): safety compliance (2 items, e.g., "I use all necessary safety equipment to do my job") and safety participation (3 items, e.g., "I always point out to the management if any safety-related matters are noticed in my organisation"). The items were recorded using a 5-point Likert scale (1 – "Strongly disagree" to 5 – "Strongly agree"). The internal reliabilities of the scale (Cronbach's α) were .72 for safety compliance and .76 for safety participation. To record near-misses, participants were asked to respond to the question "How many near-misses did you encounter in the last six months?". To record injuries and illnesses, participants were asked to respond to questions: "How many times did you sustain a work-related injury in the last year?" and "How many times did you sustain illness in the last year?". Psychological health outcomes were measured using a general health questionnaire (Goldberg, 1972) that assesses mental health (6 items, e.g., "Able to concentrate" and "Feeling reasonably happy") and a work and well-being survey (Schaufeli, Bakker, & Salanova, 2006) that measures work engagement (4 items, e.g., "At my work, I feel bursting with energy" and "I am proud of the work that I do"). Both scales have been previously validated. The items were recorded using a 5-point Likert scale (1 – "Never" to 5 – "Always"). The internal reliability of the general health scale (Cronbach's α) was .81. The internal reliability of the well-being scale (Cronbach's α) was .79.

Controls. The control variables listed below were included because they have been previously identified as having significant relationships with occupational health and safety, and thus may confound the results. Additionally, since there were some differences in demographics

between the two sub-samples, such as age, gender, or experience, the platform through which the data was collected (MTurk vs Prolific) was checked as a possible control as well; however, it was not significantly related to any variables. Gender and age were only weakly related to some variables, and there is no theoretical or empirical justification for including them as controls. The following five control variables were used: experience, safety knowledge, safety motivation, safety organizing, and mindfulness trait. Given that safety knowledge and motivation have been shown to play an important role in predicting health and safety outcomes, several measures were included to control for their possible associations with the dependent variables of interest. Safety knowledge refers to knowing how to perform the job without causing psychological or physical damage to oneself or others while safety motivation is the willingness to exert effort to enact behaviours that contribute to safety (Neal & Griffin, 2006; Neal et al., 2000). Four items from the validated scale (Neal et al., 2000) captured safety knowledge (2 items, e.g., ”I know how to perform my job in a safe manner") and safety motivation (2 items, e.g., “I feel that it is worthwhile to put in effort to maintain or improve my personal safety”). The items were recorded using a 5-point Likert scale (1 – “Strongly disagree” to 5 – “Strongly agree”). The internal reliabilities of the safety knowledge and safety motivation scales (Cronbach’s α) were .75 for both scales. The collective level of health and safety mindfulness could influence the safety climate and the extent to which mindfulness is encouraged in organisations. To control for differences in collective mindfulness between the participants’ workplaces, a previously validated Safety Organizing Scale was included in the analysis (5 items, e.g., “I can talk to my colleagues about mistakes and ways to learn from them”) (Vogus & Sutcliffe, 2007). The items were recorded using a 5-point Likert scale (1 – “Not at all” to 5 – “To a very great extent”). The internal reliability of the scale (Cronbach’s α) was .73. Additionally, dispositional mindfulness reflecting the inherent base-level quality of focus and

attention has also been controlled for because it can be associated with the consistency of health and safety mindfulness and the health and safety outcomes. Five items from The Mindful Attention Awareness Scale (Brown & Ryan, 2003) were used as a measure of dispositional mindfulness (e.g., "I could be experiencing some emotion and not be conscious of it until sometime later"). The scale is aimed at groups of people who do not engage in meditational practices but rather are mindful in a broader sense of awareness to actions, emotions, and feelings, which is the definition of mindfulness accepted for the purposes of this study. The scale has been previously validated (Brown & Ryan, 2003). The items were recorded using a 5-point Likert scale (1 – "Strongly disagree" and 5 – "Strongly agree"). The internal reliability of the scale (Cronbach's α) was .80. Work experience in healthcare was also collected to control for differences in mindfulness or safety events that can change as one becomes more experienced. As reported in Table 11, the bivariate correlations between the controls and the outcome variables are significant.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was performed to assess the measurement model of the variables included in the theoretical model (automaticity, motivation, consistency, and work outcomes). Specifically, the goal was to establish whether the items loaded properly on their respective factors (e.g., automaticity items loaded on automaticity latent factor and not on motivation, consistency, or work outcomes). The analysis was performed using open-source software R. The fit of the model is as follows: CFI = .77, RMSEA = .06, SRMR = .08. The low value of the CFI index (Hu & Bentler, 1998) should be interpreted with caution. Specifically, aside from an obvious reason for low CFI – poor model fit – there are additional considerations to be taken into account. First, the sample size is too small for a reliable CFA. The estimates of fit might be unstable due to the insufficient number of participants (Bentler & Chou, 1987; Tanaka, 1987).

Sample size recommendation vary from 5 to 10 participants per estimated parameter (Bentler & Chou, 1987). With one-hundred-and-seven free parameters to be estimated in the given model, a recommended sample size would be between 535-1070. Second, the number of items included in the model is large, so given that CFI "penalizes" for an increase in the number of items, the low value could be partially attributed to the correction factor (Bentler & Chou, 1987; Tanaka, 1987). The indices of parsimony (RMSEA and SRMR) point to a satisfactory fit. Overall, given the limitations of the sample size and the number of parameters as well as the fact that all variables loaded on their respective latent factors, the measurement model was satisfactory and the variables were used in further analysis.

Common Method Bias Evaluation

The present study involved self-reported measures. Self-report measures that are measured on like or similar scales are known to be associated with common method bias, or responses that are associated with the instrument/measurement scale rather than the actual states. To evaluate common method bias associated with the self-reported measures, Harman's single factor test was used. All items were entered into a principal component analysis with extraction restricted to one factor and no rotation used as per guidelines (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The resulting single factor explained 22% of variance which is less than a half, thus, the common method bias, even if present, is not significant.

Results

The data were prepared using IBM SPSS 20. Means, standard deviations, correlations and scale reliabilities are reported in Table 12. All correlations were in expected directions. Mindfulness automaticity correlated positively and significantly with mindfulness consistency, safety participation, general health, and well-being. As expected, mindfulness consistency

correlated positively and significantly with safety compliance, safety participation, mental health, and work engagement. However, contrary to the expectations, neither mindfulness automaticity nor mindfulness consistency correlated significantly with the reports of near-misses, injuries, or illnesses.

Table 12

Means, Standard Deviations, Correlations and Scale Reliabilities for the Variables in the Analysis

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Experience	9.29	8.38	n/a																	
2	Safety organizing	3.86	0.62	.17	**.73**																
3	Safety knowledge	4.55	0.59	.18	.26	**.75**															
4	Safety motivation	4.62	0.61	.24	.27	.74	**.75**														
5	Mindfulness trait	3.55	0.80	.15	.25	.30	.32	**.80**													
6	Intrinsic motivation	3.85	0.72	.08	.28	.13	.18	.18	**.62**												
7	Identified regulation	4.31	0.64	.22	.34	.34	.42	.22	.47	**.72**											
8	Extrinsic	3.34	0.96	-.01	.00	.02	-.01	-.06	-.06	.13	**.64**										
9	Amotivation	1.89	0.96	-.16	-.13	-.50	-.51	-.35	-.11	-.44	.08	**.80**									
10	Automaticity	3.37	0.72	.02	.16	.07	.06	.14	.20	.23	.13	-.08	**.76**								
11	Consistency	4.11	0.58	.12	.45	.31	.30	.42	.31	.49	.20	-.36	.31	**.86**							
12	Safety compliance	4.57	0.59	.04	.24	.49	.48	.40	.18	.29	-.01	-.41	.09	.31	**.72**						
13	Safety participation	4.15	0.72	.10	.44	.27	.22	.34	.34	.33	.00	-.20	.17	.37	.42	**.76**					
14	Near-misses	1.88	0.82	.12	.03	.05	.05	-.14	-.19	-.04	.04	-.04	.12	-.03	-.11	-.08	n/a				
15	Injuries	0.85	1.43	-.03	-.04	-.06	-.05	-.08	.01	-.04	-.01	.02	.11	-.04	.00	.10	.24	n/a			
16	Illnesses	1.48	1.59	.04	-.01	.01	.07	-.08	.04	.06	-.02	-.01	.01	-.04	.01	-.02	.20	.37	n/a		

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
17	Mental health	3.79	0.62	.13	.36	.40	.43	.47	.25	.24	-.02	-.33	.20	.44	.41	.23	-.11	-.22	-.11	**.81**	
18	Work engagement	3.65	0.75	.08	.46	.18	.15	.24	.47	.30	-.01	-.06	.27	.41	.19	.43	-.07	-.03	-.02	.54	**.79**

Note. Scale reliabilities are in bold on the diagonal.

Correlations greater than |.14| are significant at $p < .05$. Correlations greater than |.18| are significant at $p < .01$.

To test Hypothesis 1 related to the association between mindfulness habit automaticity and mindfulness consistency and Hypothesis 2 related to the contribution of mindfulness habit automaticity beyond motivation, hierarchical regression analysis was performed using open-source software R. In the first step, five control variables (experience, safety knowledge, safety motivation, safety organizing, and mindfulness) were entered. In the second step, motivation variables were added. Mindfulness habit automaticity was entered in the last step. As reported in Table 13, mindfulness consistency was associated with both motivation (identified, extrinsic, and amotivation) and automaticity. In particular, the greater the mindfulness automaticity ($b = .12$, $p < .01$), the higher the mindfulness consistency. Thus, Hypothesis 1 proposing the association between mindfulness habit automaticity and mindfulness consistency was confirmed. Additionally, automaticity contributed to the explanation of variance in consistency beyond the controls and motivation by 2% which was significant at $p < .01$. Hypothesis 2 proposing that mindfulness habit automaticity would explain additional variance in mindfulness consistency after controlling for motivation was also confirmed.

Table 13

Summary of the Hierarchical Regression Results Analysis of the Association between Mindfulness Consistency, Mindfulness Motivation, and Mindfulness Automaticity

Variable	B	SE	T	R^2	ΔR^2
Step 1: Controls				.33	
Intercept	0.98*	.44	2.23		
Experience	0.00	.00	-0.54		
Safety organizing	0.26**	.06	4.74		
Safety knowledge	0.08	.08	0.96		
Safety motivation	-0.08	.08	-1.01		
Mindfulness trait	0.18**	.04	4.09		
Step 2: Motivation				.46	.13**
Intrinsic	0.05	.05	0.98		
Identified regulation	0.17*	.07	2.49		
Extrinsic regulation	0.11**	.03	3.28		
Amotivation	-0.10*	.04	-2.38		
Step 3: Habit				.48	.02**
Automaticity	0.12**	.05	2.64		

N = 202. * $p < .05$, ** $p < .01$

To test whether mindfulness consistency was associated with health and safety outcomes, a series of hierarchical regressions were performed using open-source software R. In the first step, five controls were entered. In the second step, motivation consistency was added. The results for safety behaviour are presented in Table 14. The analysis revealed that mindfulness consistency

was not significantly associated with safety participation and compliance independent of the control variables. Hypotheses 3a and 3b proposing a positive relationship between mindfulness consistency and safety behaviours were rejected.

Table 14

Summary of Hierarchical Regression Analysis of the Association between Mindfulness Consistency and Safety Behaviours

	Safety compliance					Safety participation				
Variable	B	SE	t	R^2	ΔR^2	B	SE	T	R^2	ΔR^2
Step 1: Controls				.34					.27	
Intercept	0.58	.40	1.43			1.04*	.44	2.36		
Experience	-0.01	.01	-1.74			0.00	.01	-0.20		
Safety organizing	0.06	.07	0.77			0.38**	.08	4.65		
Safety knowledge	0.25*	.10	2.42			0.17	.12	1.47		
Safety motivation	0.27**	.10	2.66			-0.07	.11	-0.63		
Mindfulness trait	0.21**	.06	3.63			0.19**	.06	2.93		
Step 2: Consistency				.34	.00				.28	.01
Mindfulness consistency	0.08	.08	0.90			0.13	.09	1.40		

N = 202. * $p < .05$, ** $p < .01$

Next, the hypotheses related to safety events (near-misses) and physical health (injuries and illnesses) were tested. The results are presented in Table 15. Neither the controls nor consistency had statistically significant associations with safety events and physical health. Hypotheses 3c through 3e proposing a negative relationship between mindfulness consistency, near-misses, injuries, and illnesses were rejected.

Table 15

Summary of Hierarchical Regression Analysis of the Association between Mindfulness Consistency, Physical Health and Safety Events

	Near-misses					Injuries					Illnesses				
Variable	B	SE	t	R^2	ΔR^2	B	SE	T	R^2	ΔR^2	B	SE	t	R^2	ΔR^2
Step 1: Controls				.03					.02					.02	
Intercept	0.60	.33	1.79			1.10*	.44	2.49			0.53	.44	1.20		
Experience	0.00	.00	0.99			0.00	.01	0.66			0.01	.01	1.34		
Safety organizing	-0.04	.06	-0.58			0.00	.08	-0.06			0.01	.08	0.10		
Safety knowledge	0.03	.09	0.37			-0.09	.12	-0.78			-0.05	.12	-0.47		
Safety motivation	0.07	.09	0.81			-0.02	.11	-0.21			0.19	.11	1.70		
Mindfulness trait	-0.07	-1.48	3.63			-0.07	.06	-1.03			-0.07	.06	-1.05		
Step 2: Consistency				.03	.00				.02	.00				.02	.00
Mindfulness consistency	-0.01	.07	-0.18			0.03	.09	0.30			-0.05	.09	-0.53		

N = 202. * $p < .05$

The results for psychological health outcomes (mental health and work engagement) are presented in Table 16. Mindfulness consistency was statistically significantly related to mental health (b = .20, p < .05) and work engagement (b = .29, p < .01). Adding mindfulness consistency to the model explained an additional 2% and 3% (both statistically significant) of the variance in general health and well-being correspondingly beyond the controls, including dispositional mindfulness. Thus, hypotheses 4a and 4b proposing a positive relationship between mindfulness consistency, mental health, and work engagement were supported.

Table 16

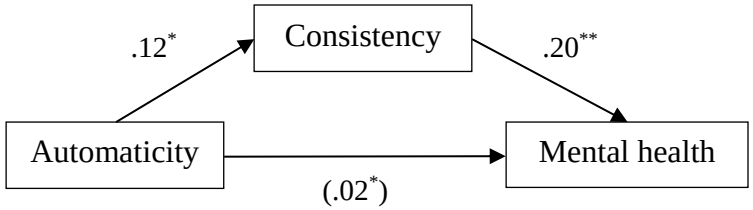
Summary of Hierarchical Regression Analysis of the Association between Mindfulness Consistency, Mental Health, and Work Engagement

	Mental health					Work engagement				
Variable	B	SE	t	R^2	ΔR^2	B	SE	T	R^2	ΔR^2
Step 1: Controls				35					.23	
Intercept	0.39	.35	1.10			0.73	.47	1.56		
Experience	-0.00	.00	-0.28			0.00	.01	-0.11		
Safety organizing	0.14*	.07	2.19			0.41**	.08	4.79		
Safety knowledge	0.08	.09	0.91			0.08	.12	0.65		
Safety motivation	0.21*	.09	2.29			-0.09	.12	-0.78		
Mindfulness trait	0.21**	.05	4.06			0.06	.07	0.86		
Step 2: Consistency				.37	.02*				.26	.03**
Mindfulness consistency	0.20*	.07	2.55			0.29**	.10	2.97		

N = 202. * p < .05, ** p < .01

To test the mediation effects of mindfulness habit automaticity on the outcomes through mindfulness consistency, conditional mediational analysis was performed using open-source software R. Since mindfulness consistency was only a significant predictor in cases of mental health and work engagement, the conditional mediational analysis was performed for these two outcomes. As presented in Figure 6, automaticity had no direct association with mental health but has an indirect association through mindfulness consistency. The indirect effect of automaticity was b = .02, 95% CI = .001, .060 ($p < .05$).

Figure 6. Direct and Indirect Effect Sizes for the Relationship between Habit Automaticity, Consistency, and Mental Health.



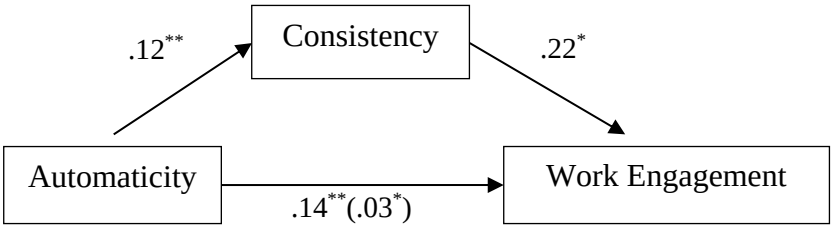
Note. Indirect effects in parentheses.

N = 202. * $p < .05$, ** $p < .01$

Figure 7 reports direct and indirect effect sizes for the relationship between mindfulness habit automaticity, mindfulness consistency, and work engagement. The indirect effect size for automaticity was b= .03, 95% CI = .001, .060 ($p < .05$). Automaticity also had a positive direct relationship with work engagement (b = .14, $p < .05$). Overall, mindfulness consistency fully or partially mediated the relationship between mindfulness habit automaticity and some outcomes (i.e., mental health and work engagement). Hypothesis 5 proposing that mindfulness consistency

mediates the relationship between mindfulness habit automaticity and health and safety outcomes was partially supported.

Figure 7. Direct and Indirect Effect Sizes for the Relationship between Habit Automaticity, Consistency, and Work Engagement.



Note. Indirect effects in parentheses.

N = 202. * p < .05, ** p < .01

All hypotheses and the results are summarized in Table 17. As reported, four hypotheses were fully confirmed, one hypothesis was partially confirmed, and five hypotheses were rejected. The results are discussed in the following section.

Table 17

Summary of the Hypotheses and the Study Results

Hypothesis	**Result**
H1: Mindfulness habit automaticity will be positively associated with mindfulness consistency.	Supported
H2: Mindfulness habit automaticity will be positively associated with mindfulness consistency after controlling for mindfulness motivation.	Supported
H3a: Greater mindfulness consistency will be positively associated with increased safety compliance.	Rejected
H3b: Greater mindfulness consistency will be positively associated with increased safety participation.	Rejected
H3c: Greater mindfulness consistency will be negatively associated with near-misses.	Rejected
H3d: Greater mindfulness consistency will be negatively associated with injuries.	Rejected
H3e: Greater mindfulness consistency will be negatively associated with illnesses.	Rejected
H4a: Greater mindfulness consistency will be positively associated with better mental health.	Supported
H4b: Greater mindfulness consistency will be positively associated with better work engagement.	Supported

H6: Mindfulness consistency will mediate the relationship between mindfulness automaticity and work outcomes.	Partially supported

Discussion

Chapter 4 pursued the following research question: "Is a mindfulness habit associated with health and safety outcomes?". The purpose of answering this question was twofold. The primary purpose was to test several theoretical propositions put forward in Chapter 2 and to contribute to the emerging research on habits in organisations. As expected, habit automaticity and response consistency were found to be related to several work outcomes. These effects were observed after controlling for other factors, including motivation. Thus, several contributions of this study are theoretical. First, this study empirically established that habits can be related to work outcomes directly or through response consistency, and that habits could help explain human behaviour beyond motivation. While these findings rely on an example of a mindfulness habit, the applications of the theory are broad and can be applied to a variety of behaviours, emotions, and thoughts. The second contribution is practical in nature. The uniqueness of this approach is the focus on discrete response units – habits – rather than generalized response attitudes which provides an opportunity to target specific wanted or unwanted habits to either facilitate them or change them. For instance, in attempts to improve employee well-being, a set of specific habits that relate to well-being can be determined; the habits that diminish well-being can be modified while the habits that enhance well-being can be promoted and reinforced.

The secondary purpose of the addressed research question was to examine the role of mindfulness habits in health and safety. Weick and Sutcliffe (2006) proposed that collective mindfulness is linked to better decision-making, attention, and battling of the detrimental effects

of routines. Several studies have confirmed the positive influence of organisational mindfulness in the prevention of medical errors and improvement of patient safety (Singer & Vogus, 2013; Sutcliffe, 2007; Vogus & Sutcliffe, 2007). The effects of individual-level mindfulness are not well-understood; however, Vogus and Hilligoss (2015) have made an argument for the importance of mindfulness habit for HROs. This study takes a small step to examine the relationships between individual-level *consistent* mindfulness and health and safety outcomes. Specifically, the associations between mindfulness habits and health and safety outcomes were examined. Since the expected relationships were not significant the hypotheses related to the safety outcomes were rejected. The non-significant relationships could be due to several factors. One possibility is that some other factors overpower the role of mindfulness habits in safety scenarios. For instance, the lack of resources needed to operate safely (e.g., insufficient staffing, malfunctioning or non-existent equipment, equipment use training, etc.) can create strong barriers to personal safety that cannot be overcome by individual mindfulness. In other words, a balance is needed between the efforts put into health and safety by employees, such as through sustained mindfulness, and the efforts on the employer side. If there is a mismatch between the two, desirable levels of health and safety may not be reached. Another factor that may have contributed to the lack of significance is the difference in the level of measurement between the independent variables and safety outcomes. The independent variables were measured at a more general level than near-misses, injuries, and illnesses which can add to the measurement errors and result in a lack of significance. Since the specific safety outcomes require recalling specific instances that participants may not remember well it is possible that the reports of near-misses, injuries, and illnesses are less accurate than general assessments of mindfulness and other work outcomes. Finally, the effect sizes could be too small to be detected with the study's sample size. A post-hoc power analysis can help evaluate

whether non-significant results are due to the underpowered sample or whether they are truly non-significant. The results of the post-hoc power analysis (R) are as follows: for safety compliance R (6, 191) = .85 for effect size 0.08 at $p < .05$, for safety participation R (6, 191) = .98 for effect size 0.13 at $p < .05$, for near-misses R (6, 191) = .14 for effect size 0.01 at $p < .05$, for injuries R (6, 191) = .39 for effect size 0.03 at $p < .05$, and for illnesses R (6, 191) = .62 for effect size 0.05 at $p < .05$. If the effect sizes are accurate, it can be speculated that the study is underpowered to detect most differences in safety behaviours and events (except for safety participation). Given some other discussed difficulties with measuring safety events (level of measurement and memory bias), the non-significant effects could be present for other reasons. The measurement of safety events needs to be refined for future studies to be less case-specific (e.g., possibly measured as a scale) and less reliant on memory (e.g., objective or momentary assessments). The non-significant results for safety participation may be due to an underpowered sample size given that the level of measurement between the predictors and the outcome is the same and it is less susceptible to memory bias. Increasing the sample size in future studies could help to more accurately evaluate the relationships between mindfulness consistency and health and safety outcomes. Since the average power was sufficient to detect the observed effect size it appears that the non-significant results for safety participation are true for this sample.

While the hypotheses related to safety outcomes were not significant, the hypotheses related to the health and well-being outcomes were supported. Specifically, positive and significant relationships were found between mindfulness habit automaticity, mindfulness consistency, mental health, and work engagement. The results suggest that the role of mindfulness habits may be particularly salient in psychological well-being (while it might be more limited or confounded for safety). The theoretical implications of these findings are that mindfulness consistency matters

beyond dispositional base-level mindfulness and motivation which, once again, supports the importance of good work habits beyond work abilities or dispositions. The practical implications are that a mindfulness habit could be a useful tool in addressing some mental health issues in healthcare, particularly if interventions to target mindfulness are designed to increase the consistency of mindfulness performance.

Habits have been largely neglected in organisational behaviour (with a few notable exceptions), although they are a key predictor of behaviour in health and transportation research. Habits can be of special importance in contexts where the cognitive and physical demands are high yet a flawless performance is expected, such as in healthcare. Mistakes in healthcare cannot only carry financial costs but also significant psychological and health costs for both patients and employees. Vogus and Hilligoss (2016) discuss the implications of habits for the operations of HROs in a brief note. They argue that habits are the core of mindful organizing as they are the threads of numerous daily practices that in combination contribute to error-free operation. Understanding habits can advance our understanding of daily life and inform interventions that try to change critical responses that are expected to occur consistently regardless of fatigue, pressures, and other contextual differences, such as mindfulness.

Conclusions

There are many threats to the health and safety of healthcare workers. They are exposed to ergonomic, biological, violence, and psychological risks on a daily basis. This study makes a small contribution to understanding the factors that can play a role in improving the well-being of employees. Specifically, the focus of this study is on mindfulness habits. Mindfulness in general has been proposed to be associated with positive outcomes (Joyner & Lardner, 2008; Reb & Choi,

2014; Weick et al., 2008), and this study provides some empirical evidence to support that habitual mindfulness is associated with employees' health and well-being.

Several theoretical and practical contributions of these findings have been identified in the chapter. From the theory standpoint, three contributions have been made. One theoretical contribution of the study is to the field of habits. Most existing studies are focused on the process of habit formation, change, or goal interference in either personal health behaviours (dieting, exercising) or commuting. This study is situated in a work context and it elucidates the potential outcomes that are associated with habits. In other words, it is the variance in the dependent variables associated with habit automaticity not the process of creating automaticity that is the focus of attention. Both types of approaches are important for a comprehensive understanding of habits, but there has been very little examination of habits from the variance perspective. Additionally, cognitive or emotional responses are rarely studied in the domain of habit research while this chapter provides an account of a thought-type response of mindfulness. Another theoretical contribution is the application of the Habit Automaticity and Characteristics Scale developed in Chapter 3. While the factor structure and several types of validity have been established for that scale, this is the first attempt to use it in a study and to test its associations with other variables as proposed in the theory of habits in Chapter 2. As expected, automaticity was positively related to response consistency which adds to the evidence of the scale quality. Additionally, the study examines relationships between a mindfulness habit and occupational outcomes and thus contributes to the field of occupational health, safety, and well-being. It is one of the early attempts to relate mindfulness habit to health and safety and the first known empirical study to explicitly examine both the constructs of habit and consistency in a research study. The

results were encouraging and provide support for the significant positive associations between habitual mindfulness and employee health and safety.

There are also two practical conclusions from this study. Given the associations between mindfulness habit and psychological health outcomes established in this study that appear to explain the variations in health beyond dispositional mindfulness, one can speculate that while some employees may be mindful by virtue of their personality, most employees may be able to develop mindfulness through training. As theoretical and empirical evidence for the importance of individual-level mindfulness grows, the resources for creating interventions targeted at improving employee mindfulness are becoming available. To further advance the contributions to practice, steps need to be taken to design and carefully evaluate an intervention that would specifically target a mindfulness habit in the context of occupational health and safety. A second practical implication is that mindfulness as a skill needs to be *practiced*, not just taught at the conceptual level. As literature on habit development suggests, building or changing habits is a process that needs to be taken seriously. People tend to relapse into established ways of acting, thinking, or feeling (Wood & Rünger, 2016). The present study demonstrates the contribution of consistent mindfulness to health and well-being which also highlights the value of continuous, systematic mindfulness. As an alleged Aristotle quote goes: “We are what we repeatedly do”. We are mindful individuals when we are mindful across time and contexts. Interventions that target mindfulness (or any other change for that matter) need to take old habits into account and facilitate the formation of new habits.

Limitations and Future Directions

This study is not without limitations. Some limitations are related to the method. One is the use of cross-sectional data. While such data allows making conclusions about general associations

between the concepts, it limits the ability to make causal claims and explore sequential (predictive) relationships between the variables. The judgments about causality can be guided by theory but cannot be empirically examined without an experimental or a longitudinal design that can help disentangle antecedents and consequences. A longitudinal design would also be helpful in capturing change or variability in the concepts of interest (Bliese, Chan, & Ployhart, 2007). Future studies could address this issue by measuring independent variables at a different point in time from dependent variables to reduce the common-method bias, and by extending observation time to capture time-related variations in the variables. Additionally, if an intervention to create or change a work-related habit, such as mindfulness, is administered, it would be of great interest to assess how the change evolves and persists. Intensive data collection methods with multiple measurement points would be particularly beneficial for improving the measurement of consistency. The consistency measure used in this study relies on memory and self-assessment which can add error variance to the data. Data collection techniques such as ecological momentary assessment could more objectively capture the response across different contexts (Beal & Weiss, 2003). The objectivity could also be increased by using sources of information other than the respondent. For example, safety behaviours could be evaluated by co-workers and supervisors which would give a more nuanced picture of a person's safety behaviours. Variables such as injuries, illnesses, and safety events are required to be reported, so there could be objective archival data available on those variables (although, it could be challenging to access them). Finally, some scales used in this study (i.e., intrinsic motivation and extrinsic motivation) had a low internal reliability which could be due to the low interrelatedness of items or heterogeneity of the scale. The low reliability is likely due to the poor item correlations. Since the scale has been previously established with satisfactory reliabilities of the subscales (Guay et al., 2000), the poor reliability is

likely a function of the sample used in the study. Low reliability indicates that there could be some error in the measurement of variables which, in turn, can influence the regression results. Therefore, the results of the regression analysis of the association between motivation, consistency, and work outcomes should be interpreted with caution. Testing the same model on different samples would be helpful to eliminate the sample bias and ensure the stability of the results.

Another limitation of this study is the focus on within-person experiences related to habit, mindfulness, and health and safety. It would be theoretically and practically valuable to incorporate broader contextual variables as antecedents to response consistency. For example, in relation to the mindfulness habit, a concept of organisational mindfulness was previously briefly discussed. Organisational mindfulness is a group-level phenomenon that could have a profound impact on the value placed on mindfulness, reinforcement for mindfulness, and resources available for mindful operations. As a result, individuals working in mindfully organized groups have more potential to develop a mindfulness habit. This is true for a wide range of habits, not just mindfulness. While a habit is an individual-level process, it is critical to expand the nomological network of antecedents to include higher-level factors, such as organisational support for the response, supervisor attitudes towards the response, and group norms about the response. Additionally, the context of the present study is narrowly situated in healthcare. The nature of health and safety can vary between occupations. For example, construction workers or factory workers are exposed to different hazards than healthcare workers which would be different from the hazards of an air traffic controller or a nuclear power plant operator. These contexts are intuitively different but the features that differentiate them need be assessed systematically and possibly examined as another group of antecedents. Potentially, these occupations may differ in terms of the levels of responsibility, tolerance for errors, or work regulations. All these features

would not only have implications for the role of mindfulness but would also affect the types of other work-related habits formed in the environment.

There are yet many issues to be explored in the areas of mindfulness and habits. While the focus of this study was on one habit, they can be analyzed more comprehensively. For instance, there could be a collection of responses that are critical for health and safety, mindfulness being just one of them, and a collection of habits that are detrimental for health and safety (e.g., being on the phone while working). Understanding what responses are performed habitually as expected and what responses are not, as well as, learning about the reasons for that, could provide a strong foundation for training development and education. From a theoretical perspective, since habit characteristics would vary between habits, a broader exploration of habits and contexts would also allow for a more complete test of the model proposed in Chapter 2. Future work could be directed towards expanding the network of antecedents to habits (and mindfulness), exploring dynamic relationships between habits and the outcomes, and extrapolating the findings to different contexts.

CHAPTER 5: CONCLUSION

Motivation is what gets you started. Habit is what keeps you going.

- Jim Ryun

We want to believe that our daily actions, emotions, and thoughts are entirely under our control. We want to believe that when we set goals, recognize desires, and form intentions, we follow with actions. Yet, the reality suggests that this is not what truly drives our daily lives. The complexity and the repetition of life prompt us to create mental shortcuts to guide decisions, choices, and responses. Habits are a form of mental shortcuts and the focus of this work. In this last chapter, the findings will be summarized, the recommendations for future research and practitioners will be suggested, and the dissertation will be concluded.

Summary of the Objectives and the Findings

There were four objectives set out to be accomplished in the dissertation. One was to provide an overview of the literature relevant to the habits of people at work. Despite the ubiquity of habits, little attention has been dedicated to their role in organisations. Several major findings from other fields (primarily psychology) on habits are discussed in Chapter 2. Among the key lessons from the literature review is the idea of resourcefulness of habits. While habits have been previously equated with mindless, simple, minute aspects of work, the literature review provides a different perspective on the nature of habits as a tool for preserving energy, developing mastery, and achieving a sense of psychological security. Additionally, while habits have been mentioned in some organisational behaviour research, they have rarely been the object of study. As a result, little is understood about different types of habits, different features that habits can possess, and how habits are related to work outcomes. The literature review provides some clues to answering these questions and, most critically, identifies the lack of research on these topics as a gap to be

filled by future studies. However, at least two barriers to filling in this gap exist – the lack of a framework and the lack of a suitable measure to study habits in organisations. Both of these gaps are addressed in this work as discussed in the following paragraphs. The second objective was to outline a theory of habits which helped address the issue of the need for a theoretical framework. A theory proposing relationships between habit automaticity and work outcomes was presented in Chapter 2. The proposed theory integrates habit automaticity as the key predictor of response consistency (response being any behaviour, emotion, or thought) along with motivation. The consistency of the response, in turn, is linked to work outcomes. Additionally, three characteristics of habits have been proposed and linked to work outcomes. The advantage of the theory is twofold. First, it includes a factor that can improve response prediction beyond motivation – habit. Numerous studies from psychology confirm the predictive ability of habits compared to goals and intentions, and the findings can be theoretically extrapolated to work-related habits as well (although, more empirical exploration is needed). Second, the proposed model is broad enough to apply across multiple organisational behaviour domains. Some of the examples provided throughout the chapters were concerned with habits of organisational citizenship, safety, mindfulness, and well-being. The theory can be applied to many other topics, such as creativity, ethics, time management, counterproductive work behaviours, and other areas where discrete behaviours, emotions, and thoughts can be identified for modification. Thus, the main contribution of the theory is to help further explain why people act, think, or feel in certain ways. The third objective was to develop and test a scale measuring habits which helped to address the gap related to the lack of appropriate measurement of habits. The Habit Automaticity and Characteristics Scale was created and evaluated in Chapter 3. The process of scale development and validation involved item generation and assessment of the proposed scale's factor structure and properties using

qualitative and quantitative methodologies. The scale, upon subsequent revisions, was demonstrated to have a stable factor structure, convergent and discriminant validity. The advantages of the scale over previously proposed measures are threefold. First, the self-report scale allows a measure of not only observable behaviours but also internal processes such as thoughts and emotions. Second, the Habit Automaticity and Characteristics Scale measures the "active ingredient" of habits – automaticity – without confounding it with the antecedents or consequences of automaticity which provides a focused measure of automaticity. Third, the scale also provides a measurement of three different aspects of habits – functionality, centrality, and specificity – which was not possible with any of the previous measures. Establishing a scale is critical for future empirical studies of habits in organisations.

The fourth objective was to test the theoretical propositions put forward in Chapter 2. The test of the theory is critical as it guides theoretical and practical implications. The findings of the study supported the general relationship that greater habit automaticity is linked to greater response consistency. One implication of that connection is related to the prediction of human behaviours, emotions, and thoughts. While deliberate paradigms have been dominating the management field, other factors have not been studied as much. Habits, in particular, have been largely ignored despite the evidence of their prevalence over deliberation in daily life (Bargh, 1994). Indeed, it was supported that habits were associated with response consistency beyond motivation. Another important implication of this finding is that changing behaviours (emotions, or thoughts) may require more than a change in attitudes. Creating sustainable, consistent practice of a certain response would most likely require changing a habitual response along with changing motivation. Another key finding of the study was related to the discovered direct and indirect associations between habit automaticity and work outcomes through the mechanism of response consistency.

This suggests that habits can meaningfully influence critical work outcomes by influencing the stability of the response. For instance, using the example of health and safety mindfulness selected for the last study, it was demonstrated that greater automaticity of the mindfulness habit was associated with a greater mindfulness consistency across contexts which, in turn, was related to increased mental health and work engagement of healthcare professionals. These findings support the propositions put forward in Chapter 2.

Achieving these four objectives enhance our understanding of factors that can drive behaviours, emotions, and thoughts (beyond deliberation); and for the nature of habits to be better explained. Throughout the chapters, several new perspectives on habits were presented, such as the resourcefulness of habits (due to their energy preservation, contribution to mastery and feelings of confidence), the variability in habits (along the three characteristics of functionality, centrality, and specificity), and their relationship with work outcomes (such as in the example of mindfulness habits and associated general health and well-being). Given the associations with work outcomes were significant this work suggests that habits are a meaningful construct to consider when explaining, predicting, or changing the way people respond to the work environment. Altogether, these findings have several theoretical and practical implications discussed in the following paragraphs.

Contribution to Theories

The phenomenon of habits, as mentioned, is underexplored in the domain of organisational behaviour but the concept of habits is not entirely new. This work contributes to some of the ongoing conversations on the impact of habits, their dynamics, and human agency.

There is an intriguing dichotomy of perspectives co-existing in the literature. One points to the rigidity, simplicity, inertia, and even error-proneness associated with habits (Ford & Gioia,

2000; Gersick & Hackman, 1990; Oldham and Cummings, 1996); another one points to energizing, optimizing, and the positive force of habits (Gersick & Hackman, 1990; Ohly et al., 2006; Ohly et al., 2017). From the former perspective, habits are dysfunctional as they are associated with the features of task and work that contribute to boredom and undermine creativity. From the latter perspective, habits allow predictability of behaviours which contributes to better collaboration; they also save time and energy which relieves resources for creativity and proactivity. Which perspective is more accurate? In Chapter 2, a lot of the focus was on clarifying the positive aspects of habits as the "dysfunctional" view of habits is more predominant and accepted in the current literature, so it was important to provide the evidence to demonstrate that habits have a different side to them. Thus, one contribution of this work is in highlighting the functionality of habits by recognising that habits are not inherently mindless, simple, and boring. For example, Baba and Jamal (1991) have empirically demonstrated that some forms of routinization can have the opposite impact on job attitudes, such as better job satisfaction while Ohly et al. (2006) showed that routinization can be even beneficial for innovation and creativity. Similarly, this study demonstrated that mindfulness habits are linked to better general health and well-being. While job designs may need to be enriched with complex, novel, and demanding tasks, it appears that a more balanced approach to designing jobs may be needed. Habits, for example, have been proposed to create several positive states, such as energy, mastery, and psychological security which, in turn, could lead to positive work outcomes. While the current work does not directly focus on the issue of job design, it provides some theoretical foundations for considering a job design that is balanced between consciously-intense and habitual tasks as well as provides an instrument to measure habituation of the tasks.

The second contribution is in shedding light on what can bridge the two dichotomous views on habits. Each perspective individually reflects the truth only partially; it is important to move beyond the disagreements on the "true" nature of habits towards a comprehensive understanding of *when* habits are functional and when they can be dysfunctional. This work proposes that habits are not unidimensional and that they can vary along the continuums of various characteristics which could explain the "badness" and "goodness" of habits. This proposition relied on the previous work by Gersick and Hackman (1990) who proposed that habits can be central or peripheral, Baba & Jamal (1991) who proposed that habituation can target either content or context, and Turner and Cacciatori (2016) who proposed that habits can vary along the dimensions of context variability and deliberation. Elaborating on these literatures, three characteristics of habits were proposed: functionality, centrality, and specificity. The proposed model incorporates these three characteristics that are believed to explain the variety in work outcomes observed as a result of habit performance.

The third contribution to the ongoing theoretical discussion is in attending to the discussion of consciousness, will, and agency in daily life and contributes to the theories of behaviours. Theories of behaviour are numerous (e.g., goal-setting theory, theory of reasoned action, theory of planned behaviour, or social cognitive theory) and the vast majority of these theories propose variables such as goals, intentions, motivation, or attitudes as predictors of behaviour. The premise of these theories is that if there is a plan, willingness, or inclination towards a certain response, that response is enacted. Some organisational scholars have pointed to their observations of the automaticity of daily work life, unconsciousness of many decisions, and the "illusion of will" (Louis & Sutton, 1991; George, 2009). However, few (if any) theories have incorporated automaticity in general and habit in particular as explanatory mechanisms of work outcomes. This

dissertation proposes a variance theory of habits. The proposed theory links habits to work outcomes through response consistency. Indeed, some initial evidence from the study on mindfulness habits supported such a relationship. Adding habits to theories of behaviour would be valuable because it would contribute to the explanatory power of these theories.

Recommendations for Future Research

Several recommendations for future research have been suggested in each of the essays. One recommendation is to continue to improve our understanding of different aspects or types of habits. From a lay perspective, it is clear that not all habits are the same. Some habits can have positive consequences for performance (Glăveanu, 2012), experience (Avni-Babad, 2011; Baba & Jamal, 1991), and creativity (Ohly et al., 2006), while others can create dissatisfaction (Baba & Jamal, 1991). An important question is – what are the different attributes of habits that are associated with these outcomes? Three characteristics were proposed in this dissertation, so another potential route for future research is to empirically examine these characteristics and test whether they are important predictors of work outcomes and considerations for job design. For example, specificity of routines has received some attention and the results supported its association with job satisfaction (Baba & Jamal, 1991). Specificity of habits can also have implications for performance, attitudes, and well-being. As observed by several scholars, some degree of habituation is beneficial for employees as it preserves their energy (Ohly et al. 2017), contributes to their confidence (Avni-Babad, 2011) and mastery (Glăveanu, 2012), and even promotes creativity (Glăveanu, 2012; Ohly et al., 2006). However, at the same time, excessive habituation can result in boredom, mindlessness, and triteness. Further assessment of the degree of context and content specificity would be helpful in differentiating the positive and negative impact of habits on work outcomes. Moreover, instead of focusing on one individual habit at a

time, clusters of habits could be analyzed to observe whether there could be differences in performance, attitudes, or well-being depending on a combination of habits that a person exhibits.

The measurement of habits could also be further developed and improved in several ways. First, future studies need to look more into the reliability and validity of habit automaticity and characteristics. Some initial assessment of both has been provided in this dissertation and deemed to be satisfactory given the limitations of the design. The validity of habits deserves particular attention as future empirical work relies on the ability to clearly capture the phenomenon. Second, the measure of automaticity could also be improved given new technologies that are becoming more accessible. For example, wearable devices can give momentary access to behaviours or reports of emotions and thoughts of an individual which would allow an individual to not rely on memory and recall accuracy. Lastly, the measurement of the characteristics of habits needs to be extended to involve perspectives of people in different roles – employees, supervisors, top management, the HR department, and others. The gaps in the evaluation of habits and disagreement on what habits need to be fostered could be a major impediment to change in organisations, so addressing this gap could assist change efforts.

Finally, future studies could look into elaborating the proposed model to include a wider range of outcomes or the antecedents to habit automaticity or response consistency. In addition to theoretical work, further empirical examination is necessary. Given the novelty of the concept of habits to organisations, qualitative research could be of particular value to establish the role of habits. The rich narrative of the qualitative method could provide suggestions for improving the model, expanding the nomological network of antecedents and consequences, and generating more routes for future research.

Recommendations for Practitioners

To change the way people act, think, or feel, it is not enough to target their motivations. One of the major reasons for that is the force of habits. As the quote at the beginning of this Chapter suggests, “Motivation is what gets you started. Habit is what keeps you going.”. Forming or changing daily responses often requires changing habits. As numerous studies from psychology (and our own anecdotal evidence) on changing dietary or exercise habits have proven, old habits die hard. Without understanding the mechanism of the habit loop as well as the obstacles to sustainable change and the ways to tackle them, most interventions aimed at changing individual behaviours, emotions, or thoughts, are doomed to fail. Luckily, some guidance for practitioners is available from several sources. One of the more established sources is the Organisational Behaviour Modification theory (OB Mod) proposed by Luthans and Kreitner (1985). It involves identification of the critical behaviour (emotion, or thought) that needs to be modified, measurement and analysis of that behaviour, and the development of an intervention strategy that is regularly evaluated. The intervention strategy relies on the principles of behaviourism and is focused on administering reinforcement to encourage or discourage the critical behaviour. OB Mod has been successfully applied as a response modification strategy (Stajkovic & Luthans, 1997). Some guidance on how to specifically deal with habits, given their persistence, is also available with the evidence coming directly from the research on consumer habits and health habits (Verplanken & Wood, 2006; Wood & Rünger, 2016).

These recommendations can be extended to accommodate different types of habits. Specifically, not only the habituation of responses needs to be considered but also their functionality, centrality, and specificity. Given that the differences in habit characteristics might be associated with the differences in work outcomes (e.g., greater functionality and low (and high)

specificity was proposed to be associated with positive work outcomes) or with the magnitude of such difference (e.g., greater centrality was proposed to magnify the relationship between functionality and work outcomes), the analysis of habits should include the assessment of these characteristics. After the analysis, decisions about habit modification (e.g., reinforce functional habit, wean out dysfunctional habits, consider the specificity of habits) and the priority of targets for response modification (e.g., central habits need to be addressed first). Importantly, as mentioned before, practitioners might be particularly interested in the differences of habit characteristics perceptions between employees, supervisors, and management in the assessment of habit characteristics. The differences in opinions about what habits are functional, central, or specific might create discrepancies in employee responses and organisational goals.

The Final Word

In the introduction to the dissertation, an alleged quote by Goethe was cited: “Habit is the most imperious of all masters”. The three essays endorse this idea from the scientific perspective. If there was one message to take away from this work, it would be this: habits may seem invisible and lightweight because they operate on the periphery of our consciousness but their significance should not be underrated as they influence our lives in hundreds of minute ways; however, understanding habits and their force on behaviours, emotions, and thoughts of employees allows us to better comprehend decisions, work experiences, and the interactions between employees and work environment, and thus, habits should be considered alongside motivations, attitudes, deliberations when predicting the responses to work environments and events and explaining the consequences of work.

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APPENDIXES

Appendix A. Think-Aloud Study Questionnaire.

We will shortly begin a study to see whether a specific activity can be done regularly. For this study, we have developed a questionnaire about the ease and importance with which that activity is done. We want to check that people understand the statements in the way that we mean them. To do this, I am going to ask you to think aloud as you complete the questionnaire. What I mean by 'think aloud' is that I want you to tell me everything you are thinking as you read each statement and decide how to answer it. I would like you to talk aloud constantly. I don't want you to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. If you are silent for any long period of time, I will ask you to talk. Please try to speak as clearly as possible, as I shall be recording you as you speak. Do you understand what I want you to do? This session will be audio-recorded for the purposes of analysis. Do you consent to having your responses audio-recorded?

Imagine you are answering on a scale from 1 – Strongly disagree to 5 – Strongly agree.

Writing a to-do list/Feeling fear before an important exam/Being mindful throughout the day is something… *[Response type is randomly assigned]*

1. …I do even when I don't have an explicit intention to do so.
2. …I don't need to think much about whether I need to do it or not.
3. …I engage in without giving it too much thought.
4. …I engage in almost involuntary.
5. …I do even when I don't feel a strong motivation to do so.
6. …I rarely give any consideration about whether or not I need to consider
7. …I do rather than ponder over.

8. …I didn’t need to think much about it the last time I did it.

9. …I’m not entirely sure what makes me do it.

10. …I would find difficult to pinpoint the reason for deciding to do it.

11. …I was mentally invested in when deciding whether I wanted to do it or not.

12. …I engage in without fully realizing that I am doing it.

13. …I sometimes cannot even remember being stimulated to begin.

14. …I cannot recall many details about when and how I did it.

15. …I do without much awareness.

16. …that is harder for me to not do rather than do.

17. …I would have trouble overriding my tendency to do it.

18. … would be difficult to restrain myself from doing.

19. … that would be hard to control.

20. …that is not under my conscious control.

21. …I could only do when I am no busy with anything else.

22. …I have to fully focus on to

23. … I cannot do while daydreaming at the same time.

24. …that if I get distracted from mentally, I will not be able to do properly.

25. …that requires a lot of mental energy.

26. …that really drains me mentally.

27. …that serves a purpose in my life.

28. … facilitates my ability to reach a specific goal.

29. …that brings me closer to one of my objectives whenever I do it.

30. …that gets me one step closer to my target.

31. …I do purposefully.

32. …that is an important aspect of my life/work.

33. … that is one of the central activities in my life /work.

34. … is crucial to me.

35. … that would feel missing if for any reason I stopped doing it.

36. … that is fundamental to my life /work.

37. …that is an important part of who I am.

38. …central to my life/work.

39. …that has a repetitive content.

40. …that I have a very specific way of doing.

41. …where there is not much variation in how I do it.

42. …that is slightly different every time.

43. …that mostly follows the same logic from time to time but content changes somewhat.

44. …that I have a rather general way of doing.

45. …that provides structure for my activity but does not specify *what* I do.

Appendix B. Think-Aloud Study Consent Form (Study 1, Chapter 3).

UNIVERSITY OF MANITOBA
Department of
Business Administration

Informed Consent Form

Study Title: Development and validation of a habit measure
Principal Investigator: Anastasia Sizykh, PhD Candidate
Co-Investigator: Dr. Nealia S. Bruning, Professor
Sponsor: NA

This consent form provides basic descriptive information about the study so you know the conditions of your participation. If you would like more detail about the study or information provided in this form, please ask. You should take the time to carefully read this letter.

Project Description: In this study, we are developing a questionnaire scale to measure habits. In the future we can explore potential benefits and harm associated with individual habits. We suspect that some habits are more beneficial for performance, satisfaction, and well-being than others. In order to test these ideas we need to develop a questionnaire about habits. The first step of this process is to ensure that the questions we create to measure habits are interpreted accurately by participants. You will be asked to verbalize your thoughts while reading and answering questions in the questionnaire. This will help us understand whether some questions are hard to understand and should be revised. Your verbalizations will be audio-recorded, transcribed (turned into a text), and analyzed to be used for scale improvement. You will receive 1 point for participating in the study.

Location and Time Requirement: The study will be conducted face-to-face at the location and time identified during the SONA sign-up. Participation will require approximately 30 minutes.
Participation in this project is voluntary. You may decline to answer any question or withdraw from the study after the tape recorder is on and you started answering the question without any negative consequences. If you withdraw earlier, the participation point will be lost.

Confidentiality:
We will keep any information gathered in this research strictly confidential. All data will be kept on a password-protected laptop of the Principal Investigator. Your name will not be recorded with the text, only a label such as "Participant 1". Only the principal investigator and co-investigator will have access to both audio files and transcriptions, and under no circumstances will they be shared with a third party. Since the audio recordings are a critical component of the study, if you do not want to be audio-recorded, you cannot participate in the study. You will not be named or identifiable in any report or publications that result from this study. Information containing personal identifiers (e.g.,

this consent form) will be destroyed as soon as it is no longer necessary for course credit purposes, approximately 12/2016.

Dissemination:
Results from this research will be disseminated in aggregate (group) form only at professional meetings and in publications in academic journals.

Risks and Benefits:
There are no risks to you from participating in this research. You might benefit from the study in the long-term by becoming more mindful about your habits.

Consent:
Your signature on this form indicates that you understand to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at our research records to see that the research is being done in a safe and proper way.

This research has been approved by the Psychology-Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at [phone number], or e-mail [email address]. A copy of this consent form has been given to you to keep for your records and reference.

If you have any questions or concerns, you can also contact the Principal Investigator, Anastasia Sizykh, at [phone number], or e-mail [email address], or Co-Investigator, Dr. N. Sue Bruning, at [phone number], or e-mail [email address].

_____

Participant's Signature Date

_____

Principal Investigator's Signature Date

Email or surface mail address to which a summary of findings and written reports (at your option) should be sent:

Appendix C. Initial Exploratory Factor Analysis Study Questionnaire.

We are interested in learning about the ease and importance of *[Response X*[1]*]*. You will see statements regarding different aspects of your experience with *[Response X]*.

Your task is to indicate the extent to which you disagree or agree with these statements on a scale from 1 – "Strongly disagree" to 5 – "Strongly agree".

When answering, try to NOT think about what others could say or feel. There are no right or wrong answers. We want to know your personal opinions only.

[Response X] is something that…

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	Usually, I just *[Response X]* without overthinking it.	1	2	3	4	5
2.	I often start *[Response X]* without giving it too much thought.	1	2	3	4	5
3.	*[Response X]* is almost like a reflex for me.	1	2	3	4	5
4.	If I have to *[Response X]*, I almost never contemplate about it.	1	2	3	4	5
5.	I usually *[Response X]* without planning for it in advance.	1	2	3	4	5

[1] "Response X" is a randomly assigned response: Responses in the student sample were: "Taking class notes" (action), "Being mindful throughout the day" (thought), or "Focusing on the positive when facing difficulties" (emotion). Responses in the healthcare sample were: "Washing hands before seeing a patient" (action), "Being mindful about health and safety" (thought), or "Imitating positive emotions before seeing a patient" (emotion).

6.	Usually, I *[Response X]* without much thinking of why I do it.	1	2	3	4	5
7.	I engage in *[Response X]* without fully realizing that I am doing it.	1	2	3	4	5
8.	The moment I start *[Response X]* is so subtle that I usually can barely realize it.	1	2	3	4	5
9.	*[Response X]* is not really a decision for me, it is somewhat of an instinct.	1	2	3	4	5
10.	I *[Response X]* without much awareness.	1	2	3	4	5
11.	I usually do not think much about the consequences of *[Response X]*, I do it as a reflex.	1	2	3	4	5
12.	*[Response X]* is effortless for me.	1	2	3	4	5
13.	*[Response X]* requires my undivided attention.	1	2	3	4	5
14.	*[Response X]* and multitasking would be very problematic for me.	1	2	3	4	5
15.	*[Response X]* requires a lot of mental energy.	1	2	3	4	5
16.	*[Response X]* is tiring.	1	2	3	4	5
17.	I *[Response X]* even when I'm being lazy.	1	2	3	4	5
18.	*[Response X]* is something I find hard to control quite often.	1	2	3	4	5

19.	I would have trouble suppressing my wish to *[Response X]*.	1	2	3	4	5
20.	*[Response X]* regularly requires a lot of willpower for me.	1	2	3	4	5
21.	Regular *[Response X]* requires extreme measures of discipline from me.	1	2	3	4	5
22.	*[Response X]* is important for some aspects of my life.	1	2	3	4	5
23.	*[Response X]* is needed for my day-to-day activities.	1	2	3	4	5
24.	*[Response X]* is a major element of some activities I do.	1	2	3	4	5
25.	A day without *[Response X]* would feel somewhat uncomfortable.	1	2	3	4	5
26.	*[Response X]* is a basic thing I do.	1	2	3	4	5
27.	*[Response X]* is core to some things I do.	1	2	3	4	5
28.	*[Response X]* benefits me but in the short-run only.	1	2	3	4	5
29.	*[Response X]* has many positive outcomes for me in the future.	1	2	3	4	5
30.	*[Response X]* helps me achieve my goals.	1	2	3	4	5

31.	*[Response X]* facilitates the achievement of my long-term goals.	1	2	3	4	5
32.	*[Response X]* has significant long-term benefits for me.	1	2	3	4	5
33.	*[Response X]* is the same from time to time.	1	2	3	4	5
34.	I *[Response X]* in a similar manner but what I do differs a lot across situations.	1	2	3	4	5
35.	There are significant differences in *[Response X]* from time to time.	1	2	3	4	5
36.	The way I *[Response X]* fluctuates significantly across situations.	1	2	3	4	5
37.	Circumstances do not matter much for *[Response X]*	1	2	3	4	5
38.	There is almost no variation in terms of *[Response X]* from time to time.	1	2	3	4	5

Appendix D. Consent Form for the Initial Exploratory Factor Analysis Study, Student Sample (Study 2, Chapter 3).

Anastasia Sizykh

UNIVERSITY OF MANITOBA

Department of Business Administration

Informed Consent Form

Study Title: Development and validation of habit measure
Principal Investigator: Anastasia Sizykh, PhD Candidate
Co-Investigator: Dr. Nealia S. Bruning, Professor
Sponsor: NA

This consent form is only part of the process of informed consent. It provides a basic description of the study and what your participation will involve. If you would like more detail about the study or information provided in this form, please ask. You should take the time to carefully read this letter.

Project Description: In this study, we are developing a measure of habit. In the future we can explore potential benefit and harm associated with individual habits. We suspect that some potential benefits of performing habits might be increased self-control, an increase in performance, resistance to stress, feelings of confidence and self-esteem. Some of the harmful outcomes might be decreased motivation and lack of development and progress. The scales that your participation will help us develop are important to our future research.

Location and Time Requirement: The study will be conducted via web-based survey. Participation will require approximately 20 minutes.

Participation in this project is voluntary. You may decline to answer any question or withdraw from the study without any negative consequences.

Confidentiality:
We will keep any information gathered in this research strictly confidential. All data will be identified by a code number (the last four digits of your student identification number) and kept in a locked filing cabinet in the Principal Investigator's office. Only the researchers will have access to the data. You will not be named or identifiable in any report or publications that result from this study. Information containing personal identifiers (e.g., this consent form) will be destroyed as soon as it is no longer necessary for course credit purposes, approximately 05/2017.

Dissemination:
Results from this research will be disseminated in aggregate (group) form only at professional meetings and in publications in academic journals.

Risks and Benefits:
There are no risks to you from participating in this research. You might benefit from the study in the long-term by becoming more mindful about your habits.

Consent:
If you choose "I consent to participate in the study" option, it indicates that you understand to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Psychology-Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at [phone number], or e-mail [email address]. A copy of this consent form has been given to you to keep for your records and reference.

If you have any questions or concerns, you can also contact the principal Investigator, Anastasia Sizykh, at [phone number], or e-mail [email address].

Appendix E. Consent Form for the Initial Exploratory Factor Analysis Study, Healthcare Sample (Study 2, Chapter 3).

Anastasia Sizykh

University of Manitoba

Department of Business Administration

Informed Consent Form

Study Title: Health and safety habits in healthcare.
Principal Investigator: Dr. Nealia S. Bruning, Professor
Co-Investigator: Anastasia Sizykh, PhD Candidate
Sponsor: Department of Business Administration, Asper School of Business, University of Manitoba

This consent form, a copy of which I will leave with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully.

Project Description: In his project, we are interested to lean about your perceptions of the ease and importance of some habits that are related to health and safety of healthcare employees like yourself. We believe that they can be critical in predicting near misses, accidents, fatigue, and stress. In this project, you will be prompted to evaluate a number of statements on a questionnaire regarding one of the habits related to your daily routine as a healthcare provider. It will only take about 15 minutes to complete. You can choose to fill it out electronically or on paper. As a small token of appreciation, you will receive a cafeteria voucher. Your participation in the study is very valuable as it will inform future research and practice across healthcare organizations.

Location and Time Requirement: the study is conducted via web-based survey or on paper. Participation will require approximately 15 minutes.

Confidentiality:
I will keep any information gathered in this research strictly confidential and anonymous. All responses to paper questionnaires will be digitalized within the maximum of 4 weeks after submission and the hard copies will be shredded immediately after. Until then, all paper questionnaires will be kept in a locked office of the co-investigator and will never be left unprotected. All digital copies, including the responses to the web-based questionnaires, will be kept on a password-protected laptop of the co-investigator. Only the researchers will have access to the data. You will not be named or identifiable in any reports of this study. Information containing personal identifiers (e.g., this consent form) will be destroyed as soon as the incentives are distributed to all the participants, approximately

03/2017. The data will be kept separately from consent forms, and will be destroyed once no longer needed for scientific purposes.

Dissemination:
Results from this research will be disseminated in aggregate (group) form only at professional meetings and by publication in academic journals.

Risks and Benefits:
There is no risk to you from participating in this research. You might benefit from the study by becoming more aware of your health and safety habits.

Consent:
Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at our research records to see that the research is being done in a safe and proper way.

This research has been approved by the Psychology-Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at [phone number], or e-mail [email address]. A copy of this consent form has been given to you to keep for your records and reference.

If you have any questions or concerns, you can also contact the Principal Investigator, Dr. N. Sue Bruning, at [phone number], or e-mail [email address], or Co-Investigator, Anastasia Sizykh, at [phone number], or e-mail [email address].

_____

Participant's Signature Date

_____

Researcher and/or Delegate's Signature Date

Email or surface mail address to which a summary of findings and written reports (at your option) should be sent:

Appendix F. Exploratory Factor Analysis after Modification Study Questionnaire.

We are interested in learning about the ease and importance of *[Response X*[2]*]*. You will see statements regarding different aspects of your experience with *[Response X]*.

Your task is to indicate the extent to which you disagree or agree with these statements on a scale from 1 – "Strongly disagree" to 5 – "Strongly agree".

When answering, try to NOT think about what others could say or feel. There are no right or wrong answers. We want to know your personal opinions only.

[Response X] is something that…

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	I do without justifying why I do it to myself.	1	2	3	4	5
2.	I just do without thinking about it.	1	2	3	4	5
3.	I need to carefully think about before doing it.	1	2	3	4	5
4.	I can start doing and not even notice.	1	2	3	4	5
5.	has consequences for me that I do not always realize.	1	2	3	4	5
6.	I can be doing without even realizing it right away.	1	2	3	4	5
7.	is effortless for me.	1	2	3	4	5

[2] "Response X" is a randomly assigned response: helping my colleagues (behaviour), using phone while at work (behaviour), reflecting on the day (thought), fully focusing on the task at hand (thought), faking a positive emotion (emotion), or approaching tasks with confidence and positive attitude (emotion).

8.	requires a lot of mental energy.	1	2	3	4	5
9.	requires no mental exertion on my part.	1	2	3	4	5
10.	would take a lot of willpower to not do.	1	2	3	4	5
11.	I can't easily restrain myself from doing.	1	2	3	4	5
12.	I can easily quit doing.	1	2	3	4	5
13.	is an important part of my day-to-day activities.	1	2	3	4	5
14.	would feel missing from my life if I couldn't do it.	1	2	3	4	5
15.	is central to my work and/or life.	1	2	3	4	5
16.	serves an important purpose in my life/work.	1	2	3	4	5
17.	helps me achieve important goal(s) in my life-work.	1	2	3	4	5
18.	is beneficial for my success in life/at work.	1	2	3	4	5
19.	I do in a specific fixed way.	1	2	3	4	5
20.	I do differently every time.	1	2	3	4	5
21.	do the same way every time.	1	2	3	4	5

What was your questionnaire about? (Attention check)

1. Helping my colleagues
2. Using a phone while at work
3. Setting timelines
4. Reflecting on the day
5. Focusing on the task at hand

6. Healthy eating

7. Faking a positive emotion

8. Approaching tasks with confidence and positive attitude

Appendix G. Consent Form for the Exploratory Factor Analysis after Modifications Study (Study 3, Chapter 3).

Anastasia Sizykh

University of Manitoba | Department of Business Administration

Study Title: Development of the habits scale.
Principal Investigator: Dr. Nealia S. Bruning, Professor
Co-Investigator: Anastasia Sizykh, PhD student
Sponsor: Department of Business Administration

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully.

Project Description: In this study, we are developing a questionnaire measure of habit. In the future we can explore potential benefits and harms associated with individual habits. We suspect that some potential benefits of performing habits might be increased self-control, an increase in performance, resistance to stress, feelings of confidence and self-esteem. Some of the harmful outcomes might be decreased motivation and lack of development and progress. Your participation will help us develop a scale that is important to our future research.

In this study, you will be asked to evaluate a number of statements regarding one of the habits we are interested in. You can only complete the study once.

We check responses carefully in order to make sure that people have read the instructions for the task and responded carefully. We will only accept participants who clearly demonstrate that they have read and understood the questions. Again, there will be some very simple questions following the study questions that will check whether you are reading the instructions. If you get these wrong, you will not be eligible for participation.

Location and Time Requirement: The study will be conducted via web-based survey. Participation will require 3-5 minutes.

Confidentiality:
We will keep any information gathered in this research strictly confidential. The identifying information (your MTurk ID number) will be removed from the data file immediately after HIT

is approved. Only the researcher will have access to the data. You will not be named or identifiable in any report or publications that result from this study.

Dissemination:
Results from this research will only be disseminated in aggregate (group) form at professional meetings and in publications in academic journals.

Risks and Benefits:
There are no risks to you from participation in this research. You might benefit from the study in the long-term by becoming more mindful about your habits.

Consent:
By continuing, you accept that you have read and understood the information about the study and consent to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Psychology-Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at [phone number], or e-mail [email address].

If you have any questions or concerns, you can also contact the principal Investigator, Sue Bruning at [phone number], or e-mail [email address], or the Co-Investigator, Anastasia Sizykh, at [phone number], or e-mail [email address].

Appendix H. Confirmatory Factor Analysis, Convergent and Divergent Validity Study Questionnaire.

Questionnaire for the "mindfulness" habit

We are interested in learning about the frequency, consistency and experiences of [*Response X*]. You will see statements regarding [*Response X*]. Some items might seem repetitive. Do not worry about it, just approach each item as if you see it for the first time. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

To what extent do you agree or disagree with the statements below?

For me, [*Response X*] is something that...

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	I do without justifying why I do it to myself.	1	2	3	4	5
2.	I just do without thinking about it.	1	2	3	4	5
3.	I can start doing and not even notice.	1	2	3	4	5
4.	I can be doing without even realizing it right away.	1	2	3	4	5
5.	is effortless for me.	1	2	3	4	5
6.	requires a lot of mental energy. (R)	1	2	3	4	5
7.	would take a lot of willpower to not do.	1	2	3	4	5
8.	I can't easily restrain myself from doing.	1	2	3	4	5
9.	is an important part of my day-to-day activities.	1	2	3	4	5

10.	is central to my work and/or life.	1	2	3	4	5
11.	would feel missing from my life if I couldn't do it.	1	2	3	4	5
12.	helps me achieve important goal(s) in my life-work.	1	2	3	4	5
13.	is beneficial for my success in life/at work.	1	2	3	4	5
14.	serves an important purpose in my life/work.	1	2	3	4	5
15.	I do in a specific fixed way.	1	2	3	4	5
16.	do the same way every time.					
17.	I do differently from time to time.					
18.	I do frequently.					5
19.	I do automatically.					5
20.	I do without having to consciously remember.					5
21.	that makes me feel weird if I do not do it.					5
22.	I do without thinking.					5
23.	that would require effort not to do it.					5
24.	that belongs to my daily routine.					5
25.	I start doing before I realize I'm doing it.					5
26.	I would find hard not to do.					5
27.	I have no need to think about doing.					5
28.	that's typically "me."					5

29.	I have been doing for a long time.					5

	Never	Seldom	Sometimes	Often	All the time
Please, evaluate how often you [*Response X*]:	1	2	3	4	5

Please, if you can accurately recall, indicate how stable the context is when you [*Response X*]. If you [*Response X*] in different places, at different times, and in different situations, the context is unstable. However, if either or all of these aspects are similar, then the context is more stable.

	Very unstable				Very stable
Time (e.g. time of day)	1	2	3	4	5
Place (the physical location)	1	2	3	4	5
Situation (e.g., weather, other people, etc.)	1	2	3	4	5

To what extent do you agree or disagree with the statements below?

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	[*Response X*] is enjoyable.	1	2	3	4	5
2.	I have a chance to [*Response X*] about a variety of things	1	2	3	4	5
3.	[*Response X*] has a large impact on people outside the organisation.	1	2	3	4	5
4.	I [*Response X*] because it is important for becoming the person I want to be.	1	2	3	4	5
5.	My supervisor thinks that I should [*Response X*].	1	2	3	4	5
6.	I find [*Response X*] personally satisfying.	1	2	3	4	5
7.	[*Response X*] is important because of its future value.	1	2	3	4	5
8.	I [*Response X*] because it plays a role in reaching my future goals.	1	2	3	4	5
9.	Situations when I need to [*Response X*] are highly routine and predictable.	1	2	3	4	5
10	[*Response X*] is very significant and important in the broader scheme of things.	1	2	3	4	5

11	There is an identifiable sequence of steps that can be followed to [*Response X*].	1	2	3	4	5
12	Being able to [*Response X*] will be of value to me in the future.	1	2	3	4	5
13	I get to use a number of complex skills when I [*Response X*].	1	2	3	4	5
14	[*Response X*] involves a great amount of effort.	1	2	3	4	5
15	I would be more efficient if I didn't have to [*Response X*].	1	2	3	4	5
16	I [*Response X*] because it is important for attaining my dreams.	1	2	3	4	5
17	My co-workers think I should [*Response X*].	1	2	3	4	5
18	[*Response X*] affects the lives of other people.	1	2	3	4	5
19	I can rely on established procedures to [*Response X*].	1	2	3	4	5
20	[*Response X*] impairs my performance on other tasks.	1	2	3	4	5
21	Mastering the ability to [*Response X*] is of value because it will help me in the future.	1	2	3	4	5
22	It is interesting to [*Response X*].	1	2	3	4	5
23	[*Response X*] is very routine.	1	2	3	4	5

24	My friends think I should [*Response X*].	1	2	3	4	5

Appendix I. Consent Form for the Confirmatory Factor Analysis and Validity Study (Study 4, Chapter 3).

Anastasia Sizykh

University of Manitoba | Department of Business Administration

Informed Consent Form

Study Title: Development of the habits scale.
Principal Investigator: Dr. Nealia S. Bruning, Professor
Co-Investigator: Anastasia Sizykh, PhD student
Sponsor: Department of Business Administration

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully.

Project Description: In this study, we are developing a questionnaire measure of habit. In the future we can explore potential benefits and harms associated with individual habits. We suspect that some potential benefits of performing habits might be increased self-control, an increase in performance, resistance to stress, feelings of confidence and self-esteem. Some of the harmful outcomes might be decreased motivation and lack of development and progress. Your participation will help us develop a scale that is important to our future research.

In this study, you will be asked to evaluate a number of statements regarding one of the habits we are interested in. You can only complete the study once.

We check responses carefully in order to make sure that people have read the instructions for the task and responded carefully. We will only accept participants who clearly demonstrate that they have read and understood the questions. Again, there will be some very simple questions following the study questions that will check whether you are reading the instructions. If you get these wrong, you will not be eligible for participation.

Location and Time Requirement: The study will be conducted via web-based survey. Participation will require 20 minutes.

Confidentiality:
We will keep any information gathered in this research strictly confidential. The identifying information (your MTurk ID number) will be removed from the data file immediately after HIT is approved. Only the researcher will have access to the data. You will not be named or identifiable in any report or publications that result from this study.

Dissemination:
Results from this research will only be disseminated in aggregate (group) form at professional meetings and in publications in academic journals.

Risks and Benefits:
There are no risks to you from participation in this research. You might benefit from the study in the long-term by becoming more mindful about your habits.

Consent:
By continuing, you accept that you have read and understood the information about the study and consent to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Psychology-Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at [phone number], or e-mail [email address].

If you have any questions or concerns, you can also contact the principal Investigator, Sue Bruning at [phone number], or e-mail [email address], or the Co-Investigator, Anastasia Sizykh, at [phone number], or e-mail [email address].

Appendix J. Mindfulness Habit Study Questionnaire.

You will see a number of statements about your occupational safety, well-being, and experience with mindfulness that you will be asked to evaluate. We define mindfulness as the capacity to intentionally bring awareness to present-moment experience with an attitude of openness and curiosity. When you evaluate the statements in the questionnaire, please, think of mindfulness as awareness of the environment, situation, and your own capabilities as well your attitude of openness towards learning from mistakes and noticing novelty in routine activities.

Indicate the extent to which you disagree or agree with these statements. Please answer according to what reflects your experience rather than what you think your experience should be.

"Being mindful throughout the day is something that…"

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I do without justifying why I do it..	1	2	3	4	5
2	I just do without thinking about it.	1	2	3	4	5
3	I can start doing and not even notice.	1	2	3	4	5
4	I can be doing without even realizing it right away.	1	2	3	4	5
5	is effortless for me.	1	2	3	4	5
6	requires a lot of mental energy.	1	2	3	4	5
7	would take a lot of willpower to not do.	1	2	3	4	5
8	I can't easily restrain myself from doing.	1	2	3	4	5
1	is an important part of my day-to-day activities.	1	2	3	4	5

2	is central to my work and/or life.	1	2	3	4	5
3	would feel missing from my life if I couldn't do it.	1	2	3	4	5
4	helps me achieve important goal(s) in my life-work.	1	2	3	4	5
5	is beneficial for my success in life/at work.	1	2	3	4	5
6	serves an important purpose in my life/work.	1	2	3	4	5
7	I do in a specific fixed way.	1	2	3	4	5
8	do the same way every time.	1	2	3	4	5
9	I do very differently from time to time.	1	2	3	4	5

Indicate how frequently or infrequently you currently have each experience. Please answer according to what really reflects your experience rather than what you think your experience should be.

		Never	Rarely	Sometimes	Very often	Always
1	I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5
2	I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5
3	I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5
4	It seems I am "running on automatic" without much awareness of what I'm doing.	1	2	3	4	5

5	I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5

The following questions ask you to assess the degree to which you engage in certain behaviours and practices. To what extent do the following characterize your work unit?

		Not at all	To a limited extent	To a moderate extent	To a considerable extent	To a very great extent
1.	I have a good "map" of my colleague's talents and skills.	1	2	3	4	5
2.	I can talk to my colleagues about mistakes and ways to learn from them.	1	2	3	4	5
3.	I discuss alternatives as to how to go about our normal work activities with my colleagues.	1	2	3	4	5
4.	When handing off an activity to another employee, I usually discuss what to look out for.	1	2	3	4	5
5.	I spend time identifying activities I do not want to go wrong.	1	2	3	4	5

Please, evaluate how mindful you are…

		Not at all	To a limited extent	To a moderate extent	To a considerable extent	To a very great extent
1.	At the beginning of the shift	1	2	3	4	5
2.	Half way through the shift	1	2	3	4	5
3.	At the end of the shift	1	2	3	4	5
4.	When preparing to see a patient	1	2	3	4	5
5.	When transferring a patient	1	2	3	4	5
6.	When working with bodily fluids or medications	1	2	3	4	5
7.	When walking in a hallway of the facility	1	2	3	4	5
8.	When working alone	1	2	3	4	5
9.	When working with a colleague	1	2	3	4	5

Why do you engage in mindfulness during work?

		Not at all	To a limited extent	To a moderate extent	To a considerable extent	To a very great extent
1.	Because I think that it is interesting	1	2	3	4	5
2.	Because I think that it is pleasant	1	2	3	4	5
3.	Because I feel good when I do it	1	2	3	4	5
4.	Because I think that it is good for me	1	2	3	4	5

5.	By personal decision	1	2	3	4	5
6.	Because I believe that it is important for me	1	2	3	4	5
7.	Because I am supposed to do it	1	2	3	4	5
8.	Because I don't have any choice	1	2	3	4	5
9.	Because I feel that I have to do it	1	2	3	4	5
10.	There may be good reasons to be mindful, but personally I don't see any	1	2	3	4	5
11.	I do it but I am not sure if it is worth it	1	2	3	4	5
12.	I don't know; I don't see the benefits	1	2	3	4	5

The following set of questions will concern your health and safety at work. All healthcare professionals face challenging events on a daily basis which is a part of their job. How often did the listed events happen to you?

Injuries include cases such as, but not limited to, a cut, bruise, fracture, sprain, or more severe injuries. How many times did you sustain a work-related injury in the **last year**? _____

Illness includes both acute and chronic illnesses, such as, but not limited to, a skin disease, respiratory disorder, poisoning, influenza, or common cold. How many times did you sustain illness in the **last year**?_____

		Never	1-3 times	4-6 times	7-10 times	More than 10 times
1.	***Near miss*** is an unplanned event that did not result in injury, illness, or damage – but had the potential to do so. How many near-misses did you encounter in the last <u>six months</u>?	1	2	3	4	5

Please, evaluate the statement below:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	I use all necessary safety equipment to do my job.	1	2	3	4	5
2.	I carry out my work in a safe manner.	1	2	3	4	5
3.	Occasionally due to lack of time, I deviate from correct and safe work procedures.	1	2	3	4	5
4.	I always point out to the management if any safety related matters are noticed in my organisation.	1	2	3	4	5
5.	I put extra effort to improve the safety of the workplace.	1	2	3	4	5
6.	I encourage my co-workers to work safely.	1	2	3	4	5

In the last month, how often did you experience these….

		Never	Rarely	Sometimes	Very often	Always
1.	Able to concentrate	1	2	3	4	5
2.	Capable of making decisions	1	2	3	4	5
3.	Felt constantly under strain	1	2	3	4	5
4.	Able to enjoy day-to-day activities	1	2	3	4	5
5.	Losing confidence	1	2	3	4	5
6.	Feeling reasonably happy	1	2	3	4	5

The following statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job.

		Never	Rarely	Sometimes	Very often	Always
1.	At my work, I feel bursting with energy.	1	2	3	4	5
2.	My job inspires me.	1	2	3	4	5
3.	I am proud of the work that I do.	1	2	3	4	5
4.	I get carried away when I am working.	1	2	3	4	5

Indicate the extent to which you disagree or agree with these statements.

		Strongly	Disagree	Neutral	Agree	Strongly agree

		disagreed				
1	I know how to perform my job in a safe manner	1	2	3	4	5
2	I know how to maintain or improve workplace safety	1	2	3	4	5
3	I feel that it is worthwhile to put in effort to maintain or improve my personal safety	1	2	3	4	5
4	I feel that it is important to maintain safety at all times.	1	2	3	4	5

Appendix K. Consent form for the Mindfulness Habit Study (Chapter 4).

Anastasia Sizykh

University of Manitoba

Department of
Business Administration

Study Title: Mindfulness in Nurses' Health and Safety
Principal Investigator: Anastasia Sizykh, Ph.D. Candidate
Co-Investigator: N. Sue Bruning, Ph.D.

Your health is important!! You, as a healthcare worker, are frequently exposed to hazards, such as harmful exposures to chemicals and hazardous drugs, patient violence, slips, trips, falls, and stress. Safety in the workplace is a responsibility of everyone – organizations, supervisors, and healthcare professionals. We all must work together to find better ways to prevent incidents.

We are interested in understanding how mindfulness is associated with health and safety of healthcare workers. Mindfulness is the capacity to maintain focus and awareness of the environment with an attitude of openness and curiosity. Some examples of health and safety mindfulness are: focusing attention on the task at hand, noticing health and safety hazards, reflecting on own or others near-misses or incidents. Your participation in this study will help us better understand the health and safety environment for the nurses and related professions. Your input will also help inform future prevention initiatives.

This letter is part of the informed consent process. It provides a basic description of the study and what your participation will involve. If you would like more detail about the study or information provided in this form, please ask. You should take the time to carefully read this letter.

Participation in this study involves filling out a questionnaire (15-20 minutes) where you will be asked to evaluate statements or answer questions related to your workplace health and safety. You will be awarded $2.5 USD/£1.5 GBP for participation. There are no risks to you from participating in this research. You might benefit by becoming more mindful about health and safety hazards.

By clicking on the agree button below, it indicates that you have understood to your satisfaction the information regarding participation in the research and agree to participate. In no way does this waive your legal rights nor release researchers, sponsors, or involved institutions from their legal and professional responsibilities. You may withdraw from the study at any time by exiting the survey page, and/or refrain from answering any questions, without prejudice or consequence. Your responses will remain confidential.

If you would like to learn about the results of the study, please contact Principal Investigator, Anastasia Sizykh, at [phone number], or e-mail [email address], or Co-Investigator, Sue Bruning at [phone number], or e-mail [email address]. Your email address will be kept separate from your survey responses so that there is no link back to your answers. All responses will be stored on password-protected computers of the principal investigator and co-investigator who will be the only individuals that have access to the data. Data will be retained for at least 7 years for publication purposes and in the event that further analyses are needed (as per the guidelines of a number of journals). Results from this research will only be disseminated in aggregate anonymous form at professional meetings and in publications in academic journals. You will not be identifiable in any of these presentations or publications.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way. This research has been approved by the Psychology-Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at [phone number], or e-mail [email address].