Collected and connected: Mindfulness and the early adolescent

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Abstract

Collected and connected: Mindfulness and the early adolescent

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Using an event sampling procedure with a sample of 114 early adolescent boys and girls,

the present study investigated three fundamental questions about the associations between

mindfulness, social relations, stress, and emotional well-being. These questions

concerned (a) the defining features of mindfulness as a state and trait construct, (b)

whether mindfulness is naturally occurring or cultivated exclusively through "formal"

practice, and (c) whether or not mindfulness is related to social functioning. Following a

review of four conceptually- and empirically-related areas of inquiry, specifically

perceived stress, emotion, mindfulness, and peer relations, a set of hypotheses were

proposed and examined. As expected, mindfulness was observed to be both a state and

trait. At the state level, perceived stress partially mediated between mindfulness and

negative emotion. At the trait level, mindfulness was: positively correlated with positive

emotion, friendship extensivity, and popularity; negatively correlated with perceived

stress, negative emotion, anxiety, and depression. Trait mindfulness was observed to

moderate the associations between (a) negative emotion and friendship extensivity, (b)

depression and friendship extensivity, and (c) negative emotion and popularity. Trait

mindfulness predicted state mindfulness, and it predicted state stress and state negative

emotion, though not as well as state mindfulness. The following results were contrary to

expectation. At the trait level, mindfulness: was *not* associated with age, did *not* moderate

between perceived stress and emotional well-being, and did *not* moderate between

perceived stress and social functioning. Finally, an unexpected and noteworthy finding

was that mindfulness loaded on the same factor as stress, negative emotion, and depression (*preoccupied non-acceptance*; mindfulness loaded negatively, the other traits positively), and this factor was negatively associated with another factor, *social competence*. This finding suggests that mindfulness is associated with both emotional well-being and social functioning. In sum, these results suggest that mindfulness is a state and trait, naturally occurring, and related to interpersonal functioning in early adolescence. Implications, study limitations, and future directions are discussed.

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Dedication

To Brendan and Allen.

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By being with yourself ... by watching yourself in your daily life with alert interest, with the intention to understand rather than to judge, in full acceptance of whatever may emerge, because it is there, you encourage the deep to come to the surface and enrich your life and consciousness with its captive energies. This is the great work of awareness; it removes obstacles and releases energies by understanding the nature of life and mind. Intelligence is the door to freedom and alert attention is the mother of intelligence (Nisgardatta Maharaj, as cited in Kabat-Zinn, 1994, p. 10).

The present study examines the intersection of four areas of research central to early adolescence – stress, emotion, mindfulness, and peer relations. Whereas the conceptual overlap between the stress and coping literature and the emotion regulation literature has been well established (Gross, 1999) and the relations between stress, emotion regulation, and early adolescent social functioning substantiated (Compas, 1987; Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Grant & Compas, 2003), no known study has investigated the conceptual intersection between these areas and mindfulness. In brief, mindfulness means deliberately and nonjudgmentally attending to one's present-moment experience (Kabat-Zinn, 1990). Fifth- and sixth-grade early adolescents reported their general tendencies related to stress, emotion, and mindfulness, and completed sociometric questionnaires on friendships with classmates and on the popularity of classmates. Experience sampling (Csickszentmihalyi & Rathunde, 1993) was used to measure momentary stress, emotion, and mindfulness over the course of a typical school week. In brief, early adolescents who are more predisposed to mindfulness

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were expected to: experience less stress, regulate their emotions more effectively, and be more socially competent.

Mindfulness-based interventions are becoming increasingly empirically substantiated (Bishop, 2002; Grossman, Niemann, Schmidt, & Walach, 2004; Scheel, 2000). However, several assertions have yet to receive empirical support. First, until recently the efficacy of mindfulness-based interventions was attributed primarily to an increase in mindfulness, yet there was no means of quantifying mindfulness. Most mindfulness scales available at the time of data collection had not been validated for state and trait use (Bishop et al., 2003) or had been designed exclusively for use with meditators (Buchheld, Grossman, & Walach, 2001). The Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003), however, was validated to quantify state and trait aspects of mindfulness. This scale was developed with the general adult population in mind and has since been validated with undergraduate students, employed adults, and cancer patients (Brown & Ryan, 2003; Carlson & Brown, 2005). The MAAS has not, however, been validated with younger populations. Thus, the first aim of this study was to validate a modified version of the MAAS (i.e., for early adolescents), and thereby contribute to the operational definition of the construct of mindfulness.

The second assertion that has yet to receive adequate empirical substantiation is that mindfulness enhances social functioning (Burgoon, Berger, & Waldron, 2000; Goleman, 1995; Kabat-Zinn, 1990; Shapiro & Schwartz, 1999; Verni, 2001). There is scant evidence to support this theory – only three known studies have examined the relation between mindfulness and social functioning (Burpee & Langer, 2005; Carson, Carson, Gil, & Baucon, 2004; Reibel et al., 2001). These studies, which focused on adult

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clinical populations and couples, suggest that mindfulness generally improves social relations and increases marital satisfaction. However, due to methodological problems (discussed later), the results remain tentative. In sum, no known study has investigated the relation between mindfulness and interpersonal relations in early adolescents.

The third assertion yet to receive empirical support is that mindfulness is not limited solely to meditators, but rather is a naturally occurring phenomenon (Bishop et al., 2004; Brown & Ryan, 2003; Kabat-Zinn, 2003). To the extent that mindfulness depends on the ability to simultaneously *observe* and *experience* internal experience, meta-cognition (Flavell, 1979) has been argued to be fundamental to mindfulness (Bishop et al., 2004). Metacognitive skills, however, are not inherent to childhood (Gelman, 1979). Rather, they emerge during the early adolescent period (Inhelder & Piaget, 1958). Thus, the capacity for mindfulness is thought to emerge during this period as well. This point has not been addressed by extant mindfulness-related studies with adolescent populations, which are theoretical (Verni, 2001) or examine outcome with older adolescent clinical populations (Flinton, 1998; Miller, Wyman, Huppert, Glassman, & Rathus, 2000). In sum, mindfulness as a naturally occurring phenomenon has not been investigated with early adolescents.

The present study was designed to examine the above gaps in the mindfulness literature. That is, the MAAS (Brown & Ryan, 2003) was adapted for early adolescent populations to determine the extent to which: (a) *trait* (dispositional) mindfulness is associated with or moderates between trait perceived stress, trait emotion, and peer relations; (b) trait mindfulness predicts *state* (momentary) mindfulness, state stress, and state emotion; (c) trait mindfulness predicts variability in state mindfulness, state

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perceived stress, and state emotion (insofar as these may be considered indicators of the stability/lability of internal experience, mindfulness is thought to stabilize internal experience); (d) state mindfulness is associated with or mediates between state stress and state emotion. This chapter is organized into five sections. The first four sections review the relevant areas of the literature (i.e., stress, emotion, mindfulness, peer relations). In the fifth and final section, the conceptual and empirical intersection of these areas is examined, and the rationale and hypotheses specified.

<u>Stress</u>

Stress is pervasive in everyday living. According to Statistics Canada, the cost of stress-related losses in workplace productivity was estimated to be in excess of 3.5 billion CAN annually in Canada (Duxbury & Higgins, 2001). In the United States, the equivalent figure was estimated at 17 billion USD annually (Taylor, 1995). Stress is associated not only with everyday events such as driving in traffic, managing a busy schedule, or experiencing joy (Selye, 1950, 1956/1976), but also with serious diseases such as hypertension (Fredrikson & Matthews, 1990; Shapiro & Goldstein, 1982), heart disease (Treiber et al., 1993), substance abuse (Baer, Garmezy, McLaughlin, Pokorny, & Wernick, 1987; Brennan & Moos, 1990), anxiety (Jacobson, 1978), depression (McGonagle & Kessler, 1990), gastrointestinal disorders (Whitehead, 1992), and immunological consequences (Glaser, Kiecolt-Glaser, Marucha, MacCallum, Laskowski, & Malarkey, 1999). Moreover, increasingly large numbers of young people are faced with stressful events including traumatic events (e.g., natural and human disasters, victimization, neighbourhood violence), chronic strain (e.g., poverty, personal or parental

chronic illness, chronic maltreatment or neglect), and daily hassles (e.g., transition to a

new school, death of a family member) (Grant & Compas, 2003).

In light of these consequences, it is not surprising to find a substantial body of

research devoted to stress and coping strategies. Insofar as early conceptualizations

provide context for contemporary ones, the development of thought in this field is

reviewed. Early conceptualizations of stress were influenced by the efforts of several

notable researchers. Cannon (1914) noted that, during affective states, a number of body

regions are activated. He held that the "autonomic system" was divided into antagonistic

sub-systems – the sympathetic and parasympathetic nervous systems. Moreover, he

posited that these subsystems are activated as a whole rather than in parts. Alexander

(1939) asserted that pathology can be due: (a) not only to local anatomical causes, but to

general disturbances as well; and (b) not only environmental causes, but also internal

causes such as faulty functioning, overstress, or emotions that arise during everyday

living. Cannon (1939) coined the phrase "homeostasis" to refer to the body's ability to

maintain a relatively constant condition. He contended that disease results from

exceeding the body's homeostatic limits for self-regulation and self-repair.

Through observation of combat soldiers, Grinker and Spiegel (1945) noted

individual differences in the threshold for stress-induced personality transformation. They

reported that physical stress was most seriously exacerbated by emotional stress, and that

the ability to control one's "load of apprehension" was crucial to combat success. In

contrast to those suffering from "neurotic symptoms," more psychologically stable

individuals were able to withstand more stress. In sum, Grinker and Spiegel introduced

personality factors into the conceptualization of the consequences of stress.

The term *stress* was popularized by Hans Selye (1950). He characterized stress in terms of a generalized physiological response, the General Adaptation Syndrome (GAS). Through this mechanism, the organism attempts to maintain fitness in the face of challenges or threats inherent to living. Selye reported that, when efforts to respond or adapt to stressors were inadequate or dysregulated, *diseases of adaptation* occurred. Whereas health and happiness depend upon successful adjustment to ever changing circumstances, Selye concluded, disease and unhappiness stemmed from inadequate or unsuccessful efforts to adapt.

Although stress cannot be avoided, Selye (1956/1976) asserted, its damaging side-effects can be minimized in several ways. First, perception influences whether the response is one of eustress or distress (i.e., "good" or "bad" stress). The effect of the stressor, therefore, depends not so much on the situation as "the way we take it" (p. 370). Second, self-awareness has a "curative value" insofar as recognizing "danger signs" that correspond to the malfunctioning of more vulnerable part(s) of one's constitution enables the person to know when to stop or change activities. Finally, Selye recommended periodic relaxation involving a state of diminished physical activity and mental alertness.

Lazarus and colleagues elaborated on the role of appraisal in the stress response. Lazarus and Alfert (1964) randomly assigned participants to one of three conditions, in which perceived threat was manipulated to varying degrees, and showed a film of a tribal circumcision ritual. In one condition (silent film condition), the circumcision was presented without a soundtrack. In the second condition (denial commentary condition), a short denial introduction preceded the film, and a denial-based commentary accompanied the film. In the final condition (denial orientation condition), the same short denial

introduction preceded the film, and the film was presented in silence. Two key findings emerged. First, in contrast with the no-soundtrack condition, participants who heard the soundtrack had less physiological activation, and rated their mood as more pleasant. This finding suggested that appraisal does, indeed, influence perceived threat. Second, based on participants' denial scores, participants were categorized as *low deniers* or *high deniers*. As compared to low deniers, high deniers had: (a) lower ratings of anxiety, depression, and tension; and (b) higher physiological activation. This finding demonstrated that whereas *high deniers* admitted to less mood disturbance, their autonomic measures indicated greater reactivity (in effect, confirming their "high denier" categorization). These findings confirmed the importance of appraisal, and suggested that denial may exacerbate the physiological symptoms of stress.

Lazarus (1966) also outlined a framework for stress-related appraisal. He contended that appraisal is anticipatory, depends on cognitions (e.g., learning, memory, judgment), and produces the stress reaction when the stimulus is appraised as threatening. Which stimuli are deemed threatening depends on a number of factors (e.g., individual motives, beliefs about the environment, beliefs about the future, perceived coping ability, intelligence). Finally (and arguably most importantly), he noted that since appraisal follows the sense perception, one's appraisal can only be known as a separate process once the individual becomes aware of it. In sum, Lazarus underlined the importance of the following elements of stressful experiences: (a) appraisal of the situation (primary appraisal); (b) appraisal of one's capacity to respond (secondary appraisal); and (c) one's attempt to manage the troubled organism-environment relation that bred the stress.

Seligman (1968) added to the understanding of appraisal. Based on experiments with rats subjected to shock, (Seligman, 1968; Seligman & Meyer, 1970) he found that the prediction of safety was as important as the prediction of danger. When a reliable predictor of shock was present, rats knew when to anticipate shock (and also when it was unlikely -- i.e., a safety signal), and were therefore not chronically fearful. Fear was found to disrupt adaptive behaviour (e.g., bar-pressing for food). That is, rats that received the safety signal temporarily suppressed behaviour, whereas those that did not stopped bar pressing altogether for the duration of the shock sequence (suggesting that chronic fear interfered with adaptive behaviour). Moreover, many of the rats in the latter group developed stomach ulcers, and lost weight. In a later study (Seligman, Maier, & Solomon, as cited in Seligman & Meyer), animals and humans alike chose predictable over unpredictable shock, and humans reported that unpredictable shock hurts more. The upshot of this work is that the *unpredictability* of aversive stimuli is a stressor in itself and may exacerbate the already deleterious physiological effects of stress.

In 1974, Selye made another important contribution to the stress literature. He observed that the intensity of the body's nonspecific response to stress depends upon the *overall* demand for adaptation. He likened the intensity of the nonspecific response to the demand for electricity – that is, with each additional household appliance simultaneously in use, the demand for electricity increases. A corollary is that when a person is already feeling anxious or vulnerable, the threshold at which additional events provoke stress is lowered. In this way, elements of internal experience (e.g., thoughts, emotions) alter the stress threshold, and thereby alter one's perception of ongoing external events. Moreover, even in the absence of external stressors, internal events can produce stress (e.g., when

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ruminating about negative past events or future outcomes. In keeping with Selye's (1974) conceptualization, Folkman and Lazarus (1985) defined stress as, "... a relationship between the person and the environment that is appraised by the person as relevant to his or her well-being and in which the person's resources are taxed or exceeded" (p. 152). Accordingly, stress could refer to the threatening event itself or the associated anticipatory, concomitant, or ensuing emotional or cognitive experience. In sum, stress results from the overall demand for adaptation (i.e., allostatic load) and depends on the interplay of internal and external factors.

Physiological response to stress. Although the physiological component of the stress response was not measured in the present study, this response is important inasmuch as present-moment awareness influences the process by which it unfolds. In brief, the physiological response to stress is characterized by activation of the Hypothalamus-Pituitary-Adrenal (HPA) axis and the Autonomic Nervous System (ANS). During stressful conditions, the HPA axis activates the ANS by way of a cascade of hormones that act on target organs and tissues. The ANS, comprised of the sympathetic and parasympathetic systems, regulates the activity of these organs and tissues to meet physiological demands. Activation of the sympathetic nervous system consists of a coordinated response that prepares the organism to fight or flee. Resources (e.g., oxygen, glucose, hormones) are rapidly deployed to skeletal muscle to maximize the likelihood of survival. The parasympathetic system produces a response counter to that of the sympathetic system. Together, these systems homeostatically regulate activation according to current physiological needs.

In keeping with this model of physiological response to stress, Green and Green (1977) proposed a multi-step conceptual framework (see Figure 1). An external event elicits cognitive and affective responses that affect the limbic system (i.e., an emotional centre discussed subsequently), which by way of the HPA axis produces a physiological response (internal event) (Arrows 1 to 4). If the physiological response is detected through sensory perception (Arrow 5), then Arrows 6 and 7 come into play, resulting in a "new" limbic response. This response, in turn, modifies the signals transmitted along Arrows 3 and 4. Thus, a cybernetic loop (i.e., control through feedback, see Carver & Scheier, 1990) is completed, and the system is brought homeostatically under partial control. Moreover, by practicing directing one's attention to ongoing internal events, a person's sensitivity to INS events becomes sufficient to maintain self-regulation skills. As a result, Arrow 8 develops, followed by the development of arrows 9 and 10. Green and Green therefore argued that by regularly bringing awareness to internal events (i.e., state mindfulness), the pathways associated with arrows 9 and 10 are strengthened, resulting in increased direct perception (i.e., increased trait mindfulness).

In brief, both pathways (Arrows 5 and 6; Arrows 9 and 10) ultimately provide input (feedback) to the autonomic domain, the pathway followed impacts the functioning of the person (Green & Green, 1977). Through conscious awareness of normally unconscious internal events (i.e., bodily sensations, and by extrapolation thoughts and emotions) (Arrow 9), Green and Green argued, a new emotional response is generated: a response to normally unconscious internal information (Arrow 10). This new emotional response is associated with a (electrophysiological) limbic response, which then combines with or replaces the original limbic response (Arrow 2). This new *limbic* response

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Normally-conscious voluntary domain – Cortical and craniospinal
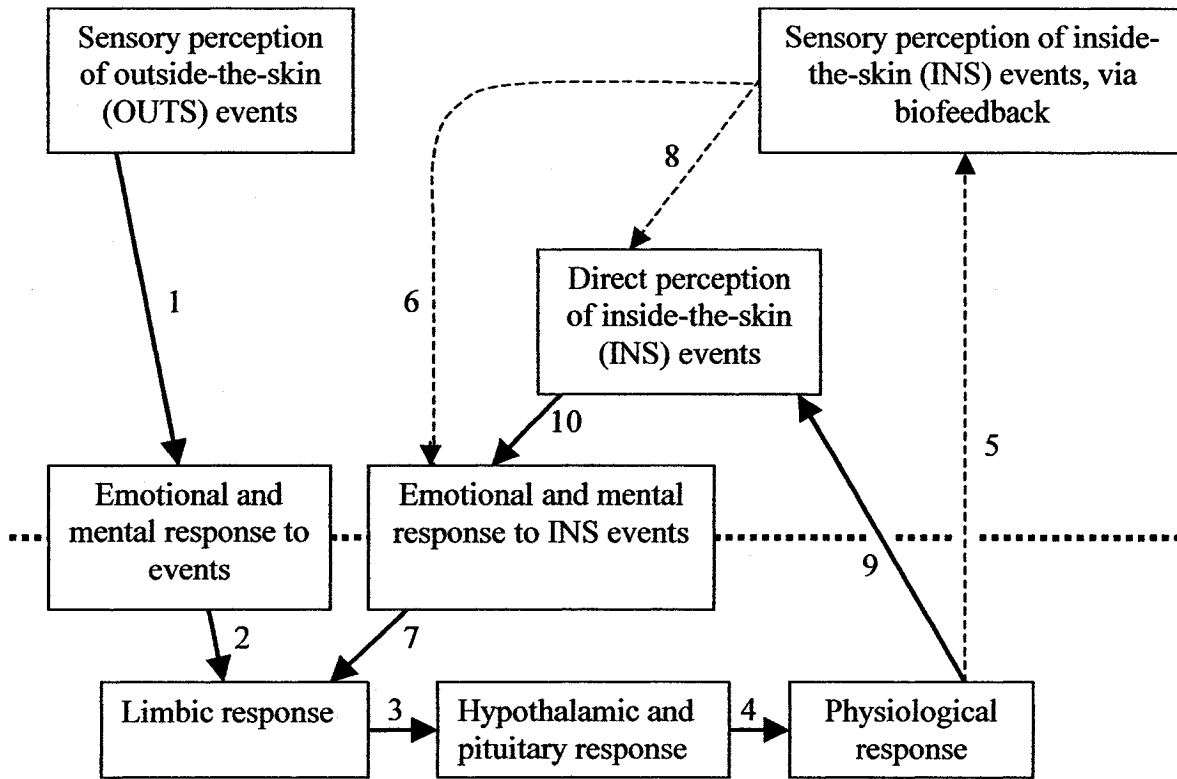
Figure 1. Operational diagram of "self-regulation" of psychophysiological events

and processes (Green & Green, 1977, p. 47).

produces a new pattern of hypothalamic firing and pituitary secretion, and a new physiological state. In this way, a conscious feedback loop of internal events results in new or altered physiological responses. Further, when conscious awareness is brought to internal events, everything that is learned is learned with feedback of some kind to the cortex, suggesting that insight into one's internal processes may be fostered. Within the ANS, feedback is normally not available – a handicap in attempting to self-regulate. However, insofar as feedback arising from an awareness of internal events can be likened to the visual feedback obtained from looking through the windshield when driving a car, Green and Green concluded, an awareness of internal events puts the person in a better position to regulate aspects of autonomic functioning. The upshot of Green and Green's (1977) work is that developing an awareness of physiological states can be similarly applied to other internal events such as emotion and cognition. That is, by developing an awareness of ongoing emotional and cognitive experiences, these inner events can be observed in real time.

Diathesis stress models of psychopathology. Maladaptive responses to stress have been found to be associated with not only deleterious physical consequences, but also with various forms of psychopathology (e.g., anxiety, depression). Factors that predispose a person to stress have been described in several *diathesis-stress* models of psychopathology (Zuckerman, 1999). These models suggest that particular factors (i.e., diatheses) predispose the individual to vulnerability and reactivity to stressors and stress. Thus, a diathesis (e.g., the emotion regulation strategy used) influences how one responds to stress, and is a requisite antecedent to the development of a disorder. Most diathesis-stress models suggest that a diathesis alone is not sufficient to provoke the onset of a

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disorder – *predisposing factors* are also necessary. The predisposing factor renders the diathesis pathogenic. One of the most frequently cited predisposing factors is stress.

Protective and risk factors. A number of protective and risk factors have been identified. In children and adolescents, the most widely acknowledged factors are: positive personality dispositions (e.g., flexibility of response, internal locus of control, friendly and well-liked by peers and adults), family factors (e.g., cohesion, warmth), and an external agency (e.g., at least one adequate identification figure, encouraging school environment – teachers, peers) that functions as a support system for the child's coping efforts (Garmezy, 1983). Risk factors include contextual factors such as family characteristics (e.g, marital discord, low socioeconomic status, large family size with overcrowding, paternal criminality, maternal psychiatric disorder, and admission of the child into the care of local authority) that increase the incidence of psychiatric disorder in children (Rutter et al., as cited in Garmezy).

Another factor that may act as a protective factor is the *way* one responds to one's internal reaction to the event (Kabat-Zinn, 1990). That is, the degree of stress experienced is a direct consequence not only of the event and how it is perceived, but also of the way events are dealt with. Thus, in a manner consistent with Green and Green's (1977) model, Kabat-Zinn asserted that the first step in successfully dealing with stressful events is inwardly recognizing when one is stressed. This perspective is in keeping with the body of work on *stress hardiness* (Kobasa, 1979; Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Kahn, 1982; Kobasa & Puccetti, 1983), which asserts the importance of predictability and perceived *control*. In sum, by being aware of and able to predict

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one's response to a stressor, a measure of control over one's response is afforded, and the person is thereby able to influence subsequent outcomes.

Coping. Coping refers to self-regulation in the face of stress, and has been identified with a broad range of behaviours including nonemotional actions taken to achieve nonemotional ends (e.g, time management, replacing the batteries of a flashlight, buying a map to navigate a new city) (Edwards, 1984). Consequently, efforts have aimed at increasing the conceptual clarity of coping, and developing finer-grained distinctions among heterogeneous organism-environment interactions (Davidson, 1992; Ekman, 1992). Although many dimensions of coping have been proposed to account for different types of responses, among the more widely known dimensions are: *emotion-focused* (i.e., internally oriented), *problem-focused* (i.e., externally oriented), *behaviour regulation* (Eisenberg, Fabes, & Guthrie, 1997; Lazarus & Folkman, 1984), *engagement* (i.e., approach orientation), and *disengagement* (i.e., cognitive or behavioural avoidance) (Compas et al., 2001). Emotion-focused and engagement coping are central of the present study. Coping is discussed further as it pertains specifically to early adolescence in the final section of this chapter.

Emotion

"Emotions are short-lived psychological-physiological phenomena that represent efficient modes of adaptation to changing environmental demands. Psychologically, emotions alter attention, shift certain behaviors upward in response hierarchies, and activate relevant associative networks in memory. Physiologically, emotions rapidly organize the responses of disparate biological systems including facial expression, somatic muscular tonus, voice tone,

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autonomic nervous system activity, and endocrine activity to produce a bodily milieu that is optimal for effective response. Emotions serve to establish our position vis-à-vis our environment, pulling us toward certain people, objects, actions and ideas, and pushing us away form others" (Levenson, 1994, p. 123).

The study of emotion has presented a number of conceptual challenges. Central among these have been: developing a consensual emotion-generative process model and a consensual operational definition, elucidating the *raison d'être* (function) of emotion, and investigating the consequences of varied emotion regulation strategies. The aforementioned quote by Levenson (1994) speaks to most of these challenges. This section reviews the emergence of contemporary conceptualizations of emotion to the extent that they bridge the conceptual gap between the stress and coping literature, and the mindfulness literature.

Process model. Contemporary definitions of emotion are based upon the underlying generative process. It is therefore incumbent to summarize the development of the contemporary emotion-generative process model. Among the first scientific psychologists to investigate emotion was James (1884, 1894/1994). He held that emotion arises from bodily state and cognition, which together transform the percept, "from an object-simply-apprehended into an object-emotionally-felt" (1884, p. 203). James' conceptualization was challenged by Cannon (1914), who contended that cognition is a more important determinant of emotion than bodily state.

Debate (e.g., Lazarus, 1984; Zajonc, 1984) has refined conceptualizations of the emotion-generative process. Whereas Lazarus held that cognition is a necessary precondition of emotion, Zajonc argued for the primacy and independence of emotion. To

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bolster his argument, Zajonc cited instances when cognition was obviated as a precondition of emotion (e.g., separate neuroanatomical structures for affect and cognition in the mammalian brain; automatic reactions to visual, olfactory, or gustatory stimuli; fixed action patterns in newborns). In sum, the main upshot of this debate was that, while for most stimuli the percept-emotion relation is mediated by cognition, for a limited subset of stimuli, cognition appears to be "short-circuited" by pre-programmed emotional reactions.

More recently, increasingly fine-grained conceptualizations of emotion have emerged. These conceptualizations distinguish between emotion and other internal experiences (Lang, 1995) such as reflex and startle (Ekman, 1984; Keltner & Gross, 1999), and mood (Ekman; Fridja, 1986). Further, new aspects have been added to the emotion-generative process model (Davidson, 2000; Teasdale, 1993). For example, Teasdale observed that individuals sometimes experience emotional reactions without being able to identify cognitions proportionate to the intensity of the reactions. By way of explanation, Teasdale cited Bowers' (1981) associative network theory of mood and memory, which states that: (a) past events that are consistent with our current mood become more accessible in memory, and (b) the concepts previously used to interpret these events are more likely to be used to interpret ongoing events. Thus, emotion was distinguished from internal experiences of shorter or longer duration (i.e., reflexes, mood), and interactions between emotion and these experiences (e.g., the effect of mood-induced memories and cognitions on emotion) were advanced.

The emotion-generative process has most recently been conceptualized from a systems perspective (Keltner & Gross, 1999; Levenson, 1999). Emotions are accordingly

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thought to result from the interaction between emotion response systems and the physical and social environments. Levenson proposed a two-system model for emotion, wherein the two systems complement each other and serve divergent functions. The first system, the *core system*, consists of a simple, durable, and efficient "processor" designed early in evolution. Its purview is limited to coping with situations with profound implications for the organism's immediate well-being and long-term survival (Ekman, 1992; Lazarus, 1991; Levenson, 1994). The core system operates in highly predictable and automatic ways (Zajonc, 1984). It is considered largely hard-wired and therefore incapable of major functional modification in response to experience. Since contemporary life seldom involves clear-cut primordial threats, but rather many smaller threats (i.e., during everyday interaction), however, it stands to reason that full-scale mobilization of the core system is necessarily best limited to critical situations. Herein lies the function of the second system.

The second system, *control mechanisms*, is thought to surround the core and consist of a more recently evolved, flexible, and less predictable set of mechanisms designed to interact with the core system (Levenson, 1999). In contrast to the core system, control mechanisms can be modified through learning, their operating parameters becoming increasingly fine-tuned across much of the lifespan. Control mechanisms exert their influence in two ways. First, they modify input to the core system (e.g., altering attributions), and thereby reduce the likelihood of a match with a prototype that activates the core system (Lazarus, 1991). Second, when an event matches the prototype for an emotion (Russell, 2003) and the associated response tendencies are activated, control mechanisms act on output from the core system, intercepting its tendency to respond in a

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stereotyped way to events that sufficiently match prototypic situations (Hochschild, 1979). For example, a driver lessens the importance of quickly getting through traffic so that, when another car cuts in front, the prototype for having been cheated (i.e., input side) is no longer matched. Alternately, the driver may become angry with the cheating motorist, and (hopefully) removes his or her foot from the accelerator to prevent ramming the offender's car (i.e., output side). In sum, control mechanisms are thought to act on input and/or output from the core system, and thereby modulate between response tendencies and resulting behaviours.

Despite the complicity of these two systems, there are invariably times when people (or their close ones) are left wondering what came over them. Goleman (1995) termed these occasions of *emotional hijacking*. To account for these occasions, he described three parts of the brain – the brainstem, the emotional centres (limbic system), and the neocortex – that interact to produce emotion (see Izard, 1993 and LeDoux, 1996 for detailed models). During an emotional hijack, an emotional centre (i.e., the amygdala) declares an emergency and recruits the rest of the brain to its agenda more quickly than the neocortex (specifically, the pre-frontal cortex) can respond. Insofar as "passions" (e.g., fear, rage) originate in the amygdala and control mechanisms in the prefrontal cortex (Ekman & Davidson, 1994; LeDoux, 1993), the amygdala and prefrontal cortex may be considered central elements in Levenson's (1999) core system and control mechanisms, respectively. However, much as contemporary conceptualizations suggest that control mechanisms exist at higher cortical levels and act downward on lower brain centers, this does not represent the whole picture. That is, where emotion is concerned, control must also be applied in an upward direction, Levenson argued, in order for

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thought and behaviour to be interrupted and replaced by a response package associated with an activated emotion (e.g., while hiking, ensconced in pleasant thought, and happening upon a bear). In sum, during emotional hijacks, the core system is set in motion more quickly than control mechanisms, neocortical (downward-acting) or limbic (upward-acting) in origin, can act to prevent a full-blown response.

Emotional hijacks are of particular consequence since they lead to distress and emoting in a manner detrimental to social functioning (Goleman, 1995). In fact, insofar as the prefrontal cortex-amygdala circuit is responsible for harmonizing thought and emotion (Davidson, Jackson, & Kalin, 2000), damage to this circuit has been shown to predict impulsivity and insensitivity to the future consequences of one's actions (Adolphs, Gosselin, & Buchanan, 2005; Anderson, Damasio, & Tranel, 2001; Bechara, Damasio, & Damasio, 1994; Bechara, Tranel, & Damasio, 2000). Conversely, individuals with more harmonized emotion and thought processes are thought to be: better at detecting and managing their emotions, more able to identify and deal effectively with others' feelings (Adolphs et al., 2005; Goleman, 1995), more emotionally adjusted, more empathic, more popular, more outgoing, and more sensitive (Nowicki & Duke, as cited in Goleman). Individuals whose emotion and thought processes are more harmonized have been described as more emotionally intelligent (Goleman, 1995; Mayer, Salovey, & Caruso, 2004), and have been shown to engage more effectively in their social interaction (Mayer et al., 2004). In sum, people who are more aware of their emotions, are thought to not only generally learn more about themselves in various situations (e.g., emotions, motivations), but also understand more about others' emotions and thereby function more effectively during social interaction.

Finally, two major findings in the area of activation of the left and right prefrontal cortices have been uncovered. First, asymmetrical activation has been found to correlate with: positive and negative emotional states; and, individual differences in the predisposition to positive emotion, negative emotion, and a stress diathesis (see Davidson, 2000, for a review). Second, recent findings also suggest that the prefontral cortex-amygdala axis is a site of plasticity in the brain (Bauer, LeDoux, & Nader, 2001; Schafe, Nadel, Sullivan, Harris, & LeDoux, 1999). These are encouraging data insofar as, despite stable individual differences in activation patterns within this axis, individuals who regularly and consistently practice more healthy, novel emotion regulation strategies may well be able to improve their emotion regulation ability, improve their social functioning, and decrease their stress.

Functions. There has been considerable division among social scientists as to what functions, if any, emotions serve. Contemporary notions stem from various traditions, and have culminated in three major perspectives (Keltner & Gross, 1999). At one extreme is the position advocated by the Stoics and European rationalist perspective – emotions serve no useful function, but rather disrupt ongoing activity, disorganize behaviour, and lack the rationality and orderliness of cognitive processes (Hebb, 1949; Mandler, 1984). A second perspective holds that emotions once served functions consistent with the environment in which much of human evolution took place, but are no longer adaptive in present-day environments (Buss, Haselton, Shackelford, Bleske, & Wakefield, 1998). This view is evident in the writings of Darwin (1872), Freud (Freud & Strachey, 1930/1961), and Skinner (1948). The third perspective, which is the conceptual opposite to the first, stems from an evolutionary perspective. Most researchers support

this perspective, and agree that emotions are time-tested solutions to adaptive problems that serve clearly specified intraorganismic and interpersonal functions (Averill, 1994; Ekman, 1992; Keltner & Gross, 1999; Keltner & Haidt, 1999; Lazarus, 1991; Levenson, 1994, 1999; Tooby & Cosmides, 1990). For example, emotions serve intraorganismic functions such as: tailoring cognitive style to situational demands, facilitating decision making, preparing the individual for rapid motor responses, and promoting learning. With regard to social functions, emotions: provide information about behavioural intentions, give clues as to whether something is good or bad, and help to flexibly script complex social behaviour. The present investigation is written from a standpoint consistent with this third perspective.

Emotion regulation. "Refuse to express a passion, and it dies. Count ten before venting your anger, and its occasion seems ridiculous" (James, 1884, p. 197). In the time since James' seminal work, conceptualizations of emotion regulation have changed substantially. One tradition that has contributed to this change is the stress and coping literature (Gross, 1999). Emotion regulation has therefore emerged as a subset of coping (i.e., emotion-focused coping) (Gross, 1998). Emotion regulation has been found associated with a number of outcomes including mental health (Barlow, 1991), psychopathology (Vaillant & Drake, as cited in Gross, 1998), and negative interpersonal sequelae (Bechara et al., 1994). In sum, emotion regulation emerged from the stress and coping literature.

With regards to its operational definition, two distinctions bear mentioning to address ambiguity. First, emotion regulation does not refer to how emotions regulate something else, but rather refers to "the heterogeneous set of processes by which

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emotions are themselves regulated" (Gross, 1998, 1999). Second, emotion regulation as a means of influencing one's own emotions (e.g., stifling laughter at a formal ceremony) is considered distinct from emotion regulation as a means of influencing others' emotions (e.g., suggesting to someone that they "Always look upon the bright side of life"). In the present study, emotion regulation was concerned with individuals' attempts to regulate their own emotions.

Emotion regulation has been recently characterized as an interaction between the core system and control mechanisms (Levenson, 1999). As such, emotion regulation occurs when instinctual impulses (core system) are combined with an understanding of the meaning of events, their consequences, and the appropriateness of emotion-related behaviours (control mechanisms).

> Emotion regulation refers to the lifelong process of working out an etiquette of action and interaction between the two emotion systems .... allowing the core system sufficiently free reign so that it can serve its basic adaptive functions, while maintaining sufficient controls so as to minimize the potential negative effects (and maximize the positive effects) that unrestrained emotions can have on the individual and others (Levenson, 1999, p. 491).

Emotion regulation has been investigated in terms of its consequences for psychological and physical health. The consequences of emotion regulation reported for these two facets of health, however, have at times been at odds (Gross, 1998). For example, Lazarus and Alfert's (1964) aforementioned study of the stress response in viewers of a filmed circumcision ritual revealed that, whereas cognitive strategies (i.e., denial, thought suppression) reduced the average stress response, individuals categorized

as high deniers *reported* less subjective discomfort yet *experienced* greater autonomic reactivity than low deniers. These preliminary results suggested that while particular cognitive strategies may result in subjective benefits for psychological health, they may be deleterious to physical health.

Other emotion regulation strategies have also been argued to harm physical health. First, *chronic inhibition* of emotion (*emotion suppression*) has been hypothesized to lead to a number of physical disorders (Alexander, 1939, 1950; Halliday, 1937). One hypothesis that has withstood empirical scrutiny is that chronic hostility and anger inhibition are linked to hypertension and coronary heart disease (Friedman & Booth-Kewley, 1987; Manuck & Krantz, 1986; Smith, 1992). Similarly, suppression of disgust was found associated with acute increases in sympathetic activation (Gross & Levenson, 1993, 1997). Moreover, Gross and Levenson (1997) replicated Lazarus and Alfert's (1964) finding that emotion suppression increased activation of elements of the sympathetic nervous system (i.e., a metabolic cost was exacted). Second, *experiential avoidance* – wherein elements of experience are ignored, distorted, or forgotten – can negatively impact physical health insofar as: (a) paradoxical processes are activated (Wegner, 1994); and, (b) opportunities to develop self-knowledge are foregone (S. C. Hayes, Wilson, Gifford, Follette, & Strosahl, 1996), leaving the individual less able to predict and control his or her own behaviour. To the extent that unpredictability and uncontrollability exacerbate stress (Seligman, 1968), which in turn contributes to pathogenesis (Zuckerman, 1999), experiential avoidance can be detrimental to physical health. Third, *rumination* (Nolen-Hoeksema, 1991; Nolen-Hoeksema, Morrow, & Fredrickson, 1993) in response to depressed mood may interfere with the maintenance of

simple instrumental behaviours such as caring for one's health, and may therefore adversely impact physical health (Kuhl, 1981). Fourth, with the exception of benign forms of distraction (e.g., playing basketball with friends), other forms of *distraction* (e.g., drug use, fighting, reckless driving) are maladaptive and can be detrimental to one's health (Nolen-Hoeksema et al., 1993). In sum, this corpus of literature underlines the importance of the emotion regulation strategy chosen.

In order to account for the diverging sequelae of emotion regulation on psychological and physical health, Gross (1998) held that there are two classes of emotion regulation. One class includes strategies that manipulate input to the core system (i.e., *antecedent-focused* emotion regulation). The other class encompasses strategies that manipulate output from the core system (*response-focused* emotion regulation). In order to substantiate this claim, Gross randomly assigned participants to three conditions: *control*, *reappraisal* (i.e., antecedent-focused emotion regulation), or *suppression* (i.e., response-focused). Their behavioural, subjective, and physiological responses to two films – one designed to be neutral, the other to elicit disgust – were then compared. Relative to the control condition, those in the reappraisal condition showed fewer behavioural and subjective manifestations of emotion, and no difference in physiological responding. Moreover, relative to the control condition, those in the suppression condition showed fewer expressive behaviours, no difference in subjective experience, and greater physiological responding. These findings support the contention that, in contrast to antecedent-focused strategies, response-focused emotion regulation strategies exact a metabolic cost. Gross (1998) pointed out several caveats, however. First, antecedent-focused emotion regulation has its cost as well. For example, unrealistic

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reappraisal (at its extreme) is equivalent to denial, and though short-term relief from negative emotion may be produced, the long-term consequences of not engaging in adaptive behaviours (i.e., fight or flight) could be costly. Second, whereas no one emotion regulation strategy is likely to be superior to others across all situations, Gross argued, knowing how and when to use a particular strategy is crucial. Third, though any one response of increased autonomic activation is unlikely to produce deleterious consequences, when experienced repeatedly they may. Gross concluded that, "certain forms of antecedent-focused emotion regulation (e.g., reappraisal) often may be better for one's health than certain forms of response-focused emotion regulation (e.g., suppression)" (1998, p. 235).

Emotion regulation is considered an element of emotional intelligence (Mayer et al., 2004), and has been found to predict prosocial and positive behaviours. Emotion regulation involves monitoring and modifying one's emotional responses and/or expressive behaviours (Gross, 1998); persons who are more skilled at emotion regulation are therefore thought to experience less volatile negative emotion that is detrimental to social interaction. Indeed, emotion regulation has been found to be: positively related to self-perceived quality of interactions with peers (Lopes, Salovey, & Straus, 2003), friends (Lopes, Brackett, Nezlek, Schütz, Sellin, & Salovey, 2004), and members of the opposite sex (Lopes et al., 2004); positively associated with friends' reports of more positive interactions, less negative interactions, and higher emotional support (Lopes et al., 2003); and, negatively correlated with self-perceived negative interactions with close friends (Lopes et al., 2003). Thus, early adolescents who more optimally regulate their emotions appear to have more effective social functioning (i.e., more popular, more friends).

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An emerging perspective of emotion regulation suggests that a new approach is thought to be more beneficial (S. C. Hayes, Bissett, et al., 1999). Central to S. C. Hayes, Bissett and colleagues' thesis is the distinction between control and acceptance strategies. Control strategies seek to identify maladaptive evaluations and expectations, and replace them with more constructive conceptualizations. These strategies are therefore founded on the implicit belief that naturally occurring internal events are problematic and, unless regulated, improvement cannot occur or be maintained. Insofar as individuals believe internal events to be problematic yet continue to experience them, they may wrongly conclude that something is wrong with them. Conversely, acceptance strategies encourage individuals to experience emotions and bodily sensations more fully and without avoidance, and to observe cognitions without going along with, resisting, or investing belief or disbelief in them. Moreover, acceptance strategies focus on reducing the use of emotional reasons to explain behaviour (e.g., thoughts do not cause behaviour). The individual's concern, S. C. Hayes, Bissett and colleagues argued, therefore shifts from moderating emotions and thoughts to experiencing the consequences of one's actions. Thus, whereas control-based interventions focus on reducing aspects of internal experience (e.g., unpleasant emotions, cravings, or cognitive appraisals) as a means of producing overt behaviour changes, acceptance-based strategies detach inner experience from the control of behaviour by: (a) targeting the individual's intention to control internal experiences; (b) encouraging the perception of thoughts as nothing more than thoughts (i.e., Just because I think it doesn't make it true); and (c) teaching the individual to choose behaviours consistent with valued life changes. One approach to emotion regulation that involves acceptance is mindfulness.

Mindfulness

Though mindfulness has existed in the scientific literature for only three decades, its conceptual underpinnings can be traced back to over 2500 years ago (Austin, 1998). Moreover, to the extent that the number of studies on mindfulness (Murphy, Donovan, & Taylor, 1997) and number of sites offering interventions (Salmon, Santorelli, & Kabat-Zinn, 1997; Swenson, 2000) may be considered a gauge of interest, interest is growing rapidly. Mindfulness-related work has been carried out in a number of areas. Interventions have been elaborated (S. C. Hayes, Strosahl, & Wilson, 1999; Kabat-Zinn, 1982, 1990; Linehan, 1993; Roemer & Orsillo, 2002; Segal, Williams, & Teasdale, 2002). Outcome studies have examined the efficacy of these interventions relative to numerous physical and mental health problems including: anxiety (Easterlin & Cardeña, 1999; Kabat-Zinn et al., 1992; Miller, Fletcher, & Kabat-Zinn, 1995), depressive relapse (Ma & Teasdale, 2004; Teasdale, Segal, & Williams, 1995; Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000), generalized anxiety disorder (Roemer & Orsillo, 2002; Wells, 1999), post-traumatic stress disorder (Wolfsdorf & Zlotnick, 2001), eating disorders (Kristeller & Hallett, 1999), psychological distress (Astin, 1997; Brown & Ryan, 2003; Reibel et al., 2001; Speca, Carlson, Goodey, & Angen, 2000; Shapiro, Schwartz, & Bonner, 1998), borderline personality disorder (Linehan, Armstrong, Saurez, Allmon, & Heard, 1991), obsessive compulsive disorder (Schwartz, as cited in Kabat-Zinn, 2003), substance use (Marlatt, 2002; Marlatt, Pagano, Rose, & Marques, 1984), chronic pain (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985), fibromyalgia (Kaplan, Goldenberg, & Galvin-Nadeau, 1993), brain and immune function (Davidson et al., 2003; Kabat-Zinn et al., 1998), psoriasis (Bernhard, Kristeller, & Kabat-Zinn, 1988;

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Kabat-Zinn et al., 1998), and health-related quality of life (Reibel, Greeson, Brainard, & Rosenzweig, 2001; Shapiro, Astin, Bishop, & Cordova, 2005). Finally, process models have been proposed to account for mechanisms of action (Baer, 2003; Bishop, 2002; Kutz, Borysenko, & Benson, 1985; Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006; Shapiro, Carlson, Astin, & Freedman, 2006; Teasdale, Segal, & Williams, 1995).

Despite the growing interest and numerous new applications being evaluated, the mindfulness literature appears to be coming of age. Indeed, an increasing proportion of recent work has focused on conceptual reviews (Baer, 2003; Bishop et al., 2004; Brown & Ryan, 2004; Dimidjian & Linehan, 2003; S. C. Hayes & Shenk, 2004; A. M. Hayes & Feldman, 2004; S. C. Hayes & Wilson, 2003; Kabat-Zinn, 2003; Roemer & Orsillo, 2003; Scheel, 2000; Teasdale, Segal, & Williams, 2003) and empirical reviews (Baer; Bishop, 2002; Grossman, Niemann, Schmidt, & Walach, 2004). This review process has uncovered methodological problems in earlier outcome studies (Baer, 2003; Bishop, 2002; Grossman et al., 2004; Scheel, 2000), and conceptual quandaries yet to be resolved (Brown & Ryan, 2004; Bishop et al., 2004; S. C. Hayes & Wilson, 2003). These caveats notwithstanding, recent meta-analyses (Baer; Grossman et al.) suggest that, Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990) holds promise and warrants further investigation. Moreover, Baer reported medium-sized and larger posttreatment and follow-up effect sizes (Cohen, 1988). Grossman et al.'s meta-analysis, which differed in terms of inclusion criteria and strategy, similarly reported medium posttreatment effect sizes. One shortcoming of these meta-analyses, however, is that, whereas they claim to distinguish between studies that control for nonspecific effects of mindfulness interventions (e.g., social support, demand characteristics, expectancy beliefs) and those

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that do not, this is not as yet possible since no extant outcome study has isolated and evaluated the *pure* mindfulness component of an intervention (Dimidjian & Linehan, 2003).

With regard to other mindfulness interventions, preliminary randomized controlled trials appear promising. Mindfulness-Based Cognitive Therapy (MBCT) was found more effective than treatment-as-usual (TAU) in preventing the relapse/recurrence of depression (Ma & Teasdale, 2004; Teasdale et al., 2000; Williams, Teasdale, Segal, & Soulsby, 2000). Dialectic Behavioral Therapy (DBT) has been found to be associated with more pronounced decreases in the frequency and medical risk of parasuicidal behaviour than TAU (Linehan et al., 1991; Linehan et al., 2006; Scheel, 2000). Studies of Acceptance and Commitment Therapy (ACT) have found preliminary evidence to suggest its efficacy in the treatment of multiple problems (Dahl, Wilson, & Nilsson, 2004; Gaudiano & Herbert, 2006; S. C. Hayes et al., 2004; Twohig, Hayes, & Masuda, 2006; Woods, Wetterneck, & Flessner, 2006). In sum, though recent reviews have uncovered methodological and conceptual problems, they have also spurred on a new generation of rigorous investigation that has resulted in most mindfulness interventions receiving the "probably efficacious" designation (Baer, 2003; Scheel, 2000; Task Force on Promotion and Dissemination of Psychological Procedure, 1995).

In terms of conceptual quandaries and empirical gaps in the mindfulness literature, three remain: whether mindfulness is a state (Bishop et al., 2004) or both state and trait (Brown & Ryan, 2004), whether mindfulness is naturally occurring (Brown & Ryan, 2003) or cultivated exclusively through formal practices (e.g., meditation, yoga) (Buchheld et al., 2001), and whether mindfulness produces benefits for social

functioning. Finally, despite substantial efforts to develop a single, widely endorsed

measure of mindfulness (Baer, Smith, & Allen, 2004; Bishop et al., 2003; Brown &

Ryan, 2003; Buchheld, Grossman, & Walach, 2001; Cardaciotto, 2005; Walach,

Buchheld, Buttenmüller, Kleinknecht, &Schmidt, 2006), consensus has yet to be reached.

The present section reviews three areas of the mindfulness literature (i.e., operational

definition, mechanisms, remaining quandaries) insofar as they help elucidate these gaps.

Operational definition. As with the field itself, the number of conceptualizations

of mindfulness has burgeoned. Hanh (1976), a Vietnamese master, described mindfulness

as, "keeping one's consciousness alive to the present reality" (p. 11). Nyanaponika Thera

(1972), a modern Buddhist monk, characterized mindfulness as a "clear and single-

minded awareness of what actually happens to us and in us, at the successive moments of

perception" (p. 5). Kabat-Zinn (2003), a leading scientist-practitioner, summarized

mindfulness as: "the awareness that emerges through paying attention on purpose, in the

present moment, and nonjudgmentally to the unfolding of experience moment to

moment" (p. 146). Finally, Langer (2000), the foremost mindfulness researcher in social

psychology, defined mindfulness alongside its counterpart, mindlessness: "Mindfulness is

a flexible state of mind in which we are actively engaged in the present, noticing new

things and sensitive to context" (p. 220). Conversely, mindlessness occurs, "When … we

act like automatons who have been programmed to act according to the sense our

behavior made in the past, rather than in the present" (p.220). Langer's conceptualization

stands in contrast to others', however, insofar as it: (a) is not based upon Eastern

philosophy; (b) focuses on cognitive operations on perceptual inputs exclusively from the

external environment; and (c) emphasizes active, goal-oriented cognitive tasks. In sum,

whereas all of these definitions point to the *intentionality, attention*, and *attitude* that

characterize the construct of mindfulness, their differences lead to conceptual cloudiness.

In addition to conceptual cloudiness, mensurational differences are also apparent

in the ways mindfulness has been operationalized (Baer, Smith, & Allen, 2004; Bishop et

al., 2003; Brown & Ryan, 2003; Buchheld et al., 2001; Cardaciotto, 2005; Walach et al.,

2006). One pronounced difference between scales resides in their factor structure.

Whereas a single factor (i.e., *attention/awareness*) was reported for some scales (Brown

& Ryan, 2003; Walach et al.), two factors (i.e., *attention/awareness* and *attitude*)

emerged for others (Bishop et al.; Cardaciotto;), and four factors emerged for other scales

yet again (Baer et al.; Buchheld et al.). In sum, empirical differences exist between extant

scales and point to the lack of a widely accepted measurement instrument.

Due to this conceptual and mensurational uncertainty, efforts have been redoubled

to clarify the construct. One notable effort was that by Sternberg (2000), who categorized

extant definitions, and proposed means of operationalizing them accordingly. Definitions

were categorized into three views: (a) mindfulness as cognitive ability (i.e., much as

individuals differ in intelligence or memory); (b) mindfulness as stable disposition (i.e.,

similar to traits such extraversion or neuroticism); and, (c) mindfulness as cognitive style

(i.e., a preferred way of thinking associated with one's personality). Morever, Sternberg

made several assertions about mindfulness. First, when conceptualized as a cognitive

ability, mindfulness closely resembles two abilities – the ability to pay close attention,

and the ability to attend to two tasks simultaneously. Second, mindfulness may be more

useful when conceptualized as a state than as a trait. That is, whereas people differ in

their average level of mindfulness (i.e., trait), the standard deviation of their mindfulness

(i.e., fluctuations in state), he contended, is more "interesting." Third, when viewed as a cognitive style, mindfulness represents a preferred way of using one's cognitive abilities in everyday living. Insofar as cognitive styles are traditionally conceptualized as an integration of personality and cognition, Sternberg held, mindfulness lies at the interface of personality and cognition. Finally, though mindfulness possesses characteristics consistent with all three views, it most resembles the latter – a cognitive style. In sum, the following assertions were made: (a) mindfulness is best tapped by the cognitive skill *attention*; (b) whereas both state and trait manifestations may exist, mindfulness seems more consistent with the former; and (c) mindfulness primarily constitutes a way of approaching everyday living that arises from the commingling of cognition (attention) and personality (attitude).

The operational definition of mindfulness can be further sharpened by examining what it is and contrasting it with what it is not. Mindfulness has been conceptualized as a particular quality of consciousness. To the extent that the quality of consciousness has implications for well-being, it has been emphasized by spiritual traditions and researchers alike (Austin, 1998; Tart, 1972). Consciousness encompasses both awareness and attention. *Awareness* can be likened to an evenly hovering "background radar" that constantly scans the internal and external environments in any given moment (Brown & Ryan, 2003). *Attention* results from focusing conscious awareness, and thereby increases sensitivity to a subset of environmental stimuli. Drawing from a well-known *figure-ground* visual illusion (i.e., two inward-facing white human facial profiles that share stimulus boundaries with a black vase, see Martin, 1997), attention and awareness can be considered intertwined such that attention extracts a "figure" from the "ground" of

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awareness. Moreover, although attention and awareness are typical of normal functioning, mindfulness is thought to be an enhanced attention to and awareness of real-time experience (Brown & Ryan, 2003).

In addition to being characterized in terms of attention and awareness (Bishop, 2002; Bishop et al., 2004), mindfulness has also been characterized in terms of two components – *self-regulation of attention*, and *orientation to experience*. Self-regulation of attention, they argued, involves: *sustained attention, attention switching*, and *inhibition of elaborative processing*. Sustained attention involves maintaining a state of vigilance over prolonged periods of time (Parasuraman, 1998). Skills are required to anchor attention in the present moment so that internal experience (e.g., thoughts, feelings, bodily sensations) may be observed as it arises in the stream of consciousness. When attention invariably wanders or becomes engaged in thoughts or emotions about the stimulus (i.e., elaborative processing), *attention switching* redirects attention to the present moment. In this way, sustained attention and attention switching contribute to the inhibition of elaborative processing by redirecting attention to the present moment. In sum, mindful states result in part from attention regulation, wherein one focuses on the objective, primary qualities of present-moment stimuli without elaboration, judgment, or interpretation.

Attention regulation has been argued to be a form of *metacognitive awareness* (Teasdale et al., 2002). In brief, metacognition (Flavell, 1979) is a form of cognitive monitoring that influences aspects of everyday functioning (e.g., oral communication, social cognition). One subclass of metacognition relevant to the present study is *metacognitive experience*. Metacognitive experience relates to the conscious awareness of

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one's actual (or perceived) progress toward a cognitive goal. For example, when reading, one becomes aware of how well material has been understood, and whether rereading might help. Metacognitive experience can therefore affect cognitive goals or tasks in several ways: (a) by signaling the need to revise or abandon extant goals or establish new ones; (b) by modifying tacit beliefs about tasks, strategies, or persons (i.e., metacognitive knowledge); or (c) by activating strategies related to cognitive or metacognitive goals (Flavell, 1979). Using the example of reading to elucidate point (c), metacognitive experience affects metacognitive strategies when one wonders (metacognitive experience) whether material read was understood well enough to pass an exam, and then decides to test one's knowledge (metacognitive strategy that addresses the metacognitive goal of assessing one's knowledge). In sum, mindfulness, via the metacognitive process inherent to attention regulation (Bishop et al., 2004), influences cognitive goals or tasks by altering beliefs, uncovering novel strategies, or signaling the need to modify the goals.

In addition to attention regulation, mindfulness has been characterized in terms of a second component, *orientation to experience*. Orientation to experience consists of an interrelated set of attitudes (Bishop et al., 2004; Kabat-Zinn, 1990; Tolle, 1999). Central among these are: *nonstriving, acceptance,* and *beginner's mind*. In contrast to most activities, which we engage in to achieve a goal, mindfulness has no goal other than paying attention to what is happening. The individual does not strive to produce a particular state (e.g., relaxation) or to change ongoing experience. Rather, the individual simply takes notice of internal experience irrespective of valence (i.e., pleasant, unpleasant, neutral). Thus, when feeling tense, one pays attention to the tension. When self-critical, one pays attention to the judgment. Nonstriving is therefore akin to

surrendering to the present moment, and involves acknowledging and facing experience, rather than indulging, fighting, avoiding, or trying to alter it (Bishop, 2002; Tolle, 1999). The second attitude, *acceptance*, involves an experiential openness to whatever is occurring in the field of awareness (S. C. Hayes, Bissett, et al., 1999; Roemer & Orsillo, 2002), and means seeing things as they are now. Thus, if one has a headache, one accepts that he or she has a headache. If a family member is ill, one accepts his or her limited vitality at this time. Acceptance is often reached only after periods of denial, anger, or tension created by trying to force things to be the way we want them to be (Gross & Levenson; 1993, 1997; S. C. Hayes et al., 1996; Nolen-Hoeksema et al., 1993; Wegner, 1994, 1997). Acceptance is, however, not intended to imply passivity, abandoning one's principles, or resigning oneself. Rather, it means being willing to see things as they are, accepting what is already fact (Kabat-Zinn, 1990). *Beginner's mind* means bringing an open curiosity to the mind's wanderings (Suzuki, 1980). Together, these attitudes reflect the *orientation to experience* component of mindfulness.

Mindfulness has also been described in terms of a third component, *intention* (Kabat-Zinn, 1990; Shapiro et al., 2006). Although not examined in the present study, intention may be considered a form of overarching goal that helps to orient experience, and may provide a rationale for facing aversive experience. Intention ("personal vision") has been argued to both predict the outcome and help one "stay the course" (Kabat-Zinn, 1990). Indeed, Shapiro (1992, as cited in Shapiro et al., 2006) reported that the intention of individuals who had practiced mindfulness for many years shifted from self-regulation to self-exploration to self-liberation. In sum, mindfulness appears to arise from a combination of attention regulation, orientation to experience, and intention.

In light of the multiple characteristics ascribed to mindfulness, it became incumbent to develop a scale with adequate convergent, discriminant, and incremental validity. Indeed, mindfulness scales have been recently developed and correlational analyses conducted with theoretically related constructs. With regard to convergent validity, since mindfulness is characterized by an awareness of internal and external events, two constructs in particular were expected to correlate positively with mindfulness: *emotional intelligence*, and the *openness to experience* dimension of personality (see Brown & Ryan, 2003, for description of these constructs). Second, where divergent validity is concerned, traits such as *public self-consciousness* and *self-monitoring*, which involve a self-evaluative stance inconsistent with mindfulness, and *absorption* and *dissociative experience*, which measure the tendency to enter trancelike or dissociative states toward ongoing experience, were expected to have null or negative associations with mindfulness. Third, to the extent that mindfulness correlates with well-being, positive correlations were also anticipated with *positive emotion, competence, vitality, self-esteem*, and *satisfaction with life*, and negative associations were expected with constructs such as *negative emotion, depression*, and *anxiety*. Fourth, to ascertain the incremental validity of mindfulness scales, partial correlations between mindfulness and measures of well-being (e.g., positive emotion) have been assessed when controlling for the effects of related constructs likely account for well-being (e.g., emotional intelligence). All of the aforementioned zero-order and partial correlations have been found significant (Brown & Ryan, 2003; Baer et al., 2004; Walach et al., 2006). In sum, mindfulness appears to be a valid construct that accounts for unique variance in subjective well-being.

Mechanisms. Several models have proposed mechanisms to explain the efficacy of mindfulness interventions (Baer, 2003; Bishop, 2002; S. C. Hayes & Wilson, 2003; Kutz et al., 1985; Lynch et al., 2006; Martin, 1997; Roemer & Orsillo, 2003; Shapiro et al., 2006; Teasdale et al., 1995). There appear to be three agreed upon mechanisms: *cognitive defusion, interoceptive exposure,* and *acceptance* (S. C. Hayes & Wilson, 2003; Roemer & Orsillo, 2003; Shapiro et al., 2006). According to S. C. Hayes and Wilson (2003), these mechanisms are interrelated to the extent that they target the excessive impact of the literal and evaluative functions of language and cognition (i.e., narrowness, inflexibility). Cognitive defusion (a.k.a. *decentering,* see Segal et al., 2002) involves observing and dis-identifying with one's thoughts, emotions, and body sensations as they arise. This nonevaluative contact is thought to: (a) undermine the literal meaning of language (e.g., It's just a thought) and the evaluative functions of language (e.g., unfavourable comparison of oneself or another to an ideal); and (b) bring verbal processes under increased contextual control because people learn when and where to use literal, planful, evaluative skills versus more experiential, nonevaluative skills (S. C. Hayes & Wilson). The second and third mechanisms, *interoceptive exposure* and *acceptance,* are thought to undermine the literal and evaluative functions of language and cognition by increasing contact with previously avoided frightening or threatening internal experiences. When one's experience and emotional reaction to the experience are observed with acceptance, they are not evaluated as good or bad, true or false. Rather, the emotional reaction becomes modified through a dehabituation process that unpairs the conditioned response (e.g., worrying) from the conditioned stimulus (e.g., physiological arousal). In this regard, mindfulness may also improve distress tolerance (Linehan, 1997).

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In addition to diminishing the impact of literal and evaluative functions of language and cognition, cognitive defusion has also been argued to produce a shift in perspective toward internal experience and in the relationship to self (S. C. Hayes, Bissett, et al., 1999; Shapiro et al., 2006). By suspending the interpretation of experience (i.e., secondary processing), one encounters experience at its most basic level (i.e., primary processing). When experience is approached this way, one becomes aware of aspects of experience previously beyond awareness. A shift in perspective consequently occurs, in which 'subject' becomes 'object.' Although these shifts are a natural part of development –young children tend to buy gifts for their mother that they would like for themselves (with any luck, a tendency outgrown) – mindfulness practice is thought to accelerate this shift. With regard to the relationship to self, cognitive defusion is thought to transform personal narratives (stories) with which one has identified (e.g., who we are, what we like or dislike, our opinions about others) simply into "stories" (Shapiro et al.). As such, cognitive defusion produces a, "shift from 'self as content' (that which can be witnessed or observed as an object in consciousness) to 'self as context' (that which is observing or witnessing – i.e., consciousness itself)" (Shapiro et al., p. 379). In sum, cognitive defusion is thought to contribute to the shift toward more cognitively complex conceptualizations of the self and experience.

In sum, through nonjudgmental self-observation, one becomes aware of one's emotional reaction (and their internal and behavioural consequences). This leads to a re-perceiving of experience. Moreover, by not immediately acting or elaborating on the emotional reaction, one is exposed to its nuances and texture (Brown & Ryan, 2003). These interrelated mechanisms therefore contribute to processing experience within a

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larger context, which undermines cognitive and behavioural inflexibility (S. C. Hayes & Wilson, 2003), increases affect tolerance (Bishop et al., 2004), and quickens recovery time (Roemer & Orsillo, 2003).

Remaining quandaries. The operational definition of mindfulness remains a subject of debate (Bishop et al., 2004; Brown & Ryan, 2004; S. C. Hayes & Shenk; 2004; A. M. Hayes & Feldman, 2004). Central to this debate is whether mindfulness is a state, a trait, or both. The present zeitgeist is apparent in conceptualizations and scales on three counts. First, the conceptual stance held by most researchers is either made explicit or implied in the literature. Some researchers explicitly state that mindfulness accelerates or increases an inherently ontogenetic process: "the practice of mindfulness is simply a continuation of the naturally occurring human development process whereby one gains an increasing capacity for objectivity about one's own internal experience" (Shapiro et al., 2006, p. 378). Others state that by practicing mindfulness, one increases one's *capacity* for mindfulness: "Mindfulness develops and deepens over time but invariably requires an ongoing commitment to its practice and cultivation" (Kabat-Zinn, 2003, p. 150). Examples of an implied conceptual stance include: "... the *development of mindfulness* [italics added] would be associated with improvements in sustained attention and switching ..." (Bishop et al., 2004, p. 232). If mindfulness were exclusively a state, it would be dichotomous insofar as, in any given moment, one is either aware of observing one's experience or not. That is, one cannot *develop* something that is dichotomous in the way an on-off light switch is. However, one may be able to develop one's propensity (i.e., trait) to notice the switch is off, and then turn it on. A second example of this implied stance is: "*mindful individuals* [italics added] probably bring undivided attention and a

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nonjudgmental stance to observing, describing, and acting" (Baer, Smith & Allen, 2004, p. 204). This example implies the existence of between-person differences. In sum, these exemplars suggest: (a) that a between-person capacity (trait) exists; and (b) that by engaging in mindfulness on a moment-to-moment basis, one accrues "capacity" for mindfulness. In this regard, contemporary thinking suggests that both state and trait forms of mindfulness exist, and that they inform one another as they run in parallel across time.

Second, the present conceptual stance is also apparent in the scales and findings. The item content of *most* mindfulness measures addresses enduring tendencies (i.e., traits), not recent experience (i.e., states) (Baer et al., 2004; Brown & Ryan, 2003; Buchheld, Grossman, & Walach, 2001; Cardaciotto, 2005; Walach et al., 2006). Moreover, with the exception of investigations of test-retest reliability, most measures have been administered at a single point in time. Thus, they do not tap fluctuations that occur at a state level. Finally, the notion that mindfulness is also considered a trait was confirmed by Buddhist monk and researcher Matthieu Ricard (personal communication, Training the mind: Science and spirituality [lecture], University of British Columbia's College for Interdisciplinary Studies and the Tung Lin Kok Yuen Canada Foundation Lecture Series on Buddhism and Contemporary Society, March 9, 2007). Ricard presented recent electroencephalogram (EEG) data that compared non-meditators to long-term meditators (i.e., more than 10,000 hours). The latter group produced far more intense brain-wave activity consistent with compassion, a quality consistent with the *acceptance* orientation to experience component of mindfulness (Bishop et al., 2004), than the former group. This finding suggests that the baseline level of mindfulness can,

indeed, be raised through practice. In sum, the literature appears to indicate that mindfulness continues to be conceptualized as both a state and a trait.

The second gap in the mindfulness literature relates to the theorized relation between mindfulness and social functioning. Mindfulness-based interventions have been theorized and found to be associated with increased relationship quality (Burpee & Langer, 2005; Carson, Carson, Gil, & Baucom, 2004; Reibel et al., 2001). However, the few studies that exist are limited to adult clinical populations and couples and have methodological problems that limit their interpretability and generalizability. In Carson et al.'s study, the following problems were evident: (a) mindfulness was not operationalized or measured, rather the intervention was assumed to increase mindfulness, which in turn was deemed responsible for the change in outcome; and (b) the effects of some nonspecific elements of the intervention were not controlled for (e.g., spouses' shared experience as participants; demand characteristics, insofar as one invests resources during the intervention because it is deemed credible, one's post-treatment rating of the relationship may be favourably altered). In the Burpee and Langer study, which investigated the association between mindfulness and marital satisfaction while controlling for spousal perceived similarity, two methodological problems are apparent. First, the mindfulness scale remains unpublished and thus unavailable for inspection; however, their definition of mindfulness does appear to hinge primarily on drawing novel distinctions in familiar situations, a characteristic consistent with other definitions of mindfulness. Second, despite significant correlations between the predictor variables (i.e., mindfulness, perceived similarity, demographic variables), the outcome variable (i.e., marital satisfaction) was regressed on mindfulness with only one other simultaneous

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predictor – perceived similarity. Consequently, demographic variables that correlated significantly with mindfulness or marital satisfaction (e.g., education level, number of children, other siblings) were not controlled for. It therefore remains unknown whether mindfulness accounted for significant, unique variance in marital satisfaction. Finally, the Reibel et al. study, which investigated the effect of MBSR on indices of health-related quality of life in a heterogeneous patient population, found a pre- to post-treatment increase in social functioning. However, as with the Carson et al. investigation, mindfulness per se was not operationalized or measured, and due to the absence of a control group, nonspecific effects of the intervention were not controlled for. An additional caveat relates to the generalizability of Reibel et al.'s social functioning finding, since the study group's pre-treatment score was below the 25th percentile of the U.S. general population norm. In sum, there are few studies that investigate mindfulness and social functioning, and those that do are limited to adult samples and have methodological problems.

The third quandary in the literature relates to whether mindfulness is naturally occurring versus cultivated exclusively through formal practices. Whereas most researchers consider meditation an effective way to cultivate mindfulness, it appears that most also agree that mindfulness is not limited to meditators (Bishop et al., 2004; Brown & Ryan, 2003, 2004; Kabat-Zinn, 2003). Hanh (1976) recommends practicing mindfulness during everyday activities such as making tea, washing dishes, or taking a bath. Bishop et al. (2004) held that, once attention regulation skills are learned, mindfulness can be evoked in many everyday situations. Kabat-Zinn (2003) wrote, "We are mindful to one degree or another, moment by moment. It is an inherent human

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capacity" (p. 147). Baer and colleagues (2004) stated that,"mindfulness is a naturally occurring characteristic that is likely to show meaningful variation" (p. 204). Finally, two mindfulness-based interventions – ACT (S. C. Hayes, Strosahl, et al., 1999) and DBT (Linehan, 1993) – do not even include a meditation component. In sum, it appears to be widely thought that mindfulness is naturally occurring.

Current definition. In the present study, mindfulness was therefore investigated as a naturally occurring state and a trait in its relations to stress, emotion, and social interaction. That is, whereas everyday mental functioning involves varying degrees of awareness and attention, mindfulness is primarily a heightened awareness of and attention to present-moment experience. For example, when eating mindfully, one can be aware of the moment-to-moment taste experience while being peripherally aware of the sense of increasing fullness of one's stomach. In contrast to mindfulness, everyday consciousness is considered limited or blunted in various ways. For example, when eating one might become absorbed in thoughts about the past or future, thereby removing one's consciousness from the act of eating. Mindfulness is therefore argued to be a state insofar as it fluctuates *within-person*, and a trait to the extent that *between-person* differences (e.g., cognitive skills, personality) exist in individual ability and willingness to attend in this way. Thus, the present definition of mindfulness emphasizes a propensity for and moment-to-moment engagement in open, nonjudgmental observation of internal and external experience.

Peer Relations

A widely accepted tenet in the social-development literature is that interpersonal relationships contribute to the social and emotional development of children (Rubin,

Bukowski, & Parker, 1998). Social relationships have been argued to contribute to a number of positive outcomes (e.g., sense of support and security, self-concept, modulation of aggressive behaviours, social perspective-taking, moral judgment, and sexual socialization) (Berndt, 1982; Hartup, 1996; Piaget, 1932; Sullivan, 1953). For children considered "at risk," however, peer relationships have been found to play a role in the development of maladaptive outcomes (e.g., dropping out of school, criminality, psychological disturbance, victimization) (Asher & Coie, 1990; Boivin, Hymel, & Hodges, 2001; Coie & Dodge, 1998; Kupersmidt, Coie, & Dodge, 1990; Parker & Asher, 1987; Shantz, 1986; Snyder, Dishon, & Patterson, 1986). According to Sullivan (1953), relationships between peers during the school age and early adolescent years play an especially important role. Moreover, Sullivan observed that isolation from the peer group during the school-age years would pose a serious challenge to self-esteem, and that same-sex "chumship" (i.e., a close relationship with a same-sex peer) provides early adolescents and early adolescents with the first opportunity to relate as "co-equals," thereby learning to see oneself through others' eyes (i.e., social perspective-taking). The social, cognitive, and emotional development of children, therefore, appears to be fostered in a number of ways through relationships with peers.

In keeping with Sullivan's work, the contribution of peer relations to development has since been conceptualized in terms of two distinct dimensions of social interaction: acceptance within the peer group (popularity), and whether a child has a chum (friendship) (Bukowski & Hoza, 1989; Bukowski & Newcomb, 1984; Masters & Furman, 1981). Popularity has been defined in terms of the experience of being accepted or well liked by other members of one's broader social network (e.g., classmates). Friendship has

been characterized in terms of the experience of a having a close, dyadic, and reciprocal relation. Thus, popularity is a measure of group-oriented, *unilateral* likeability (acceptance), and friendship a measure of *bilateral* (reciprocal) affective bond between two individuals (Bukowski, Newcomb, & Hartup, 1996; Bukowski, Sippola, Hoza, & Newcomb, 1994). Finally, a child's ability to effectively engage at both the group and dyadic levels within the peer system (i.e., popularity and friendship) has been argued to be a useful gauge of social competence (Rubin et al., 1998). Although ratings of social competence can be influenced by a number of conceptually independent variables, a socially competent child, by definition, is well liked and engages in group-oriented activities, and also participates in one or more satisfying dyadic relationships (Vaughn & Waters, 1981). Although the present study does not investigate social competence, by virtue of its association with popularity, friendship, and social skills (Gottman, Gonso, & Rasmussen, 1975; Vaughn & Waters, 1981), social competence is employed here as conceptual linkage between early adolescents' sociometric status and social skills.

Although popularity and friendship are interrelated, insofar as being liked by the peer group increases the likelihood of having a friend (Bukowski, Pizzamiglio, Newcomb, & Hoza, 1996), group and dyadic peer relations are considered conceptually distinct phenomena that contribute uniquely to the social development of children (Bukowski & Hoza, 1989; Parker & Seal, 1996; Rubin et al., 1998). In addition to the benefits afforded through popularity (Hartup, 1996; Newcomb, Bukowski, & Pattee, 1993), children have been found to derive further benefits from friendship including: interpersonal understanding, empathy, feelings of self-worth (Bukowski et al., 1996; Bukowski et al., 1994), resiliency and strength (Bagwell, Newcomb, & Bukowski, 1998),

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protective buffering from environmental stressors (Gauze, Bukowski, Aquan-Assee, & Sippola, 1996; Sullivan, 1953), and social competence (Berndt, 1982; Bukowski & Hoza, 1989; Newcomb & Bagwell, 1995). Thus, whereas popularity and friendship may be considered indices of social competence (Lindsey, 2002), they also predict social-developmental trajectories and outcomes.

With regard to collecting popularity- and friendship-related sociometric data, four main methods exist: peer-nomination, peer ratings, rank-order, and paired comparisons. The currently favoured *peer nomination* and *peer ratings* methods have been closely examined conceptually and empirically to determine how to interpret data obtained from them (Asher & Hymel, 1981; Bukowski & Hoza, 1989; Bukowski & Newcomb, 1984; Hoza, Bukowski, & Gold, as cited in Bukowski & Hoza, 1989). With regard to peer nomination, debate has existed as to whether nominations ought to be *unlimited* (e.g., entire class) or *limited* (e.g., three same- and other-sex classmates). Empirically-founded concern suggests that artifactual constraint and measurement error may arise due to the limited nomination approach (Terry, 2000). Thus, the unlimited approach was used in this study.

In the literature, peer nominations and ratings have been used in varying ways to measure popularity and friendship. Consequently, methods relevant to this study are described here. With regard to peer nomination, several techniques have been used to assess popularity; three of these are described here. The first technique, though not used in the present investigation, is nonetheless briefly described here insofar as its description elucidates relevant concepts. In the first technique, popularity is assessed using positive criteria (e.g., someone you enjoy playing with) and negative criteria (e.g., someone you

don't like to play with). The number of nominations a child receives from peers for positive criteria indicates how much he or she is liked (i.e., *acceptance*). The number of nominations received from peers for negative criteria is an indicator of how much he or she is disliked (i.e., *rejection*). The relationship between acceptance and rejection is somewhat counterintuitive, however, in that they are not polar opposites. Rather, they can be combined empirically to form two derivative dimensions – *social preference* and *social impact* (Newcomb & Bukowski, 1983; Vaughn & Waters, 1981). A child's social preference score equals the difference between the child's acceptance and rejection scores, and is a measure of likeability. The social impact score is an index of the strength of the impression (positive or negative) the child leaves with peers, and is computed by adding the child's acceptance and rejection scores. Social preference and social impact scores are then combined to classify each child as popular (i.e., high social preference, high impact) or otherwise (Coie, Dodge, & Coppotelli, 1982). Incidentally, social preference is thought to be a more important determinant of popularity than social impact (Bukowski, Sippola, Hoza, & Newcomb, 2000). For the interested reader, the treatment and interpretation of such data have been specified elsewhere (Bukowski et al., 2000). In sum, acceptance and rejection scores are combined to create social preference and social impact scores. In this regard, popularity is currently most often characterized in terms of high social preference and high social impact.

The second nomination technique employed to measure popularity is the "class play" (Masten, Morison, & Pellegrini, 1985). Each child nominates classmates for particular characteristics. This technique is used in the present study – one subset of class play characteristics relates to popularity (e.g., "Someone who is liked by lots of people";

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"Someone who is popular"). The second measure of popularity used here is therefore based on the number of nominations each child received from same- and other-sex classmates for the aforementioned two items, and taps peers' perceptions of the target child's popularity.

The third nomination technique for assessing popularity, which was used in this study, involves tallying the number of *unilateral, same*-sex friendship nominations received. That is, irrespective of whether a friendship nomination is reciprocated by the target child, it is added to the target child's count. Friendship nominations are typically limited to those from same-sex peers since same-sex preference has been found to be a cross-culturally universal and robust phenomenon (Maccoby, 1988; Masters & Furman, 1981). Moreover, to preclude any confusion, while this technique is based on children's nominations of classmates as *friends*, since the tally of nominations is based on unilateral nomination, it follows that it can only be considered a measure of popularity. This nomination technique has been traditionally employed to compute the child's level of *social acceptance*. One caveat bears mentioning at this juncture, however. Given the means of computation, the label "social acceptance" has been argued to be misleading, and the tally unstable (Terry, 2000). Inasmuch as the computation is based on nominations from diverse perceivers yet treated as one-dimensional, Terry asserted, it may be misleading since the child could receive nominations for a number of reasons unrelated to social acceptance (e.g., propinquity, lack of available alternatives, need fulfillment) (Hartup & Stevens, 1997; Kandel, 1978a, 1978b). Moreover, insofar as friendships are formed, lost, renewed, or replaced over time and vary across contexts, friendship nominations are not stable (Bukowski & Newcomb, 1984). In sum, though

these arguments do not appear widely in the literature, they are worth bearing in mind when interpreting the results from this nomination technique, which ultimately is more accurately labeled a measure of *acceptance* than of popularity.

When popularity is assessed using rating scales, participants rate how much they like each other on a Likert-type scale with endpoints labeled "not at all" (disliking) and "very much" (liking). Whereas three types of scores can be calculated from these ratings, the most widely known is a mean score based on the ratings received from peers (Bukowski et al., 2000). Since the mean score is derived from the combination of liking (acceptance) and disliking (rejection) ratings, it is considered a conceptually and empirically valid index of social preference (Bukowski et al.). Moreover, the mean received liking-disliking rating scores have been shown to correlate highly with the social preference scores derived from the first peer nomination procedure (discussed three paragraphs previously) (Bukowski et al.). In sum, the child's popularity (more specifically, *social preference*) can be assessed using rating scales by computing the mean received liking-disliking rating score. This technique is also used in the present investigation.

In order to assess friendship, it has been proposed that three hierarchically organized questions need to be considered (Bukowski & Hoza, 1989). First, is the target child engaged in dyadic friendship (i.e., friendship status is *friended*, rather than *friendless*)? Second, provided that the target child is friended, in how many friendships is he or she involved (i.e., *friendship extensivity*)? Finally, what is the quality of the child's friendships? The first question, therefore, addresses whether positive feelings are reciprocal between the target child and at least one peer. The first question provides an

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important distinction between children (friended vs. friendless) insofar as friendless children are perceived as less socially competent and less mature, and have more behavioural problems than other children (Parker & Seal, 1996). The second question taps friendship *extensivity*: the number of mutually nominated same-sex friendships (i.e., overall network size). Sex differences in network size notwithstanding (Berndt & Hoyle, 1985; Eder & Hallinan, 1978; Savin-Williams, 1980), extensivity has been found to be associated with and predictive of positive outcomes. Children with more friends are reported to be more socially skillful and to interact differently with their peers than children with few friends (Gottman et al., 1975). Early adolescents' number of friends has also been found to be associated with self-perceived competence and perceived emotional support (Cauce, 1986, 1987). The size of children's networks at the beginning, middle, and end of summer camp have been found to predict acceptance-rejection (popularity) at the end of camp, with better-accepted children having higher extensivity scores (Parker & Seal, 1995). Finally, children's extensivity scores correlated with teacher ratings of social competence (Lindsey, 2002). The third question, quality of friendship, is not addressed in the present study. However, the interested reader can find several studies that examine this topic (Berndt, 1982; Berndt, Hawkins, & Hoyle, 1986; Berndt & Hoyle, 1985; Berndt & Perry, 1986; Bigelow, 1977; Bukowski, Newcomb, & Hoza, 1987). In sum, in the present study, the friendship status and extensivity for participants are determined by tallying their number of reciprocal friendship nominations.

The importance of measures of peer relations (i.e., popularity, friendship status, and friendship extensivity) is evident in its associations with and prediction of a number of social, cognitive, and emotional outcomes related to adjustment and psychopathology.

Popular children have higher levels of sociability and cognitive abilities, greater problem-solving skills, and lower levels of aggression and withdrawal (Newcomb, et al., 1993). The behavioural patterns of popular children suggest that they are capable of achieving interpersonal goals (Dodge, Asher, & Parkhurst, 1989) and maintaining positive relationships (Asher & Parker, 1989). Further, it has been reported that, "friendship success and group acceptance rest on somewhat different sets of social skills" (Parker & Seal, 1996, p. 2266). Friendship extensivity and popularity appear to stem from common and unique social skills, correlate with measures of social competence, and predict adjustment and psychopathology. As such, these complementary measures are well situated to serve as indices of social skills, and as predictors of subsequent social and emotional outcomes.

In sum, the present investigation examines the peer relations of early adolescents using peer nomination and peer ratings techniques. With these techniques, two distinct dimensions of social interaction are measured: popularity, and friendship. Within the popularity dimension, the following constructs were tapped: popularity (perceived by peers, not the individual), social acceptance, and social preference. With regard to the friendship dimension, the following are measured: friendship status, and friendship extensivity. The measures from these two dimensions have been shown to correlate with social competence and, in this regard, effectively measure early adolescents' social functioning in the peer domain.

Conceptual and Empirical Overlap

The aim of this study was to examine the overlap between stress, emotion, mindfulness, and peer relations in early adolescence. Insofar as age groups can be

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characterized in terms of particular ontogenetic capacities and challenges, these capacities

and challenges must necessarily be accounted for. For example, adolescence has been

characterized by the following stages and challenges: early adolescence, by puberty and

entry into middle school; middle adolescence, by increased autonomy relative to the

family and increased peer involvement; and late adolescence, by increasing responsibility

for choices related to work and intimate relationship, and separation from the home

(Wagner & Compas, 1990). In light of these challenges and emerging capacities, the

conceptualizations of stress and coping, emotion, mindfulness, and peer relations used in

the present study needed to account for ontogeny.

In this regard, the ontogenetic emergence of increasingly complex cognitive skills

in early adolescence is especially relevant insofar as it influences the characteristics and

efficacy of particular coping strategies. During early adolescence, for example, cognitive

skills transition from the concrete-operational to the formal-operational stage of thought

(Inhelder & Piaget, 1958). One feature that characterizes formal-operational thought is

reflective abstraction, which refers to the ability to think about thought. That is, during

the preceding concrete-operational stage, mental operations are *first-order*, operating

exclusively on environmental data provided by the senses. During the formal-operations

stage, however, mental operations become *second-order* (i.e., capable of operating on

themselves). New information can, therefore, be gained from internal reflection. Thus,

during the formal operations stage, for which onset varies from age 11 to adulthood, the

capacity for "thought thinking about itself" (Brainerd, 1978, p. 215) emerges. This

emergent capacity, known as metacognition (Flavell, 1979), has been argued to influence

coping (Compas et al., 2001; Wagner & Compas, 1990). For example, one notable shift in

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adolescence is the increasing use of emotion-focused coping (Wagner & Compas).

Moreover, insofar as metacognition has been argued to be fundamental to mindfulness

(Bishop et al., 2004), the capacity for the attention regulation skills that characterize

mindfulness (i.e., the ability to simultaneously *experience* and *observe* one's experience)

is also thought to emerge during early adolescence. Finally, inasmuch as anxiety and

depression are thought to not be separable in children and adolescence, any distinction

between these different forms of negative emotion in this age group is not viable (Finch et

al., as cited in Compas et al., 1993). This section therefore reviews the conceptual and

empirical overlap of stress and coping, emotion, mindfulness, and peer relations as they

pertain to early adolescence.

    Stress and coping in early adolescence. Although early adolescent stress and

coping were initially assumed to resemble the same in adulthood, it became apparent that

ontogeny and age-related challenges needed to be accounted for. Accordingly, stress was

redefined as: "Environmental events or chronic conditions that objectively threaten the

physical and/or psychological health or well-being of individuals of a particular age in a

particular society" (Grant & Compas, 2003, p. 449). Moreover, a number of childhood

and adolescent stressors have been identified, including: personal illness, pain, parental

conflict or divorce, adoption, and natural disaster (Compas et al., 2001).

    With regard to the early adolescent coping literature, one notable challenge has

been distinguishing between the many types of coping. That is, although a broad

definition may be useful, it blurs the heterogeneity among the different types of coping

and their sequelae. Several dimensions of childhood and adolescent coping have therefore

been proposed. Particularly relevant among these are: the *engagement* versus

disengagement dimension, and the *problem-focused* versus *emotion-focused* dimension (Compas et al., 2001). In brief, engagement coping encompasses responses that are oriented toward the stressor or toward one's thoughts and emotions (e.g., problem-solving, emotional expression, and support seeking); disengagement coping involves responses that are oriented away from the stressor or one's thoughts and emotions (e.g., withdrawal, cognitive avoidance). Problem-solving coping refers to responses that act on the source of stress in the environment, and emotion-focused coping includes responses aimed at palliating negative emotions that arise from a stressful event (Lazarus & Folkman, 1984).

These dimensions of coping have been investigated in terms of their consequences for children and adolescents. The majority of studies indicate that: (a) engagement and problem-focused coping are associated with fewer internalizing symptoms, fewer externalizing symptoms, and higher social competence; and (b) disengagement and emotion-focused coping are associated with more internalizing symptoms, more externalizing symptoms, and less social competence (Compas et al). However, a minority of studies indicate just the opposite: (c) engagement and problem-solving coping are associated with more internalizing symptoms, more externalizing symptoms, and less social competence; and (d) disengagement and emotion-focused coping are associated with fewer internalizing symptoms, fewer externalizing symptoms, and more social competence.

At first glance, the aforementioned findings appear contradictory, but upon closer inspection, several conclusions can be drawn. First, in the studies that led to findings (c) and (d), stressful events were subjectively or objectively uncontrollable (e.g., parental

conflict) or of a nature such that disengagement prevented a negative situation from escalating (e.g., peer conflict) (Losoya, Eisenberg, & Fabes, 1998). Moreover, inasmuch as interpersonal stressors (e.g., the breakup of a relationship) are less controllable than impersonal stressors (e.g., school exam), they are more likely to elicit emotion-focused coping (Compas, Orosan, & Grant, 1993). Thus, engagement or problem-focused coping may be less effective when the stressor is beyond the individual's control; this finding underlines the importance of context in childhood and adolescent stress and coping.

Second, the coping strategies found to be associated with poorer adjustment in children and adolescents (i.e., avoidance, social withdrawal, resigned acceptance, emotional ventilation or discharge, wishful thinking, and self-blame or criticism) share a common problem:

> ... focusing on emotions is not the problematic element in these coping strategies. Rather, coping responses that involve disengagement with the stressor or one's emotions, negative cognitions about the self and the situation, and unregulated release or ventilation of emotions are most consistently associated with more symptoms and lower competence. These responses may reflect inadequate skills in modulating and regulating the experience and release of negative emotions rather than focusing on emotions per se (Compas et al., 2001, p. 119).

Thus, emotion-focused coping per se is not problematic, but rather when combined with disengagement, the result is problematic. In sum, emotion-focused coping, when accompanied by an engagement orientation to *internal* experience (i.e., nonjudgmental acceptance), may be a particularly adaptive means of coping with uncontrollable stressors or situations likely to worsen when overt problem-solving is undertaken. Although the

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present study does not specifically examine the aforementioned types of coping, on the basis of this literature, mindfulness, which may be characterized in terms of both *emotion-focused* and *engagement* coping, is thought to be particularly effective for dealing with uncontrollable interpersonal stressors such as those inherent to the peer domain.

Stress, coping, and peer relations. Interpersonal stressors have been argued to cause psychological distress (Selye, 1974). Specifically, in early adolescence, the interpersonal stressor *family events* was found to predict emotional and behavioural problems (Wagner & Compas, 1990). However, since early adolescents' social interaction occurs increasingly with peers (Sullivan, 1953), by the end of early adolescence, *peer events* is thought to be the primary source of psychosocial stress (Wagner & Compas). Moreover, psychosocial stress is considered a major risk factor for psychopathology in childhood and adolescence (Grant, Compas, Thurm, McMahon, & Ey, as cited in Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Thus, during early adolescence, peer relations are an increasingly prominent source of interpersonal stress, and may therefore also be a major risk factor for psychopathology.

The relation between coping and peer relations is thought to be bi-directional (Eisenberg, Fabes, & Guthrie, 1997). On the one hand, children's ability to cope with stress has been found to affect the quality of their peer relations (Newcomb, Bukowski, & Pattee, 1993; Parker & Asher, 1987). Stress is thought to interfere with social functioning by inducing lapses in concentration during which unwanted thoughts or detrimental behaviours may paradoxically arise (Wegner, 1994). On the other hand, the quality of a child's peer relations may predict his or her stress level. For example, rejection or being

disliked by many classmates can lead to stress (Ladd, 1990). Conversely, friendship has been found to buffer against stress (Gauze et al., 1996; Sullivan, 1953). In sum, peer relations and stress are closely interconnected in early adolescence, bi-directionally increasing or palliating one another. Thus, depending on one's relationship to the peer group, it may function as a coping resource or as a stressor.

Stress, emotion regulation, and peer relations. Several findings confirm the link between emotion regulation and peer relations in childhood and early adolescence. First, socially competent children not only interact effectively (e.g., stand up for themselves, understand norms for interacting), they also regulate their negative emotions (Kliewer, 1991). Second, children who are able to regulate their emotional reactivity when exposed to others in distress have been found to be: less likely to experience personal distress themselves, more likely to express appropriate emotions (e.g., empathy), and more likely to voluntarily engage in prosocial behaviours such as comforting (Fabes, Eisenberg, Karbon, Bernzweig, et al., 1994; Fabes, Eisenberg, Karbon, Troyer, et al., 1994). Third, children's emotion regulation abilities have been shown to predict social functioning as much as 6 years later in early adolescence (Murphy, Shepard, Eisenberg, & Fabes, 2004). Fourth, attention regulation has been found to predict both socially appropriate behaviour and social status (Eisenberg, Fabes, Guthrie, & Reiser, 2000), suggesting that emotion regulation strategies that focus on attention skills (e.g., mindfulness) may be well-suited to enhancing social functioning. Thus, emotion regulation is thought to contribute to social competence in two ways: by enabling the individual to accurately receive and appropriately send messages, and by influencing social behaviour (Eisenberg, 2001). As such, emotion regulation is thought to help minimize over- or mis-interpreting others'

gestures based on our own needs, biases, or insecurities. In this regard, emotion regulation may be considered an inner resource for coping that either combines with peer support or palliates against peer-related interpersonal stress. In sum, these findings point to the link between emotion regulation and social functioning and to the role of attention regulation in emotion regulation during early adolescence.

Mindfulness and emotion regulation. Insofar as mindfulness may be considered a form of emotion regulation, several other findings are suggestive of its effectiveness in early adolescence. First, an important component of emotion regulation has been shown to be attention control (Derryberry & Rothbart). Since attention control is central to mindfulness, individuals who are more mindful are thought to be able to better regulate emotion. Second, inasmuch as mindfulness may be characterized in terms of emotion-focused coping and engagement coping, it is thought to be particularly effective when stressors are uncontrollable or interpersonal. Third, since mindfulness interventions with adults have been shown to reduce anxiety (Kabat-Zinn et al., 1992; Miller et al., 1995), mindfulness is thought to also be instrumental to children with internalizing problems. For example, anxious children have been found to select more avoidant responses to stressors, and to be more distractible; this distractibility has been shown to impair their performance on a number of tasks (Daleiden & Vasey, 1997). Moreover, avoidant responses have been found related to deleterious outcomes: (a) *avoidance* correlated positively with anxiety, depression, conduct problems, and psychological distress, and negatively related with self-esteem; and (b) avoidance mediated between negative events and each of depression, anxiety, and conduct problems (Ayers, Sandler, & Twohey, 1998). Mindfulness is thought to be particularly effective in this regard insofar as it

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involves interoceptive exposure, which has been shown particularly efficacious in the treatment of anxiety (Andrews, Crino, Hunt, Lampe, & Page, 1994; Barlow, 2001; Beck, 1995). Thus, mindfulness is thought to reduce anxiety and distractibility, and thereby contribute to multiple salubrious outcomes. In sum, insofar as mindfulness is characterized by attention regulation and an engagement orientation to experience, and has been shown to reduce anxiety, it may be an effective emotion regulation for early adolescents.

Mindfulness and peer relations. Among the interventions designed to ameliorate children and adolescents' social functioning is Interpersonal Cognitive Problem-solving Thinking (ICPS) (Spivack & Shure, 1982). According to ICPS and more recent theories (Adolphs et al., 2005; Anderson et al., 2001; Bechara et al., 1994, 2000; Goleman, 1995), how well one solves interpersonal problems depends on the interaction of cognitive and emotional factors. ICPS skills have been argued to mediate the quality of social adjustment (Spivack & Shure). These skills are thought to contribute to the capacity to think through interpersonal problems (a capacity that differs from that used to reason through impersonal, abstract problems). Children are thought to learn ICPS skills through experience, beginning in the family and continuing with others in situations involving interpersonal problems. Through these experiences, the child develops a style of thinking that is characterized more by *how* than by *what* the child thinks. One ICPS skill is consistent with the *orientation to experience* component of mindfulness: the capacity to generate alternative solutions to a problem (Spivack & Shure). This skill is consistent with beginner's mind (i.e., an open curiosity toward experience) (Bishop et al., 2003; Langer, 1989). Moreover, mindfulness is thought to alter the link between one's initial

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reactions and subsequent behaviours, by allowing for a "gap" between stimulus onset and the time of response (Shapiro et al., 2006). While this gap may not be perceived by onlookers, by dwelling in the present-moment one's relationship to time is thought to be altered such that alternate responses or no response at all may arise as options. As such, state mindfulness alters the link between stimulus onset and subsequent behaviour. In sum, mindfulness is thought to benefit social functioning by fostering an open style of thinking consistent with the ICPS skill *generation of alternative solutions to problems.*

Mindfulness is also thought to ameliorate early adolescents' social functioning by increasing their understanding of interpersonal situations. This form of contextual understanding is consistent with the *control mechanisms* of Levenson's (1999) two-component emotion system. This understanding is thought to be enhanced when interpersonal situations are dispassionately observed. That is, the dispassionate observation of situational triggers, the emotion-generative process, and subsequent emotion-cognitive outcomes is thought to contribute to the formation or strengthening of neural links between the limbic system and the prefrontal cortex (Bechara et al., 2000; Davidson, 2000; Davidson et al., 2000). On a functional level, new insights are thought to be gleaned from this observation; insights that lead to a re-perceiving of the self and/or the situation (Green & Green, 1977; Shapiro et al., 2006; Teasdale et al., 1995). In contrast, when one is unaware of ongoing stress, one reacts unconsciously to it. To the extent that the reaction is maladaptive (e.g., fighting, substance use) stress is exacerbated and may lead to deleterious consequences. Thus, mindfulness is thought to contribute to structural and functional changes that refine the early adolescent's understanding of self and the interpersonal situation. In sum, mindfulness is thought to improve social

functioning by introducing a delay during which novel response options may emerge, and by fostering a context for re-perceiving the self, and internal and external events.

Stress, mindfulness, emotion regulation, and peer relations. To the extent that stress refers to an emotional experience, and that emotion serves intraorganismic and social functions (Levenson, 1999), stress impinges on both intra- and inter-personal functioning. In stressful interpersonal situations, for example, children may learn to regulate emotion through problematic forms of regulation, and thereby develop maladaptive behaviors (Gross, 1999). Thus, much in the way mindfulness plays a role in stressful impersonal experiences, it plays a role in social functioning. Early adolescents who are more mindful are thought to more effectively regulate emotion, and consequently to enjoy greater subjective well-being (e.g., more positive emotion, less negative emotion) and socially competence (e.g., have more friends, be more popular). Finally, the extent that meta-cognition is influenced by ontogeny, older early adolescents were expected to possess a greater capacity for mindfulness. These expectations are specified in greater detail as follows.

Research Hypotheses

Associations between trait mindfulness and demographic characteristics. Due to the ontogenetic emergence of metacognition, (1) trait mindfulness was expected to increase with age across early adolescence.

Associations between trait mindfulness and other traits. Participants who reported higher levels of trait mindfulness were expected to: (2) experience less perceived stress; (3) more effectively regulate their emotions, and (4) more effectively relate to their peers. With regard to emotion, more mindful participants are specifically expected to report:

(3a) more trait positive emotion, (3b) less trait negative emotion, (3c) less depression; and (3d) less anxiety. Where peer relations are concerned, more mindful participants were expected to: (4a) be more popular; (4b) be more socially accepted; (4c) be more likeable; (4d) be friended; and (4e) have more friends.

Trait mindfulness as moderator of other traits. (5) Trait mindfulness was expected to moderate the relations between the other three trait areas. That is, trait mindfulness was hypothesized to moderate between: (5a) trait perceived stress and trait emotion; (5b) trait perceived stress and peer relations; and, (5c) trait emotion and peer relations. For hypothesis 5a, it was therefore specifically hypothesized that: (i) the negative correlation hypothesized between trait perceived stress and trait positive emotion would be *less negative* for early adolescents who were high in trait mindfulness than for early adolescents low in trait mindfulness; (ii) the positive correlation hypothesized between trait perceived stress and trait negative emotion would be *less positive* for early adolescents high in trait mindfulness than for those low in trait mindfulness; (iii) the positive correlation hypothesized between trait perceived stress and trait depression would be *less positive* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; and, (iv) the positive correlation hypothesized between trait perceived stress and trait anxiety would be *less positive* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness.

With regard to hypothesis 5b (i.e., trait mindfulness as moderator between trait perceived stress and peer relations), it was specifically hypothesized that: (v) the negative correlation between trait perceived stress and popularity would be *less negative* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness;

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(vi) the negative correlation between trait perceived stress and social acceptance would be *less negative* for early adolescents high in trait mindfulness than for those low in trait mindfulness; (vii) the negative correlation between trait perceived stress and likeability would be *less negative* for early adolescents high in trait mindfulness than for those low in trait mindfulness; and, (viii) the negative correlation between trait perceived stress and one's number of friends would be *less negative* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness.

With respect to hypothesis 5c (i.e., trait mindfulness as moderator between trait emotion and peer relations), it was specifically hypothesized that: (ix) the positive correlation between trait positive emotion and popularity would be *more positive* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (x) the positive correlation between trait positive emotion and social acceptance would be *more positive* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (xi) the positive correlation between trait positive emotion and likeability would be *more positive* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (xii) the positive correlation between trait positive emotion and number of friends would be *more positive* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (xiii) the negative correlation between trait negative emotion and popularity would be *less negative* for those high in trait mindfulness than for those low in trait mindfulness; (xiv) the negative correlation between trait negative emotion and social acceptance would be *less negative* for early adolescents high in trait mindfulness than for those low in trait mindfulness; (xv) the negative correlation between trait negative emotion and likeability would be *less*

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negative for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (xvi) the negative correlation between trait negative emotion and number of friends would be *less negative* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (xvii) the negative correlation between trait depression and popularity would be *less negative* for those high in trait mindfulness than for those low in trait mindfulness; (xviii) the negative correlation between trait depression and social acceptance would be *less negative* for early adolescents high in trait mindfulness than for those low in trait mindfulness; (xix) the negative correlation between trait depression and likeability would be *less negative* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (xx) the negative correlation between trait depression and number of friends would be *less negative* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; (xxi) the negative correlation between trait anxiety and popularity would be *less negative* for those high in trait mindfulness than for those low in trait mindfulness; (xxii) the negative correlation between trait anxiety and social acceptance would be *less negative* for early adolescents high in trait mindfulness than for those low in trait mindfulness; (xxiii) the negative correlation between trait anxiety and likeability would be *less negative* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness; and, (xxiv) the negative correlation between trait anxiety and number of friends would be *less negative* for early adolescents high in trait mindfulness than for early adolescents low in trait mindfulness.

Trait mindfulness as predictor of state experience. Trait mindfulness was hypothesized to: (6) predict (i.e., account for significant variance in) state measures, and

(7) predict the variability in state measures. Specifically, trait mindfulness was expected to predict: (6a) state mindfulness, (6b) state stress, (6c) state positive emotion, and (6d) state negative emotion. Moreover, trait mindfulness was expected to predict: (7a) the variability in state mindfulness, (7b) the variability in state stress, (7c) the variability in state positive emotion, and (7d) the variability in state negative emotion.

Finally, since state mindfulness is more temporally proximal (i.e., simultaneous) to other momentary outcomes (i.e., state perceived stress, state positive emotion, state negative emotion) than trait mindfulness, it was expected that: (8) state mindfulness would be a stronger predictor of momentary outcomes than trait mindfulness.

State mindfulness as mediator of other state scales. Hypotheses 9 related to mediation involving state mindfulness. Two mediation models were examined: in the first, state mindfulness was expected to mediate between state perceived stress and state emotion; in the second mediation model, state perceived stress was, alternately, hypothesized to mediate between state mindfulness and state emotion. For the first model, state mindfulness was specifically hypothesized to mediate: (9a) between state perceived stress and state positive emotion, and (9b) between state perceived stress and state negative emotion. Due to the conditions that must be met for mediation to occur (described in the Results section), several other hypotheses are implied here. Participants who reported higher levels of state mindfulness were expected to: (9c) report less state perceived stress; (9d) report more state positive emotion; and (9e) report less state negative emotion. Finally, with regard to the second mediation model, state perceived stress was expected to mediate: (9f) between state mindfulness and state positive emotion, and (9b) between state mindfulness and state negative emotion.

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Method

Overview

The design of the present study involved two phases of data collection. In the first phase, questionnaires were used to evaluate participant traits (predispositions). In the second phase, a fixed schedule version of the experience sampling method (Csikszentmihalyi & Larson, 1987) was used to assess participant state experience on multiple occasions.

Participants

Participants were 5th and 6th grade elementary schoolchildren (N= 114) from an English-speaking school in a middle-class suburb of Montreal, Canada. The mean age for the 61 girls and 53 boys who participated was M= 10.83 (SD = .74) years, with a range of 9 to 13 years. The participants for this study were part of a larger study that incorporated measures of the stress hormone cortisol. Consequently, the data from participants who, at the time of data collection, were taking psychostimulants known to affect cortisol levels (e.g., methylphenidate, adderall) were eliminated. Moreover, students for whom both individual and parental consent were not obtained were excluded from the study. The potential pool of 120 students was, therefore, reduced by six; the participation rate was 95%. Ethical approval for the larger study was obtained from the institutional review board of Concordia University.

Procedure

Potential participants were met within a group format to describe the purposes and procedures of the study. They were informed: (a) of what they would be required to do if they participated, (b) that their participation was voluntary and confidential, (c) that this

was not a treatment study, and (d) that their school was not chosen for any particular reason. Potential participants were given a permission letter that described the purposes and procedures of the study to their parents (see Appendix A). Participants were asked to bring the letter home for their mother/father/legal guardian to read and then indicate on the enclosed consent form whether or not they granted permission for their child's participation. It was made clear that the consent form was to be returned – each child who did so received two dollars whether permission was granted or not. Participation was limited to children who had received parental/legal guardian consent and consented themselves (see Appendix B).

Data collection involved two phases. During the first phase, questionnaires (see Appendix C) were administered using a group administration procedure in participants' homerooms. All instructions were read aloud while participants privately marked their responses at their desks. Participants were encouraged to complete the questionnaires quietly and carefully, and according to what really happens to them rather than what they thought their experience ought to have been in an attempt to control for socially desirable responding. During the questionnaire administration, experimenters (two per classroom) circulated to promptly answer questions individually. At the end of administration, an informational session was carried out to inform participants of the procedures for the second part of the study and to provide each with a self-report booklet (see Appendix D).

During the second phase, a *fixed schedule* version of experience sampling (Csikszentmihalyi, 1990; Csikszentmihalyi & Larson, 1987; Csikszentmihalyi & Rathunde, 1993) was used to minimize disruption to the participants' academic schedule. Data were collected for four consecutive days, five times daily: early morning (30

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minutes after waking), following arrival at school (8:10am), after morning recess

(9:55am), after lunch (12:20pm), and after afternoon recess (2:00pm). At each time,

participants completed booklet questions that focused on the social interactions, perceived

stress, attention/awareness (mindfulness), and emotions experienced within the preceding

15 minutes. At the end of data collection, each participant who completed the

questionnaire received 20 dollars, and those who completed at least half of the booklet

received an additional five dollars.

At the end of the academic year, an interactive session on brain awareness and

stress management was provided to participants in attendance. During the summer,

participants were sent a letter containing a report of the group findings.

Scales and Variable Definitions

Perceived Stress. Due to the central role of perception in determining the extent to

which an event is deemed stressful, scales considered for the present investigation were

limited to those that focused on perception; objective measures of events were not

considered. Moreover, since both trait and state aspects of perceived stress were of

interest, a scale with two versions – one comprehensive, the other abridged for rapid

administration – was required. The Perceived Stress Scale (PSS: Cohen, Kamarck, &

Mermelstein, 1983), a well-validated scale with 14-item and 4-item versions, was

selected. Since the original scale was designed for community samples with at least a

junior high school education, however, the instructions and items were modified to

account for participant reading level (see "How I Manage" in Appendix C, and seventh

small page within Appendix D).

Confirmatory factor analyses were conducted on the Modified Perceived Stress Scale (MPSS) used in the present investigation. In contrast to Cohen et al.'s (1983) analyses of the PSS, in which a single factor was found, the MPSS loaded on two factors according to whether the item was positively or negatively stated. Moreover, on the basis of reliability analyses, some items were removed to ensure adequate reliability. The items retained for the two factors, *cope* and *stress*, were limited to positively stated items 6, 7, 9, 10, and 13, and to negatively stated items 1, 2, 3, and 11, respectively. The internal consistencies (Cronbach's alphas) of the *cope* and *stress* scales were .72 and .74, respectively (see Appendix E; see Nunnelly, 1978, for details). Thus, trait-level perceived stress scores were obtained in the present study by averaging the scores of the retained items (i.e., items 1, 2, 3, and 11). The mean of *trait perceived stress* was $M= 2.52$ ($SD=$ .89) with a range between 1.00 and 5.00 (see Table 1). Trait-level *cope* scores were similarly obtained from items 6, 7, 9, 10, and 13, had a mean of $M= 3.15$ ($SD= .78$), and ranged between 1.00 and 5.00 (see Table 1). Skewness and kurtosis indices were also determined to ensure that the scores on scales were normally distributed. Since none of the absolute values for skewness exceeded 3.0 (Chou & Bentler, 1995) and none of the absolute values for kurtosis were greater than 10.0 (Kline, 1998, 2005), all scales met the assumption of normality.

The scoring and analysis of the 4-item state version of the PSS were conducted in keeping with a different procedure. First, since the state version was administered to each participant as many as 20 times (i.e., repeated-measures design), participant scores on any given item could not be averaged across the 20 times while maintaining statistical

Table 1

Descriptive Statistics for Trait Scales

Scale	M	SD	Range	Skewness Statistic	SE	Kurtosis Statistic	SE
Stress	2.52	.89	1.00, 5.00	.36	.23	-.27	.46
Cope	3.15	.78	1.00, 5.00	-.20	.23	.57	.46
Positive emotion	3.86	.76	1.00, 5.00	-1.26	.23	2.58	.46
Negative emotion	2.12	.70	1.00, 4.20	.87	.23	.53	.46
Self-report anxiety	2.58	.98	1.00, 5.00	.44	.23	-.36	.46
Self-report depression	2.44	.66	1.00, 4.33	.60	.23	.32	.46
Peer-nominated anxiety [a]	1.43	1.35	0.00, 7.00	1.01	.23	1.05	.46
Peer-nominated depression [a]	1.24	1.00	0.00, 6.80	2.10	.23	5.97	.45
Mindfulness	4.46	.84	2.40, 5.87	-.53	.23	-.37	.46
Number of same-sex friends [a]	4.14	2.33	0.00, 10.00	.01	.23	-.91	.45
Same-sex social acceptance [a]	6.03	2.44	0.00, 11.00	-.63	.23	-.61	.45
Likeability	3.09	.56	1.55, 4.62	-.15	.23	.46	.45
Popularity [a]	2.71	2.42	0.00, 10.50	.70	.23	-.40	.45

Note. [a] Non-standardized descriptive statistics shown here for comparison purposes. For all other analyses, however, standardized scores were used for these scales (i.e., standardized across sex and classroom to account for varying numbers of participants of each sex in each class).

independence. Consequently, four numbers between 1 and 20 were randomly generated –
2, 10, 14, and 18 – and corresponding data collection times were determined. Since there
were five data collection times per day across four days, the randomly-generated number
2 corresponded to the second data collection time on day 1; the randomly-generated
number 10 corresponded to the fifth data collection time on day 2; 14 corresponded to the
fourth time on day 3; and 18 corresponded to the third time on day 4. Reliability analyses
were conducted at each of these four data collection times. (Note: this procedure was used
for all *state* scales – state perceived stress, state positive emotion, state negative emotion,
and state mindfulness).

The second procedural modification for the scoring and analysis of the 4-item
state perceived stress scale stemmed from the fact that all of the items were negatively
stated. State perceived stress scores were, therefore, obtained by simply averaging the
scores of the four items; high scores indicated high state perceived stress. The mean level
of state perceived stress at each of the aforementioned four times were: M= 1.75 (SD=
.78), with a range between 1.00 and 4.00; M= 1.67 (SD= .95), with a range between 1.00
and 5.00; M= 1.69 (SD= .96), with a range between 1.00 and 5.00; and, M= 1.60 (SD=
.95), with a range between 1.00 and 5.00. The internal consistencies at each of the four
times were: .70, .87, .86, and .87 (see Appendix J). These results indicate minimal
variability in the descriptive statistics across the four selected times, and the consistently
adequate reliability of this scale.

Emotion. Five conceptual and methodological issues were addressed to select a
measure of emotion. The first three of these were related to dimensionality. In brief,
whereas some emotions were conceptualized as unitary constructs by early researchers, it

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was later determined that emotion could be more effectively characterized with two dimensions: positive affect, and negative affect (Bradburn, 1969; Diener & Emmons, 1985; Watson, Clark, & Tellegen, 1988). The second dimensionality issue related to the nature of the dimensions themselves. Whereas unrotated dimensions (e.g., *pleasantness-unpleasantness* and *arousal*) have been proposed, varimax-rotated factors have been used more extensively and effectively in the self-report emotion literature (Watson et al., 1988). Third, characterizing emotion using two dimensions presented its own methodological challenges. The scale was required to: (a) sample from the entire range of positive and negative emotions; (b) measure the intensity and frequency of specific emotions to account for the possibility of simultaneous positive affect and negative affect, yet in different proportions (i.e., "mixed emotions"); and (c) circumvent a ceiling effect response tendency for positive emotion, and a floor effect response tendency for negative emotion. The fourth and fifth issues related to measurement reliability that stemmed from the focus of the present investigation on both trait (dispositional) and state (momentary) aspects of emotion. Since memory bias reduces measurement reliability, state emotion needed to be measured ecologically (i.e., in-situ shortly after events). Finally, since reliable ecological measurement depends on minimal disruption of ecological conditions (i.e., participants' academic schedule), administration time was key. As with other state scales used in this study, the administration time of this scale was limited to one minute.

Several well-validated self-report emotion scales were considered for this investigation (Diener & Emmons, 1985; McNair, Lorr, & Droppelman, 1971; Watson & Clark, 1994; Watson, Clark, & Tellegen, 1988), however, the majority contained numerous items, making them unfeasible to administer. The scale that most closely met

the aforementioned requirements was that by Diener and Emmons (1985). Since it has

been validated for multiple time periods, it was selected to investigate both trait and state

aspects of emotion. Because their scale was designed with adult populations in mind,

however, the instructions and items were modified for the present study to account for

participant reading level (see "My Feelings" in Appendix C, and eighth small page of

Appendix D). Positive emotion scores were obtained by averaging the scores on items 1,

4, 6, and 9, and negative emotion scores by averaging the scores on items 2, 3, 5, 7, and 8.

The mean level of trait positive emotion was M= 3.86 (SD= .76) with a range between

1.00 and 5.00 (see Table 1). The mean level of trait negative emotion was M= 2.12 (SD=

.70) with a range between 1.00 and 4.20 (see Table 1). The internal consistencies for trait

positive emotion and trait negative emotion were .73 and .71, respectively (see Appendix

F).

The scoring and analyses of the 9-item *state* version of Diener and Emmons

(1985) scale followed the aforementioned procedure for state scales (outlined in

Perceived Stress section of Method). That is, since participants were administered the

state version of this scale as many as 20 times, participant scores on a given item could

not, for reasons of statistical independence, be averaged across all 20 times.

Consequently, only data collected at those times corresponding to the aforementioned

four randomly generated numbers were analyzed for reliability. These analyses,

conducted separately for data at each of these times, indicated the following mean levels

of *state positive emotion*: M= 3.57 (SD= 1.16) with a range between 1.00 and 5.00; M=

3.61 (SD= 1.20) with a range between 1.00 and 5.00; M= 3.70 (SD= 1.14) with a range

between 1.00 and 5.00; and, M= 3.36 (SD= 1.28) with a range between 1.00 and 5.00,

respectively. The corresponding internal consistencies of state positive emotion were .91, .86, .84, and .87 (see Appendix K). The mean levels of *state negative emotion* were: $M=$ 1.52 ($SD=$ .73) with a range between 1.00 and 3.80; $M=$ 1.38 ($SD=$ .84) with a range between 1.00 and 5.00; $M=$ 1.53 ($SD=$ .94) with a range between 1.00 and 5.00; and, $M=$ 1.50 ($SD=$ .93) with a range between 1.00 and 5.00. The internal consistencies of state negative emotion were .85, .93, .93, and .92 (see Appendix K). These results indicated minimal variability in the descriptive statistics of state positive emotion and state negative emotion scales across the four times, and consistently good reliability. It is also noteworthy that the intensity of positive and negative emotions has been argued to be a dimension of personality (i.e., emotionality), and has been found associated with autonomic arousal and reports of distress in emotion-inducing contexts (Larsen & Diener, 1987).

To further examine emotion, two other scales were used. First, emotion was investigated using a second self-report scale (see "What am I like?" in Appendix C). Participants used a five-point Likert type scale to rate the extent to which statements applied to them (i.e., where "1" corresponded to "Never true"; "5" represented "Always true"). *Self-report trait anxiety* was tapped using items 3, 7, and 25 (i.e., "I get stressed a lot"; "I worry a lot"; "I am nervous or tense"). Self-report trait anxiety scores were obtained by averaging the scores across these items; higher scores indicate more self-report trait anxiety. The mean level of self-report trait anxiety was $M=$ 2.58 ($SD=$ .98) with a range between 1.00 and 5.00 (see Table 1), and the internal consistency was .75 (see Appendix G). *Self-report trait depression* scores were determined by averaging each participant's scores across items 1, 2, 6, 14, 15, 16, 19, 21, and 32. The mean level of

self-reported trait depression was $M= 2.44$ ($SD= .66$) with a range between 1.00 and 5.00 (see Table 1). The internal consistency of the self-report trait depression scale was .74 (see Appendix G).

The final means of assessing emotion was a peer assessment procedure, in which information about other participants was collected according to different aspects of functioning (see "What are they like?" in Appendix C); this procedure was based upon on Masten, Morison, and Pellegrini's (1985) "class play" method of peer assessment. In brief, the scale used in the present study consisted of roles in a hypothetical play (characteristics) that participants ascribed to classmates. Each role was accompanied by a list of the names of participating classmates, from which participants nominated one or more classmates whom they thought were described by the role. For each role, the number of nominations was standardized within sex and classroom to account for differences in the number of boys and girls in each classroom who could nominate the target child. The roles that tapped trait anxiety included same- and other-sex nominations for roles 1 and 8 (i.e., "Someone who is nervous or tense"; "Someone who gets stressed a lot"). Participants' *peer-nominated trait anxiety* scores were determined by averaging the standardized number of nominations received across these four items; higher scores indicate more perceived anxiety. The mean non-standardized number of nominations for peer-rated trait anxiety (the non-standardized statistics are provided as a more informative index than the equivalent standardized statistics) was $M= 1.43$ ($SD= 1.35$) with a range between 0.00 and 7.00 (see Table 1). The internal consistency of the peer-nominated trait anxiety scale was .73 (see Appendix H). Roles that tapped trait depression included same- and other-sex nominations for items 3, 10, 18, 32, and 36. Participants' *peer-nominated*

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trait depression scores were obtained by averaging the number of nominations received (standardized within sex and classroom) for these ten items; higher scores indicate more perceived depression. The mean non-standardized number of peer nominations for trait depression was *M*= 1.24 (*SD*= 1.00) with a range between 0.00 and 6.80 (see Table 1). The internal consistency of the peer-nominated trait depression scale was .85 (see Appendix H).

Mindfulness. All of the mindfulness scales available prior to data collection were considered for the present study: the Mindful Attention Awareness Scale (MAAS: Brown & Ryan, 2003), the Toronto Mindfulness Scale (Bishop et al., 2003), and the Freiburg Mindfulness Inventory (FMI: Buchheld et al., 2001). For the interested reader, mindfulness scales have since been developed (Baer et al., 2004; Cardaciotto, 2005; Walach et al., 2006). In the present study, Brown and Ryan's MAAS was selected for the following reasons. First, mindfulness was defined as naturally occurring, and not limited to individuals who formally practice mindfulness skills (e.g, meditators). Second, two versions existed – a 15-item *trait mindfulness* scale, and a 5-item *state mindfulness* scale – making the scale well suited to experience sampling. Third, both the trait and state versions of the MAAS demonstrated strong convergent, discriminant, and incremental validity.

Fourth, item selection reflected judicious inclusion and exclusion criteria. Earlier findings (Brown & Ryan, 2001, as cited by Brown & Ryan, 2004) uncovered two factors for mindfulness: "presence" (i.e., *open* or *receptive* attention/awareness), and "acceptance" (i.e., orientation to experience). However, *presence* was found to subsume *acceptance*, and account for most of the explained variance in mindfulness.

Consequently, items that focused on *attention to* and *awareness of* aspects of present-moment experience were retained, whereas items that reflected attitudinal attributes (e.g., acceptance, empathy, gratitude), motivational intent (i.e., why remain attentive?), or consequences associated with mindfulness (e.g., calmness, emotional well-being) were excluded. Further, items that assumed or implied refined levels of consciousness were excluded to ensure the scale was well adapted for the general population. Finally, items that reflected high levels of attention and awareness were excluded because of participants' tendency to endorse them favourably, and thereby risk producing a skewed response distribution.

In the present study, the wording of MAAS items was modified to reflect the reading level and age-appropriate activities of 9- to 13-year-olds (see "Every Day Situations" in Appendix C). Internal consistency and confirmatory factor analyses were conducted to examine whether the factor structure would be maintained in a sample with younger ages. Trait mindfulness scores were derived by reverse scoring and then averaging the scores of all 15 items; high scores therefore reflected more trait mindfulness. The mean level of trait mindfulness was $M = 4.46$ ($SD = .84$) with a range between 2.40 and 5.87 (see Table 1). The internal consistency was .88 (see Appendix I).

As a means of assessing the extent of within-person variability in mindfulness, a subset of items from the trait mindfulness scale were selected and reworded slightly to reflect recent occurrence. In keeping with the work of Brown and Ryan (2003), items 3, 8, 10, 13, and 14 were selected for the state mindfulness scale on the basis of their applicability to a variety of situations. As with the trait version, these items of the state version were modified for the present study to reflect the reading level and age-

appropriate activities of early adolescents (see sixth small page of booklet in Appendix D). Reliability analyses and scoring of the 5-item state mindfulness scale were conducted according to the aforementioned procedure for state scales (outlined in Perceived Stress section of Method). Consequently, state mindfulness data collected at four times corresponding to the randomly generated numbers were analyzed for reliability. State mindfulness scores were then obtained by reverse scoring each item and averaging across the five items; high scores indicated more mindful states. The mean levels of state mindfulness at the four times were: $M= 4.88$ ($SD= 1.26$), $M= 5.01$ ($SD= 1.51$), $M= 5.16$ ($SD= 1.46$), and $M= 5.26$ ($SD= 1.46$). The range at all four times was between 0 and 6. The corresponding internal consistencies were .82, .93, .97, and .97, respectively (see Appendix L). These values demonstrate the minimal variability in descriptive statistics and consistently strong internal consistency of the state mindfulness scale.

Peer Relations. In the present study, peer relations were tapped using five means: popularity, social acceptance, social preference (likeability), friendship status, and friendship extensivity. To determine a participant's number of friends (i.e., friendship extensivity), a sociometric questionnaire was administered (see "Who are your friends?" in Appendix C). Participants were given a list of the names of participating classmates arranged in two columns: the left column contained the names of same-sex classmates, the right column other-sex classmates. To nominate friends, participants wrote a number next to the name of each same-sex classmate they considered a friend (i.e., "1" in the box next to best friend's name, "2" next to second best friend's name, etc.). If a classmate was considered their fourth (or higher numbered) best friend, participants were asked to write a "4" next to the name. Participants then did the same with the names of other-sex

classmates. The same-sex nominations were then used to determine each participant's number of mutual (reciprocated) friends (other-sex nominations were not used; for details see Maccoby, 1988; Masters & Furman, 1981). Mutual friends were defined as individuals who nominated a same-sex classmate as friend (e.g., best friend, second best friend, third best friend, or another friend) and who were, in turn, nominated by that same-sex classmate as friend. The *number of same-sex friends* was standardized within sex and classroom to account for differences in the number of boys and girls in each class. The overall mean was obtained by averaging across all of the standardized means for each sex in each class. For comparative purposes, the overall *non*-standardized mean was $M = 4.14$ ($SD = 2.33$), with a range between 0.00 and 10.00 (see Table 1); 93.9% of participants ($N = 107$) had at least one mutual friend.

The second means of assessing aspects of peer relations, social acceptance, also involved a nomination procedure. Social acceptance was defined as the number of times a child was selected as a friend by same-sex children in his/her class (i.e., mutuality was not a requirement in the operational definition of social acceptance). *Same-sex social acceptance* was standardized within class and sex in order to permit cross-sex and cross-class comparisons. The overall non-standardized mean was $M = 6.03$ ($SD = 2.44$) same-sex friendship nominations with a range from 0.00 to 11.00 (see Table 1).

The third peer nomination technique used was related to *likeability*. Each participant was given a list of the names of participating classmates (see untitled second page of Appendix C). Next to each classmate's name there were five boxes with a number (from 1 to 5) located next to them. Each number corresponded to a likeability rating, where "1" represented "Do not like the person", and "5" represented "Like the

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person very much". Participants indicated the number that corresponded to how much they liked each classmate. *Likeability* was defined as the mean of ratings received from classmates. Since the likeability rating was calculated by dividing the sum of all classmates' ratings by the number of ratings, the denominator accounted for cross-class differences in the number of classmates; standardization was therefore not required. Participants received a *likeability* rating of $M = 3.09$ ($SD = .56$) with a range of 1.55 to 4.62 (see Table 1).

The fourth means of assessing an aspect of peer relations, popularity, stemmed from the aforementioned class play method, for which a description and sample are located in the Emotion section of the Method chapter and in "What are they like?" in Appendix C. From the list of roles (characteristics), popularity was tapped by same- and other-sex nominations for roles 15 and 21 (i.e., "Someone who is liked by lots of people"; "Someone who is popular"). Participants' popularity scores were determined by averaging the number of nominations received across these four roles; higher scores indicate greater popularity. The number of nominations for popularity was standardized within-classroom and within sex; the non-standardized mean was $M = 2.71$ ($SD = 2.42$) with a range between 0.00 and 10.50 (see Table 1). The internal consistency of the peer-rated popularity scale was .87 (see Appendix H).

Variability in State Scales. The variability of state scales was examined to evaluate the hypothesis that, in contrast to less mindful peers, more mindful individuals will report: (a) less variable stress levels; (b) less variable levels of mindfulness; and, (c) less emotional lability. Consequently, the variance in state stress, state mindfulness, state positive emotion, and state negative emotion were used as the primary indices of

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variability in state experience (see Table 2). The mean variability and range of state

positive emotion, state negative emotion, state stress, and state mindfulness across the 20

data collection times were: M= .64 (SD= .39) with a range of 0 to 1.62; M= .42 (SD= .38)

with a range of 0 to 1.69; M = .40 (SD= .30) with a range of 0 to 1.35; and, M = .54 (SD=

.43) with a range of 0 to 1.52.

Table 2

Descriptive Statistics for Variability in State Scales

Scale	M	SD	Range	Skewness		Kurtosis	
				Statistic	SE	Statistic	SE
Variability in state positive emotion	.64	.39	0.00, 1.62	.51	.24	-.17	.47
Variability in state negative emotion	.42	.38	0.00, 1.69	1.17	.24	1.16	.47
Variability in state stress	.40	.30	0.00, 1.35	.86	.24	.48	.47
Variability in state mindfulness	.54	.43	0.00, 1.52	.64	.24	-.67	.47

Results

Analyses were organized into five sections. In the first, scale psychometric properties were determined using confirmatory factor analyses and internal consistency analyses. In the second, the degree and nature of relations between trait mindfulness and *other trait scales* of interest were elucidated using correlational analyses and multiple regression analyses. In the third section, the degree and nature of the relation between trait mindfulness and the *state scales* were examined using hierarchical linear modeling (HLM). The third section included investigations of trait mindfulness as a predictor of the state scales themselves (i.e., state mindfulness, state stress, state positive emotion, and state negative emotion) and as a predictor of the within-person variability in each state scale. The third section concluded with an examination of whether trait mindfulness or state mindfulness more strongly predicted the other state scales. In the fourth section, HLM was used to examine the relations between the state scales, and in particular whether or not state mindfulness mediated between state perceived stress and state emotion. In the fifth and final section, empirically-driven exploratory factor analyses and corresponding structural equation models were conducted to account for the relative lack of moderation by trait mindfulness in the relations between the variables of trait stress, trait emotion, and social functioning.

Insofar as in the present study multiple domains were examined with many measures, only key results are presented in this section; the remainder of the results, albeit important, are presented in the appendices. Specifically, the first section (i.e., scale psychometrics) and the second section (i.e., results from the correlational and multiple regression analyses) can be found in Appendix M. Consequently, the present chapter

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includes analyses of the following: the relation between trait mindfulness and the state scales (using HLM); the relation between state mindfulness and other state scales (using HLM); and, the relation between trait mindfulness and other trait scales (using SEM).

In order to conduct HLM and SEM (and multiple regression; Appendix M) in a meaningful way, the two conceptualizations of mindfulness – trait and state – required careful consideration. According to the first conceptualization, mindfulness is a naturally occurring trait, to which individuals are predisposed to varying degrees. It has also been asserted that trait mindfulness can be cultivated (Kabat-Zinn, 1990; Shapiro et al., 2006). That is, through regularly and consistently attending to experience in a mindful way, an individual can gradually increase his/her predisposition to mindfulness. When conceptualized in this way, mindfulness may *moderate* the relation between the other trait scales.

According to the second conceptualization, mindfulness is a state that involves awareness and acceptance of one's ongoing experience of internal and external events. By engaging experience in this way, it has been argued, the experience itself is altered. As such, state mindfulness is conceptualized as a mechanism through which experience is processed in real-time, and may therefore *mediate* between events and subsequent experiences of or responses to them (e.g., emotion, behaviour).

The former conceptualization of mindfulness was borne in mind when multiple regression analyses, hierarchical linear modeling, and structural equation modeling were conducted with trait measures. Trait mindfulness was therefore analyzed as a moderator of the relations between other trait scales. Conversely, when viewed as a state, mindfulness was analyzed as a mediator between other state scales.

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Relation between Trait Mindfulness and State Scales

The aim of this section was to investigate the relation between trait and state measures and answer the question, To what extent does trait mindfulness predict state perceived stress, state mindfulness, and state emotion, and their *variability*? Recall that several hypotheses involving trait mindfulness and state scales were posited. First, trait mindfulness was expected to be negatively correlated with the variability in: state mindfulness, state stress, state positive emotion, and state negative emotion (i.e., as trait mindfulness increases, variability decreases). Second, trait mindfulness was expected to predict (account for significant variance in): state mindfulness, state stress, state positive emotion, and state negative emotion. Third, due to the temporal proximity of state mindfulness to other state outcomes (i.e., they were reported at the same times), state mindfulness was expected to be more strongly related to state outcomes than trait mindfulness. The following predictions were therefore implied: state mindfulness was expected to be more positively related to state positive emotion than trait mindfulness; state mindfulness was expected to be more negatively related to state negative emotion than trait mindfulness; and, state mindfulness was expected to be more negatively related to state perceived stress than trait mindfulness. This section presents the investigations of these three areas using correlational analyses and hierarchical linear modeling.

Trait mindfulness and variability in state scales. Several correlations were hypothesized between trait mindfulness and the variability in each of: state mindfulness, state stress, state positive emotion, and state negative emotion. These correlations are indicated in bold font in Table 3. The correlation between trait mindfulness and variability in state mindfulness, $r = -.28, p < .01$, indicated that participants who reported

more attention to everyday experience (i.e., higher trait mindfulness), reported more

consistent attention to state experience across *time of day* and across *day of study*. The

correlation between trait mindfulness and variability in state stress, $r = -.23, p < .05$ (see

Table 3), indicated that participants who reported more attention to everyday experience,

also reported less variable intensity of state perceived stress. The significant correlation

between trait mindfulness and variability in state positive emotion, $r = -.19, p < .05$ (see

Table 3), indicated that those who reported more attention to everyday experience, had

less variable intensity in their positive emotions throughout the study. The correlation

between trait mindfulness and variability in state negative emotion, $r = -.18, p < .05$ (see

Table 3), suggested that more trait mindful early adolescents, had less variable intensity

in their state negative emotions. In sum, these findings were consistent with the assertion

that trait mindfulness predicts less variability (i.e., stabilizes) state experience.

Unexpected correlations were also found between three trait scales (trait negative

emotion, self-report anxiety, self-report depression) and the variability within three of the

state variables (variability in state stress, variability in state mindfulness, variability in

state negative emotion) (see Table 4). Although these correlations were indirectly related

to the hypotheses, they provide further support for them. That is, whereas trait

mindfulness was associated with less variation (more consistency) in state experience,

traits antithetical to mindfulness (i.e., "preoccupied non-acceptance") were predictive of

greater lability in state experience.

Trait mindfulness as predictor of state scales. Since state scales in the present

investigation involved repeated assessments of state-level experience (i.e., time-

dependent variables) that were nested within person-level trait scales (i.e., time-

Table 3

Correlations between Trait Mindfulness and Variability in State Scales

Scales	1	2	3	4	5
			$(n = 105)$		
1. Trait mindfulness	1.00	**-.28**[++]	**-.23**[+]	**-.19**[+]	**-.18**[+]
2. Variability in state mindfulness		1.00	.70***	.12	.35***
3. Variability in state stress			1.00	.25**	.56***
4. Variability in state positive emotion				1.00	.66***
5. Variability in state negative emotion					1.00

Note. Bold font indicates correlations specifically relevant to hypotheses.

** $p < .01$, two-tailed. *** $p < .001$, two-tailed. [+] $p < .05$, one-tailed. [++] $p < .01$, one-tailed.

Table 4

Correlations between Trait Scales and Variability in State Scales

Trait scale	State scale		
	Variability in state stress	Variability in state mindfulness	Variability in state negative emotion
	(n = 105)		
Trait negative emotion	.42***	.31***	.37***
Self-report trait anxiety	.33***	.26**	.33***
Self-report trait depression	.34***	.37***	.34***

Note. ** *p* < .01, two-tailed. *** *p* < .001, two-tailed.

independent variables), statistical dependence among the waves of data precluded the use of conventional statistical methods (Boyle & Willms, 2001). Hierarchical linear modeling (HLM), which accounts for within-person correlations, was therefore used to investigate the relations between state and trait scales (this subsection), and the relations among state scales (next subsection). Finally, because mindfulness is thought to develop in a continuous fashion, the analytic approach employed throughout was *growth curve modeling*.

This subsection addressed whether or not trait mindfulness predicted significant variance for the following outcome variables: state mindfulness, state stress, state positive emotion, and state negative emotion. In addition to testing trait mindfulness as a predictor for each outcome variable, the multilevel models included time series variables (time of day, day of study), and demographic variables (sex, age) as predictors as well to control for their effects (see Tables 5, 6, 7, and 8). All predictors were entered simultaneously. Whereas significant unstandardized parameter estimates can be found throughout the first columns of Tables 5, 6, 7, and 8, only those indicated in bold font are relevant to the hypotheses in the present study. Consequently, discussion has been limited to the bold-font parameter estimates. Further, since the model intercept parameters were not going to be interpreted (other than as an index of the relative proportions of within- and between-person variability), the predictor variables were entered as uncentered (Raudenbush & Bryk, 2002).

With state mindfulness as the outcome variable, support was found for the hypothesis that trait mindfulness would predict state mindfulness, *coefficient* = .293, t = 2.63, $p < .01$ (see coefficients in bold font in Table 5). Moreover, one unexpected finding

Table 5

Hierarchical Linear Regression Model of State Mindfulness on Time Series

Variables, Demographic Variables, and Trait Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	($n = 105$)		
Time of day	**.001**	.007	.095
Day of study	**.130***	.026	5.087
Sex	**-.158**	.182	-.866
Age	**-.155**	.152	-1.020
Trait mindfulness	**.293**	.111	2.629

Random effects	Variance component	df	Chi-square	*p*-Value
Time of day	.002	103	153.384	.001
Day of study	.049	103	365.268	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates

correlations specifically relevant to hypotheses.

** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

Table 6

Hierarchical Linear Regression Model of State Stress on Time Series

Variables, Demographic Variables, and Trait Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	(n = 105)		
Time of day	-.005	.005	-1.085
Day of study	-.070***	.018	-3.811
Sex	.121	.127	.954
Age	.149	.099	1.509
Trait mindfulness	**-.298***	.084	-3.53

Random effects	Variance component	df	Chi-square	*p*-Value
Time of day	.001	103	147.004	.003
Day of study	.024	103	350.286	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates

correlations specifically relevant to hypotheses.

*** $p < .001$, two-tailed.

Table 7

Hierarchical Linear Regression Model of State Positive Emotion on Time Series

Variables, Demographic Variables, and Trait Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	$(n = 105)$		
Time of day	.037***	.008	4.910
Day of study	.006	.026	.221
Sex	-.199	.171	-1.161
Age	-.337***	.096	-3.499
Trait mindfulness	**.145**	.108	1.335

Random effects	Variance component	df	Chi-square	p-Value
Time of day	.002	104	152.695	.002
Day of study	.047	104	313.701	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates

correlations specifically relevant to hypotheses.

*** $p < .001$, two-tailed.

Table 8

Hierarchical Linear Regression Model of State Negative Emotion on Time Series Variables, Demographic Variables, and Trait Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	(n = 105)		
Time of day	.002	.005	.364
Day of study	-.020	.021	-.908
Sex	.078	.105	.744
Age	.236*	.104	2.262
Trait mindfulness	**-.166***	.067	-2.460

Random effects	Variance component	df	Chi-square	*p*-Value
Time of day	.000	104	108.584	.359
Day of study	.032	104	340.554	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates correlations specifically relevant to hypotheses.

* *p* < .05, two-tailed.

also emerged: state mindfulness *was* associated with *day of study, coefficient* = .130, t = 5.09, *p* < .001, suggesting that the reported levels of state mindfulness increased as the study progressed.

With respect to the multilevel models for the remaining outcome variables (i.e., state stress, state positive emotion, state negative emotion), support was found for the majority of the hypotheses (see coefficients in bold font in Tables 6, 7, and 8). Trait mindfulness was negatively associated with state stress, *coefficient* = -.298, t = -3.53, *p* < .001. Support was found for the contention that trait mindfulness would be negatively associated with negative emotion, *coefficient* = -.166, t = -2.46, *p* < .05. Empirical support was not found for trait mindfulness as predictor of state positive emotion, *coefficient* = .144, t = 1.34, n.s. In sum, whereas trait mindfulness predicted state stress and state negative emotion, it did not predict state positive emotion.

<u>Trait versus state mindfulness: Which is the better predictor of state experience?</u> This subsection addresses whether trait mindfulness or state mindfulness was a stronger predictor of other state measures while controlling for demographic and time series variables. Although the parameter estimates for the demographic and time series variables have been included in Tables 9, 10, and 11, the results discussed here focus on a comparison of the coefficients in bold font in the last two rows. Whereas two findings provide support for the hypothesis that state mindfulness would be a stronger predictor of other state scales than trait mindfulness, a third finding did not. First, whereas state stress was predicted by both trait mindfulness, *coefficient* = -.159, t = -3.60, *p* < .001, and state mindfulness, *coefficient* = -.377, t = -15.28, *p* < .001 (see Table 9), it was more strongly predicted by state mindfulness. Second, whereas state mindfulness predicted state

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Table 9

Hierarchical Linear Regression Model of State Stress on Time Series

Variables, Demographic Variables, State Mindfulness, and Trait Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	($n = 105$)		
Time of day	-.007	.004	-1.526
Day of study	-.025	.012	-1.971
Sex	.057	.067	.861
Age	.054	.045	1.183
State mindfulness	**-.377*****	.024	-15.562
Trait mindfulness	**-.159*****	.044	-3.601

Random effects	Variance component	df	Chi-square	*p*-Value
Time of day	.000	89	124.129	.008
Day of study	.006	89	167.057	.000
State mindfulness	.023	89	245.348	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates

correlations specifically relevant to hypotheses.

*** $p < .001$, two-tailed.

Table 10

Hierarchical Linear Regression Model of State Positive Emotion on Time Series Variables, Demographic Variables, State Mindfulness, and Trait Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	(*n* = 105)		
Time of day	.036***	.007	4.935
Day of study	.003	.027	.093
Sex	-.214	.172	-1.247
Age	-.336	.099	-3.400
State mindfulness	**.129**	.107	1.208
Trait mindfulness	**.041**	.031	1.318

Random effects	Variance component	df	Chi-square	*p*-Value
Time of day	.002	89	123.601	.009
Day of study	.049	89	241.373	.000
State mindfulness	.024	89	121.217	.013

Note. Coefficients are unstandardized parameter estimates. Bold font indicates correlations specifically relevant to hypotheses.

*** $p < .001$, two-tailed.

Table 11

Hierarchical Linear Regression Model of State Negative Emotion on Time Series

Variables, Demographic Variables, State Mindfulness, and Trait Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	($n = 105$)		
Time of day	.003	.005	.694
Day of study	.008	.021	.373
Sex	.083	.066	1.262
Age	.120*	.048	2.476
State mindfulness	**-.214*****	.028	-7.587
Trait mindfulness	**-.080**	.044	-1.813

Random effects	Variance component	df	Chi-square	p-Value
Time of day	.000	89	98.477	.231
Day of study	.029	89	199.592	.000
State mindfulness	.026	89	154.695	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates correlations specifically relevant to hypotheses.

* $p < .05$, two-tailed. *** $p < .001$, two-tailed.

negative emotion, *coefficient* = -.214, t = -7.59, *p* < .001, trait mindfulness did not,

coefficient = -.080, t = -1.81, n.s. (see Table 11). Third, the parameter estimates for state

mindfulness, *coefficient* = .04, t = 1.32, n.s., and trait mindfulness, *coefficient* = .13, t =

1.21, n.s., indicated that neither significantly predicted state positive emotion (Table 10).

<u>Relation Between State Mindfulness and Other State Scales</u>

In this section, the nature of the relationship between state mindfulness and other

state scales was investigated. At the state level, due to the speculative nature of the

present study, two mediation models were considered. First, state mindfulness was

hypothesized to mediate between state perceived stress and state emotion. Specifically,

state mindfulness was hypothesized to mediate between state perceived stress and state

positive emotion, and between state perceived stress and state negative emotion.

According to the second model, state stress was hypothesized to mediate between state

mindfulness and state emotion. That is, state stress would mediate between state

mindfulness and state positive emotion, and between state mindfulness and state negative

emotion. Since experience sampling was used to obtain repeated assessments at the state

level, however, hierarchical linear modeling was required to assess for mediation. This

was done in a manner similar to conventional statistical approaches such as regression

and structural equation modeling. That is, four conditions needed to be met: (a) the

predictor variable must correlate significantly with the outcome variable (see parameter

estimate "c" in Figures 2 and 3); (b) the predictor must be significantly correlated to the

proposed mediator (see parameter estimate "a" in Figures 2 and 3); (c) the proposed

mediator must be significantly associated with the outcome (see "b" in Figures 2 and 3);

and (d) the effect of the predictor on the outcome must be significantly reduced when the
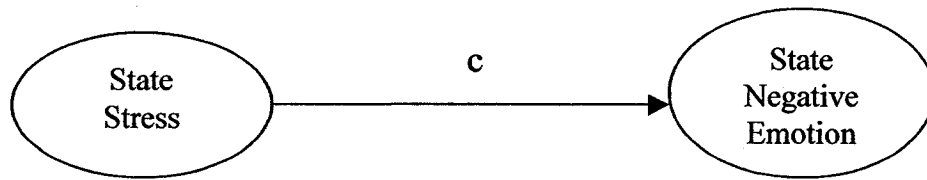
(a) Unmediated model
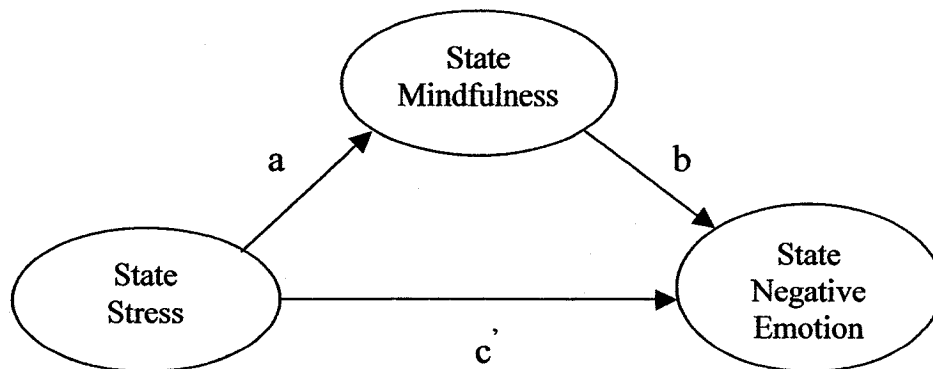
(b) Mediated model

Figure 2. Unmediated and mediated models for state mindfulness as mediator between state stress and state negative emotion.
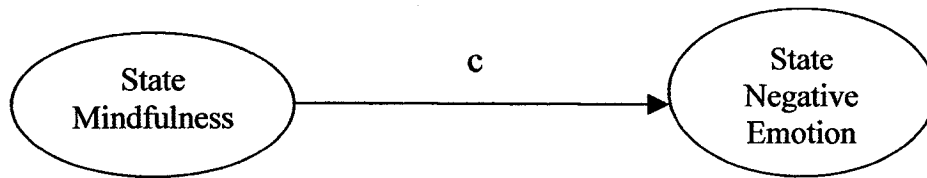
(a) Unmediated model
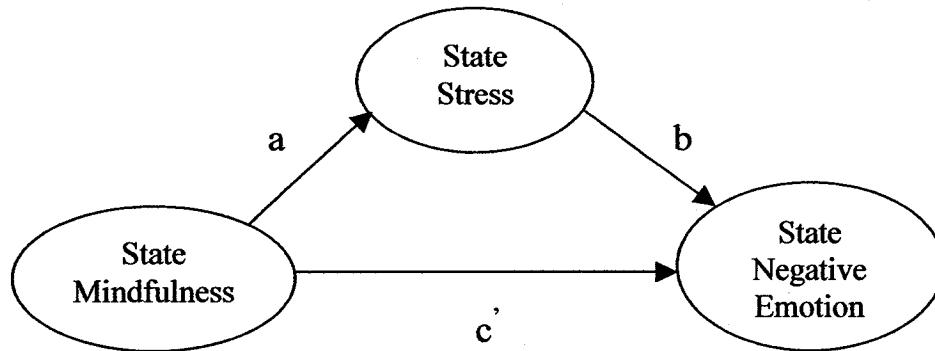
(b) Mediated model

Figure 3. Unmediated and mediated models for state stress as mediator between

state mindfulness and state negative emotion.

effect of the proposed mediator has been accounted for (i.e., "c" minus "c'" in Figures 2 and 3) (Baron & Kenny, 1986; Holmbeck, 1997). Note that since state mindfulness did not correlate significantly with state *positive* emotion (see Table 10), condition (c) for the first mediation model was not met, and condition (a) for the second model was not met. Thus, state mindfulness could not mediate between state stress and state positive emotion, nor could state stress mediate between state mindfulness and state positive emotion. . Consequently, the results that follow are limited to the assessment of: state mindfulness as mediator between state stress and state *negative* emotion, and state stress as a me4diator between state mindfulness and state *negative* emotion. Finally, *time of day* and *day of study* were entered as predictors for each of the four conditions to control for their effect, and increase the accuracy of cross-condition contrasts.

The two models are examined sequentially here, analyses of the first model begin followed by those of the second model. With regard to the first model, in order to ascertain that the first condition of mediation (i.e., significant effect of predictor on outcome) had been met, state stress was entered as a predictor of state negative emotion (see Table 12). It was found that time of day did not predict any significant within-person variance in state negative emotion, *coefficient* = .002, t = .51, n.s., nor did day of study, *coefficient* = -.002, t = -.11, n.s. As hypothesized, the effect of state stress on state negative emotion was significant, *coefficient* = .397, t = 7.67, p < .001, indicating that as state stress levels increased, levels of state negative emotion did as well.

The second condition of mediation (i.e., significant effect of predictor on mediator) of the first model was then assessed, with state stress as the predictor and state mindfulness the proposed mediator (see Table 13). With regards to the partialled time

Table 12

Hierarchical Linear Regression Model of State Negative Emotion on Time Series

Variables and State Stress

Fixed effects	Coefficient	SE	T-ratio
	(*n* = 105)		
Time of day [a]	.002	.004	.514
Day of study [a]	-.002	.019	-.110
State stress	**.397***	.052	7.67

Random effects	Variance component	df	Chi-square	*p*-Value
State stress	.123	94	292.978	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates correlations specifically relevant to hypotheses.

[a] Entered as fixed effect only; residual parameter variance set to zero.

*** *p* < .001, two-tailed.

Table 13

Hierarchical Linear Regression Model of State Mindfulness on Time Series

Variables and State Stress

Fixed effects	Coefficient	SE	T-ratio
	(n = 105)		
Time of day [a]	-.002	.005	-.340
Day of study [a]	.093***	.017	5.479
State stress	**-.681***	.062	-10.912

Random effects	Variance component	df	Chi-square	p-Value
State stress	.192	94	362.632	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates

correlations specifically relevant to hypotheses.

[a] Entered as fixed effect only; residual parameter variance set to zero.

*** p < .001, two-tailed.

series variables, results indicated that *time of day* did not account for significant variance in state mindfulness, *coefficient* = -.002, *t* = -.34, n.s., yet *day of study* did, *coefficient* = .093, *t* = 5.48, *p* < .001. These findings suggests that, whereas state mindfulness did not fluctuate significantly as a function of the time of day, it increased across the four days of data collection; this may be an effect of demand characteristics. Finally, the parameter estimate for state stress as predictor of state mindfulness was significant, *coefficient*= -.681, *t* = -10.91, *p* < .001, revealing that as state stress increased, state mindfulness decreased.

Results for the third condition (i.e., significant effect of proposed mediator on outcome) of the first model revealed that state mindfulness had a significant impact on state negative emotion (see Table 14). The parameter estimate of state mindfulness as predictor of state negative emotion (when time series variables were controlled for) was significant, *coefficient* = -.213, *t* = -7.56, *p* < .001. The parameter estimates for time of day and day of study as predictors of state negative emotion were not significant; the estimates were, *coefficient* = .002, *t* = .39, n.s., and, *coefficient* = .004, *t* = .21, n.s., respectively. These findings indicate that: (a) as state mindfulness increased, state negative emotion decreased, and (b) state negative emotion did not fluctuate significantly as a function of time.

The final mediation condition of the first model was assessed by contrasting the direct effect of state stress on state negative emotion under two conditions: (a) when the effect of state mindfulness on state negative emotion was tested simultaneously (along with time series variables), *coefficient* = .338, *t* = 5.86, *p* < .001, (see Table 15 and path "c'" in Figure 2); and (b) when state stress on state negative

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Table 14

Hierarchical Linear Regression Model of State Negative Emotion on Time Series

Variables and State Mindfulness

Fixed effects	Coefficient	SE	T-ratio
	($n = 105$)		
Time of day [a]	.002	.004	.385
Day of study [a]	.004	.020	.208
State mindfulness	**-.213*****	.028	-7.562

Random effects	Variance component	df	Chi-square	*p*-Value
State mindfulness	.024	92	151.677	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates

correlations specifically relevant to hypotheses.

[a] Entered as fixed effect only; residual parameter variance set to zero.

*** $p < .001$, two-tailed.

Table 15

Hierarchical Linear Regression Model of State Negative Emotion on Time Series

Variables, State Mindfulness, and State Stress

Fixed effects	Coefficient	SE	T-ratio
	$(n = 105)$		
Time of day [a]	.002	.004	.523
Day of study [a]	.006	.019	.298
State mindfulness	**-.088****	.029	-3.046
State stress	**.338*****	.058	5.857

| Random effects	Variance component	df	Chi-square	*p*-Value
State mindfulness	.025	81	151.677	.024
State stress	.155	81	218.408	.000

Note. Coefficients are unstandardized parameter estimates. Bold font indicates

correlations specifically relevant to hypotheses.

[a] Entered as fixed effect only; residual parameter variance set to zero.

** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

emotion was the sole predictor of state negative emotion, *coefficient* = .397, *t* = 7.67, *p* <

.001 (see Table 12 and path "c" in Figure 2).

Although multi-level mediation can present added complexities (Krull &

MacKinnon, 1999), the present study investigated mediation with state-level variables

only; consequently, determining the significance level of the mediated effect was a two-

step process – one step to calculate the numerator, the other to calculate the denominator

(see Appendix N). In the first step, the numerator consisted of the product of the

predictor-mediator parameter estimate and the mediator-outcome parameter estimate. In

the second step, the standard error of the mediated effect was determined. Whereas

multiple methods to calculate the standard error of the mediated effect exist (e.g., first-

order Taylor series expansion, second-order Taylor expansion, estimate of unbiased

variance), for sample sizes in excess of 50, it has been shown that, irrespective of the

method used, estimates of the standard error for the mediated effect are "quite close"

(MacKinnon, Warsi, & Dwyer, 1995, p. 60). Consequently, the estimate of unbiased

variance was used (Goodman, 1960; Krull & MacKinnon, 1999).

Three findings emerged from these calculations for the first model (see Appendix

N). First, a significant indirect effect of state stress was found to act on state negative

emotion via the proposed mediator, state mindfulness, *t* = 3.000, *p* < .01. Second, the

direct effect of state stress on state negative emotion was significantly reduced by the

introduction of the proposed mediator, state mindfulness, *t* = 2.030, *p* < .05. Taken

together, these findings indicate that state mindfulness did, indeed, partially mediate

between state stress and state negative emotion. A third and final finding is that 14.9% of

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the effect of state stress on state negative emotion was due to its indirect effect via state mindfulness.

The same analytical procedure was used to evaluate the second (alternate) mediational model – state stress as mediator between state mindfulness and state negative emotion. However, since the variables in the second model consist of a simple reorganization of those in the first model, the analyses used for the first model were applicable to the second model as follows.

The first condition of mediation (i.e., significant effect of predictor on outcome) of the second model (see Figure 3) was analyzed with state mindfulness entered as a predictor of state negative emotion (see Table 14; note that the values for the first condition of the second model correspond to those of the third condition of the first model). Thus, the parameter estimate of state mindfulness as predictor of state negative emotion (when time series variables were controlled for) was significant, *coefficient* = - .213, *t* = -7.56, *p* < .001. The parameter estimates for time of day and day of study as predictors of state negative emotion were not significant; the estimates were, *coefficient* = .002, *t* = .39, n.s., and, *coefficient* = .004, *t* = .21, n.s., respectively. These findings indicate that: (a) as state mindfulness increased, state negative emotion decreased, and (b) state negative emotion did not fluctuate significantly as a function of time.

The second condition of mediation (i.e., significant effect of predictor on mediator) for the second model (see Figure 3) was then assessed, with state mindfulness as the predictor and state stress the proposed mediator (see Table 13; note that the values for the second condition of the second model correspond to those of the second condition of the first model). With regards to the partialled time series variables, results indicated

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that *time of day* did not account for significant variance in state mindfulness, *coefficient* = -.002, *t* = -.34, n.s., yet *day of study* did, *coefficient* = .093, *t* = 5.48, *p* < .001. These findings suggests that the parameter estimate for state mindfulness as predictor of state stress was significant, *coefficient* = -.681, *t* = -10.91, *p* < .001, revealing that as state mindfulness increased, state stress decreased.

Results for the third condition (i.e., significant effect of proposed mediator on outcome) of the second model (see Figure 3) revealed that state stress had a significant impact on state negative emotion (see Table 12; note that the values for the third condition of the second model correspond to those of the first condition of the first model). The parameter estimate of state stress as predictor of state negative emotion (when time series variables were controlled for) was significant, *coefficient* = -.213, *t* = -7.56, *p* < .001. It was found that time of day did not predict any significant within-person variance in state negative emotion, *coefficient* = .002, *t* = .51, n.s., nor did day of study, *coefficient* = -.002, *t* = -.11, n.s. As hypothesized, the effect of state stress on state negative emotion was significant, *coefficient* = .397, *t* = 7.67, *p* < .001, indicating that as state stress levels increased, levels of state negative emotion did as well.

The final mediation condition of the second model was assessed by contrasting the direct effect of state mindfulness on state negative emotion under two conditions: (a) when the effect of state stress on state negative emotion was tested simultaneously (along with time series variables), *coefficient* = -.088, *t* = -3.05, *p* < .01, (see Table 15 and path "c'" in Figure 3); and (b) when state mindfulness on state negative emotion was the sole predictor of state negative emotion, *coefficient* = -.213, *t* = -7.56, *p* < .001 (see Table 14 and path "c" in Figure 3).

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Three findings emerged from these calculations for the second mediation model (see Appendix O). First, a significant indirect effect of state stress was found to act on state negative emotion via the proposed mediator, state mindfulness, $t = 6.28, p < .001$. Second, the direct effect of state stress on state negative emotion was significantly reduced by the introduction of the proposed mediator, state mindfulness, $t = 17.86, p < .0001$. Taken together, these findings indicate that state stress did, indeed, partially mediate between state mindfulness and state negative emotion. A third and final finding is that 58.9% of the effect of state mindfulness on state negative emotion was due to its indirect effect via state stress.

Thus, of the two mediational models tested, the second model – state stress as mediator between state mindfulness and state negative emotion – was indicative of stronger partial mediation. This suggests that, at the state level, mindfulness appears to precede state stress. That is, when state mindfulness is high, there will be less state stress, which in turn reduces state negative emotion. Conversely, when state mindfulness is low, there will be more state stress, and in turn more state negative emotion. It must be remembered, however, that studying a state process requires multiple forms of assessment, and that a longitudinal model would be needed to examine the reciprocal effects of state stress and state mindfulness. Such a longitudinal model may be beyond the capabilities of the experience sampling method (Csikszentmihalyi & Larson, 1987).

Relation Between Trait Mindfulness and Other Trait Scales

Mindfulness is an emerging area of research, and a such its empirical links to stress and emotion have rarely been examined. Moreover, the present study is the first study to empirically examine the relation between mindfulness and early adolescent peer

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relations. Due to the limited number of relations between the variables of trait stress, trait emotion, and social functioning that were found to be moderated by trait mindfulness, SEM was used to further elucidate (i.e., over and above correlational and multiple regression results) the role of trait mindfulness in the relations between trait stress, trait emotion, and peer relations. Measurement models were developed and tested prior to developing and testing structural models. With regard to the development of measurement models, several points were borne in mind. First, the model was specified with the fewest number of parameters possible to ensure parsimony (i.e., over-identified model). It was anticipated that the number of factors and factor loadings would be straightforward. That is, it was thought that: *trait perceived stress* and *trait cope* would load on a stress-related factor; *trait mindfulness* would be the only scale to load on a mindfulness-related factor; the six emotion scales would load on an emotion-related factor; and the four peer relations scales would load on a factor related to social functioning. Exploratory factor analyses were nonetheless conducted as a preliminary step in the development of the measurement models.

Second, to ensure meaningful SEM results, the ratio of participants to estimated parameters was required to meet or exceed minimal values (Kline, 1998). Scales were therefore limited to those: (a) most relevant to the hypotheses, and (b) that were significantly zero-order correlated with multiple other scales. Third, scales were required to either meet the assumption of normality or be transformed; all scales met this assumption (see Skewness and Kurtosis indices in Table 1). Fourth, due to the nature of the scales and since trait-level data were measured at a single point in time, causality could not be inferred between latent variables (factors). Finally, after extracting the

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factors using the Principal Component method, Oblimin rotation with Kaiser

Normalization was used to allow for intercorrelation between the factors.

Three exploratory factor analyses were conducted. The first of these included all

13 scales at the trait level – that is, stress, cope, positive emotion, negative emotion, self-

report anxiety, self-report depression, peer-nominated anxiety, peer-nominated

depression, mindfulness, number of same-sex friends, same-sex social acceptance,

likeability, and popularity. However, the factor structure required many iterations (34) to

converge, and several scales loaded heavily on more than one factor. Consequently, two

scales that had few significant correlations with other scales and low factor loadings –

peer-nominated anxiety and peer-nominated depression – were removed from further

analyses to obtain the factor structure indicated in Figure 4.

Since the scales that load on Factor 3 ("Positive outlook") were the least related to

trait mindfulness, and therefore to the hypotheses being investigated, they were

eliminated from the second exploratory factor analysis. Consequently, in the second

exploratory factor analysis, the following scales were factor analyzed using Principal

Component extraction and Oblimin rotation with Kaiser Normalization: stress, cope,

positive emotion, negative emotion, self-report anxiety, self-report depression,

mindfulness, number of same-sex friends, same-sex social acceptance, likeability, and

popularity. The factor structure that emerged is shown in Figure 5. Due to few significant

correlations with other scales and a low factor loading, one scale – self-report anxiety –

was removed from further analyses to obtain the factor structure indicated in Figure 6.

The factor structures indicated in Figures 4, 5, and 6 were then used to develop the

structural models for subsequent SEM analyses. The ML estimation procedure was used

since the scales were normally distributed, and ML produces accurate estimates with smaller sample sizes (Weston & Gore, Jr., 2006). The zero-order correlations used in the SEM analyses are located in Tables M2 through M7. The structural models corresponding to Figure 4, Figure 5, and Figure 6 are indicated in Figure 7, Figure 8, and Figure 9, respectively.

Figure 4 and Figure 7 correspond to the first model tested. SEM results indicated that the model did not adequately estimate the correlation matrix. The probability of the absolute fit index, χ^2 (38, N=111) = 76.292, $p < .001$, was significant, indicating that the estimated associations between scales departed significantly from the actual associations. The Comparative Fit Index (CFI: Bentler, 1990), CFI = .861, similarly indicated a poor fit. Finally, the Akaike Information Criterion (AIC) predictive fit index, AIC = 220.716, provided a point of comparison for subsequent models.

After estimating the first structural model, it was noted that the largest standardized residuals in the residual covariance matrix occurred in two locations: (a) between scales that regressed on Factor 1 and scales that regressed on Factor 3, and (b) between scales that regressed on Factor 2 and scales that regressed on Factor 3. The model was, therefore, unable to accurately estimate the associations involving scales that regressed on Factor 3. Inspection of the factor loadings in the corresponding exploratory factor analysis, revealed that two scales – trait positive emotion and popularity – loaded significantly on more than one factor, even after rotation. Although the related pathways could have been added, the scales that loaded on Factor 3, with the exception of *trait positive emotion*, did not contribute significantly to the investigation of the hypotheses and were therefore removed.

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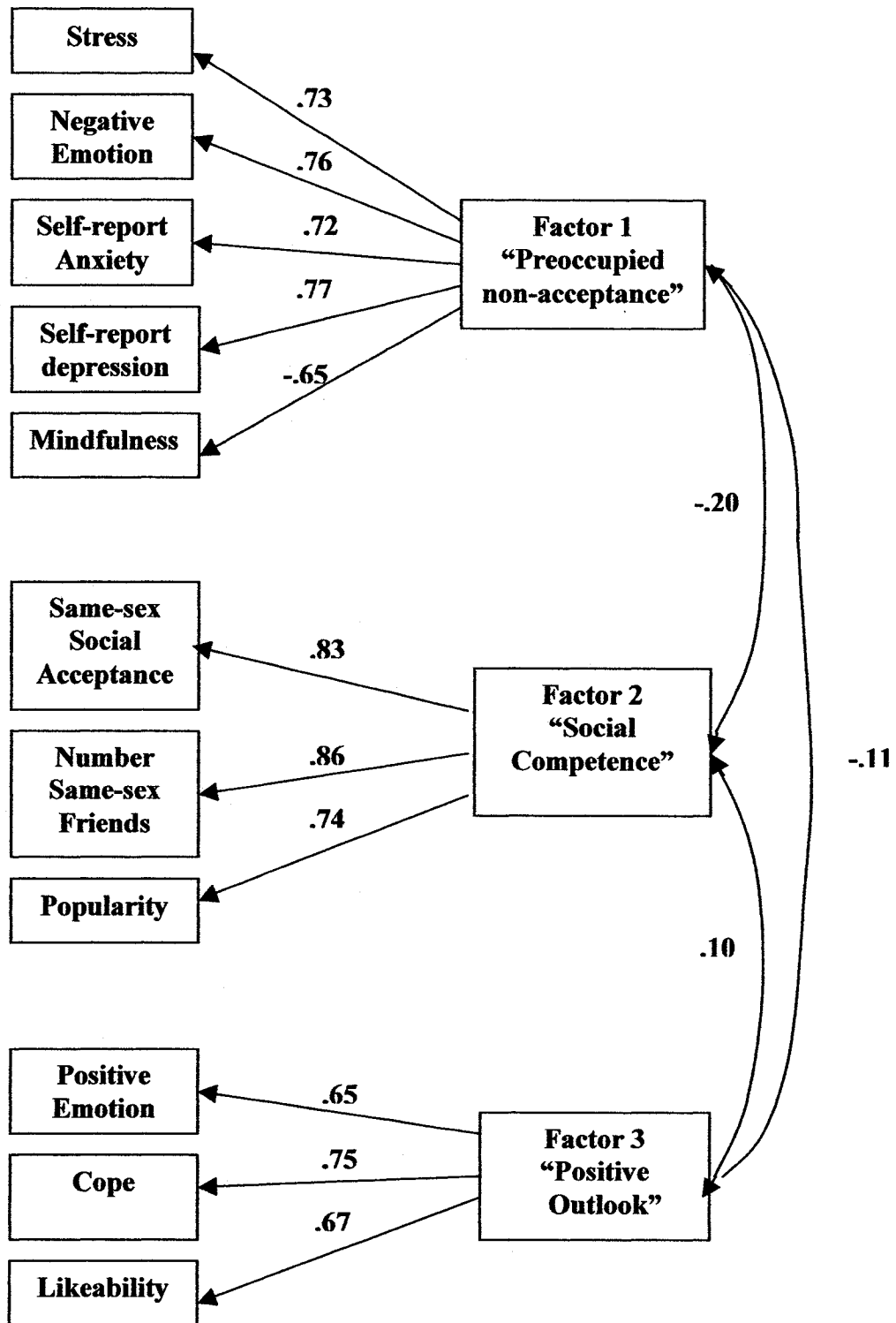
Figure 4. Exploratory Factor Analysis Results for Measurement Model 1.

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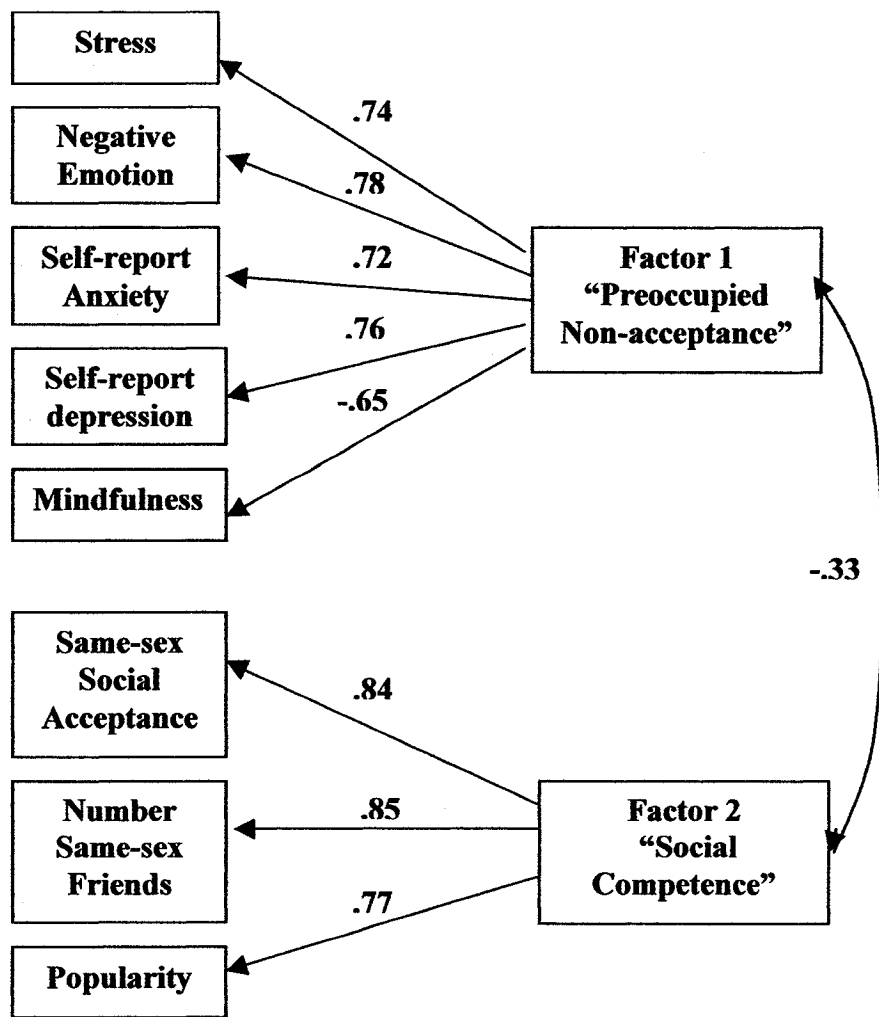
Figure 5. Exploratory Factor Analysis Results for Measurement Model 2.

115
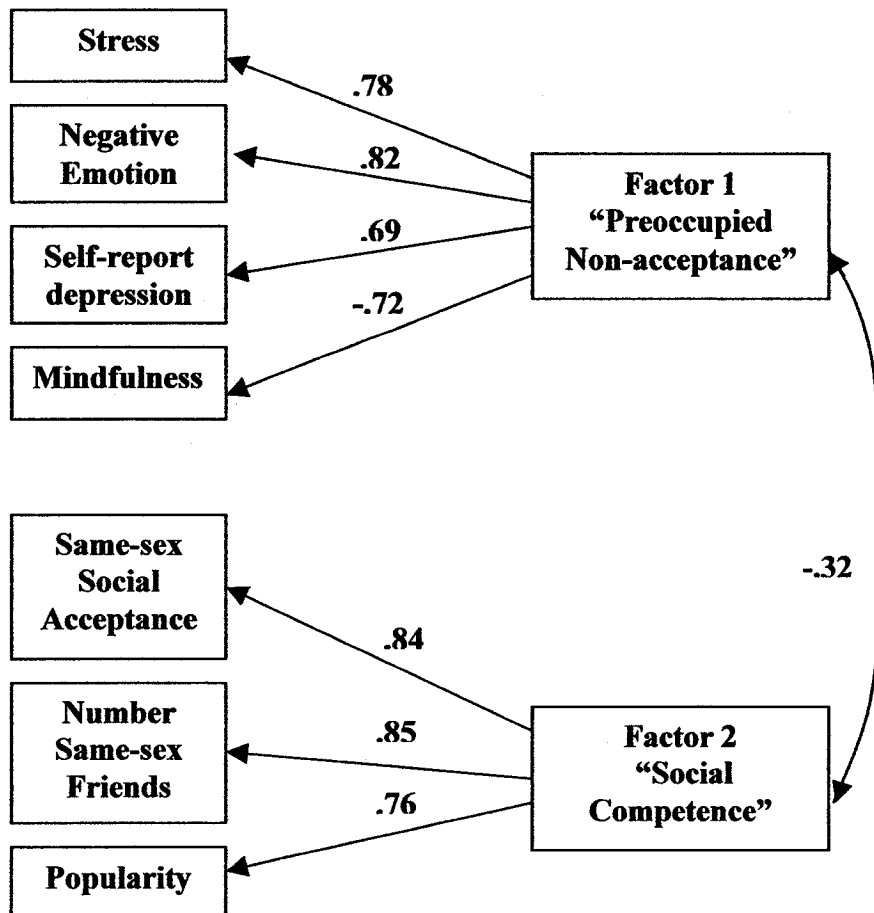
Figure 6. Exploratory Factor Analysis Results for Measurement Model 3.

116
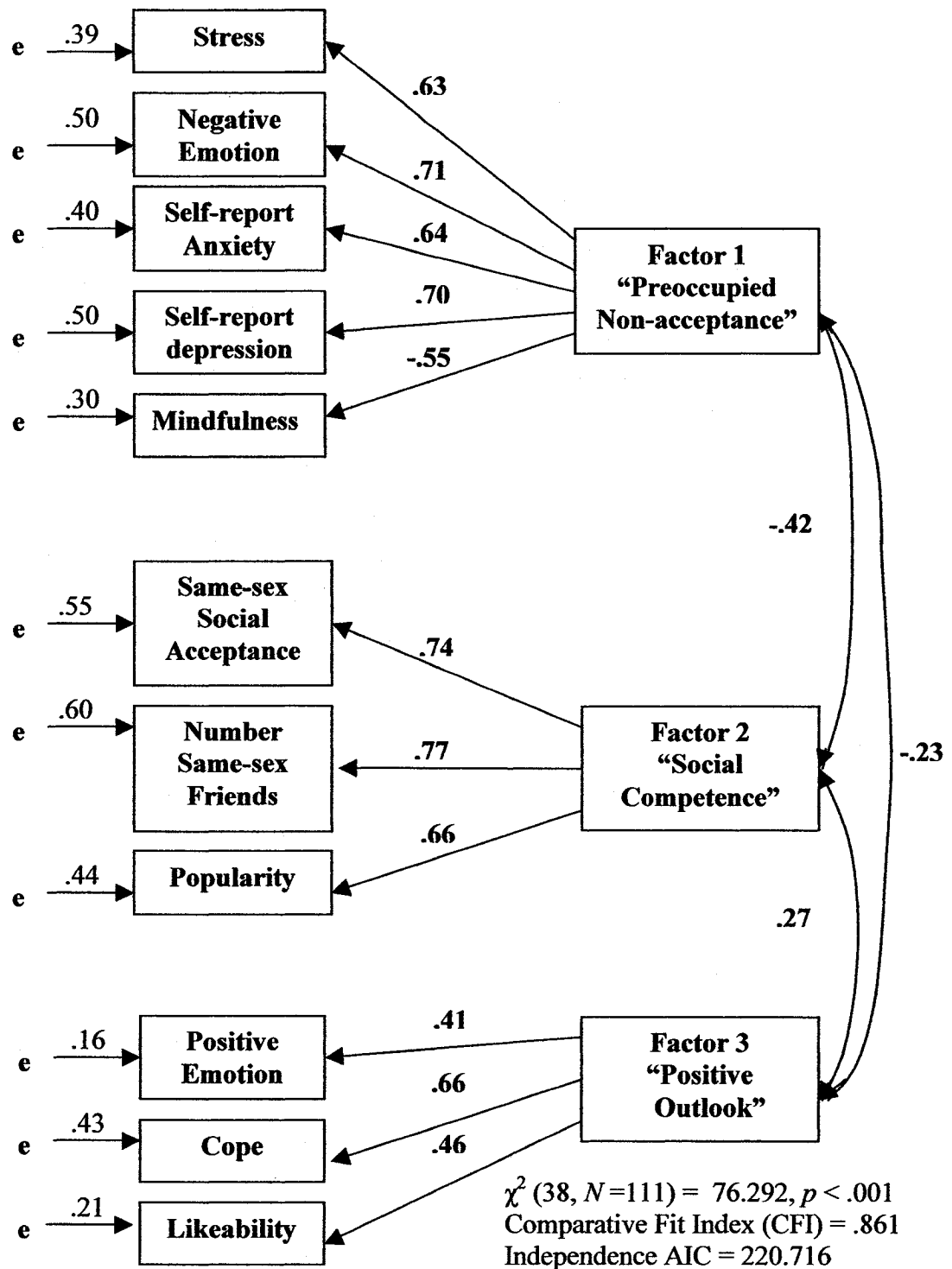
Figure 7. SEM Structural Model 1 Parameter Estimates, Variance Estimates, and Fit

Indices. The error terms (i.e., numbers to the right of the e's) are indices of the variance

accounted for in the scales (i.e., using $R^2 = 1 - e^2$). All other numbers are parameter
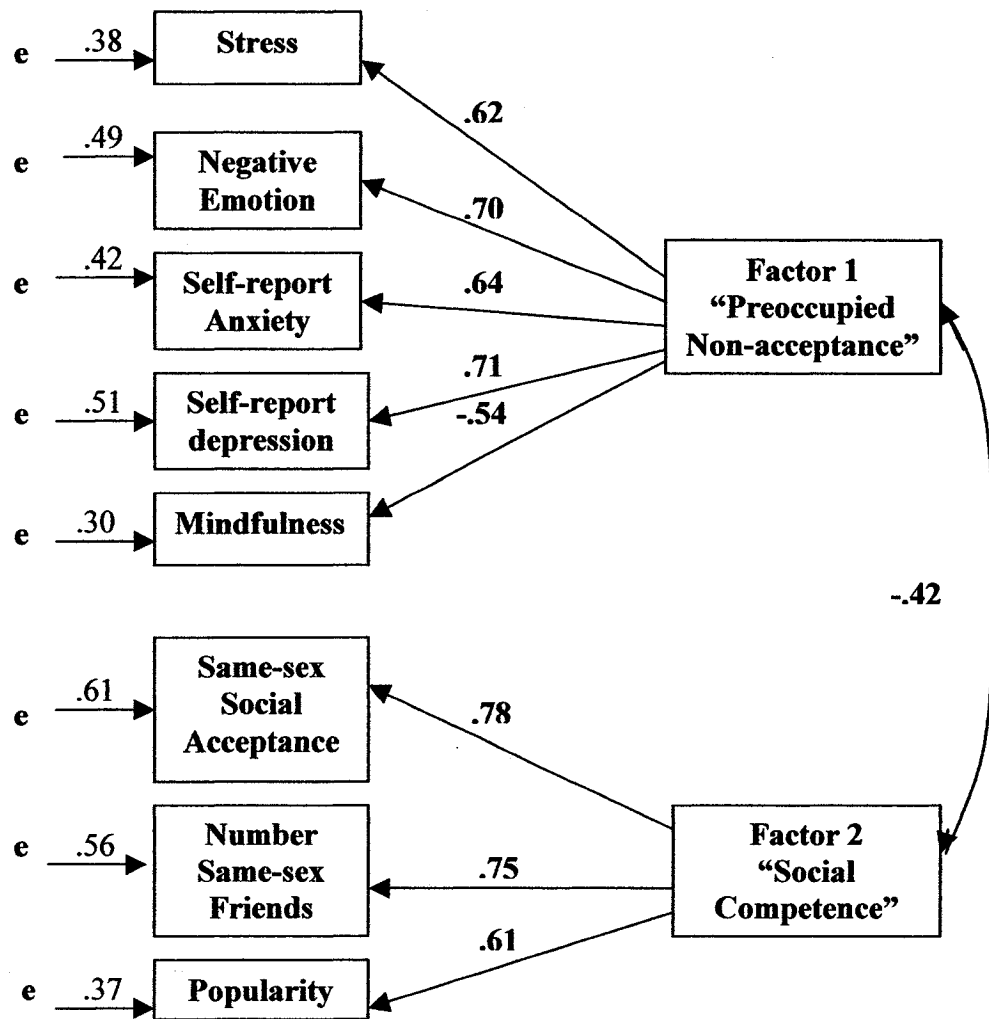
estimates.

χ^2 (17, N=111) = 34.102, p < .01
Comparative Fit Index (CFI) = .926
Independence AIC = 203.403

Figure 8. SEM Structural Model 2 Parameter Estimates, Variance Estimates, and Fit

Indices. The error terms (i.e., numbers to the right of the e's) are indices of the variance

accounted for in the scales (i.e., using $R^2 = 1 - e^2$). All other numbers are parameter
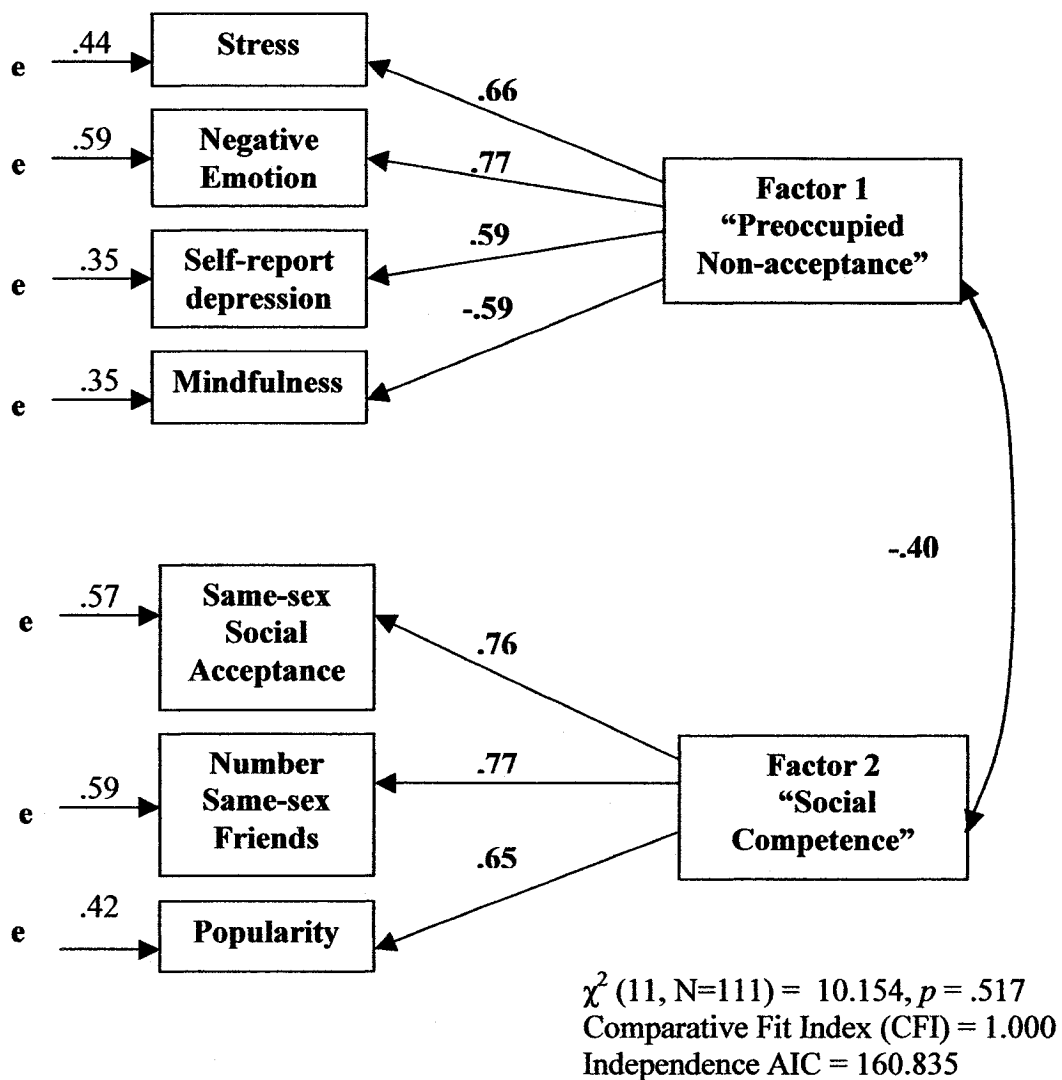
estimates.

Figure 9. SEM Structural Model 3 Parameter Estimates, Variance Estimates, and Fit

Indices. The error terms (i.e., numbers to the right of the e's) are indices of the variance

accounted for in the scales (i.e., using $R^2 = 1 - e^2$). All other numbers are parameter

estimates.

The second model, a post hoc modification of the first, provided a more parsimonious model for the role of trait mindfulness in its relations to trait stress, trait emotion, and peer relations (see Figures 5 and 8). The fit indices for this model were equivocal, however. Whereas the absolute fix index, χ^2 (17, N=111) = 34.102, $p < .01$, indicated a poor fit, the comparative fit index, CFI = .926, suggested an acceptable fit, and the AIC index, AIC = 203.403, revealed an improvement relative to the first model. CFI values between .90 and .95, however, are not necessarily conclusive and require careful interpretation (Weston & Gore, Jr., 2006). Consequently, the pathways with the largest standardized residuals were examined to determine which scales were involved. It became apparent that multiple pathways with large standardized residuals involved one factor – self-report trait anxiety. Moreover, among the scales that regressed onto Factor 1, self-report trait anxiety was the least associated with trait mindfulness. Consequently, self-report trait anxiety was eliminated from the subsequent exploratory factor analysis and SEM.

The third model, again a post hoc modification, provided the most parsimonious explanation of the role of trait mindfulness in trait stress, trait emotion, and peer relations (see Figures 6 and 9). The fit indices for this model were unequivocal. The chi-square index, χ^2 (11, N=111) = 10.154, $p = .517$, and the comparative fit index, CFI = 1.000, indicated an excellent fit, and the AIC index, AIC = 160.835, revealed a notable improvement over the second model. Since the modifications that brought about the second and third models were data driven, however, one caveat to these findings relates to their generalizability to other samples. These findings will need to be replicated to advance the literature.

In sum, results were divided into five sections. In the first section, the scales were found to be reliable and normally distributed (see Appendix M). In the second section, analyses of the trait scales confirmed that trait mindfulness was: positively associated with trait positive emotion, number of same-sex friends, and popularity; and, negatively correlated with trait perceived stress, trait negative emotion, self-report trait anxiety, and self-report trait depression. Contrary to prediction, trait mindfulness was not significantly associated with: age, peer-nominated anxiety, peer-nominated depression, or likeability (see Appendix M). Multiple regressions revealed that trait mindfulness moderated the relations between: trait cope and trait positive emotion, self-report trait depression and number of same-sex friends, and trait negative emotion and number of same-sex friends. A trend toward moderation was found for trait mindfulness in the relation between trait negative emotion and popularity (see Appendix M). In the fourth section, trait mindfulness was found to predict less variability in state experience, whereas characteristics antithetical to trait mindfulness predicted more variability in state experience. Hierarchical linear modeling provided support for several key hypotheses. First, trait mindfulness predicted state mindfulness, state perceived stress, and state negative emotion. Second, when the effects of trait mindfulness and state mindfulness were contrasted, state experience regressed more on state mindfulness than on trait mindfulness. With regard to mediation involving state mindfulness, two models were investigated. In the first, state mindfulness was found to mediate (14.9%) between state stress and state negative emotion. In the second mediational model, state stress was found to meditate (58.9%) between state mindfulness and state negative emotion. It was, therefore, concluded that the second model was more likely to represent the actual state

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process. In the fifth section, factor analyses and structural equation modeling revealed an unexpected path model with excellent fit indices. Trait mindfulness loaded negatively on "preoccupied non-acceptance," a factor on which trait perceived stress, trait negative emotion, and self-report trait depression loaded positively. Same-sex social acceptance, number of same-sex friends, and popularity loaded onto a second factor, "social competence," which correlated negatively with *preoccupied non-acceptance*.

Discussion

The present study investigated the intersection of four overlapping areas of research: stress, emotion, mindfulness, and peer relations during early adolescence. In particular, the elucidation of the role of mindfulness relative to these other areas was emphasized. Despite rapid growth in the mindfulness literature, conceptual and empirical gaps remain: the operational definition of mindfulness (i.e., state versus state and trait), whether mindfulness correlates positively with social functioning, and whether mindfulness is naturally occurring or cultivated through formal practice.

The present study investigated these three gaps as they pertain to early adolescents. First, with regards to the operational definition, mindfulness has been conceptualized in several ways (i.e., stable trait or disposition, cognitive ability, cognitive style or preferred way of thinking, state, and as both trait and state) (Sternberg, 2000). The two most debated contemporary conceptualizations are: mindfulness as state versus mindfulness as state and trait. As such, this study investigated the role of mindfulness in stress and emotional well-being at the trait and state levels of experience. Second, mindfulness has been argued to improve social functioning, yet only three known studies have examined this claim (Burpee & Langer, 2005; Carson et al., 2004; Reibel et al., 2001). Moreover, these studies have methodological problems and were conducted with adult populations. Thus, the second aim of this study was to investigate the relation between mindfulness and social functioning in early adolescence. Third, mindfulness training has been argued to be beneficial for children and adolescents, however, this claim remains largely uninvestigated. Moreover, *meta-cognition*, which emerges with formal operations thinking (Inhelder & Piaget, 1958), has been argued to be the sine qua non mental skill of

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mindfulness. It was therefore uncertain whether early adolescents possess the requisite meta-cognitive ability to cultivate the attention skills that characterize mindfulness. That is, can mindfulness training "take hold" in this age group? Consequently, the third goal of the present study was to assess the effect of age on mindfulness among children on the cusp of formal operations (i.e., early adolescence).

During early adolescence, the peer domain plays an increasingly pivotal role in adjustment and psychopathology. Early adolescents' social spheres and interpersonal stressors shift increasingly from the family to the peer domain (Wagner & Compas, 1990). Insofar as stress disrupts adaptive behaviour (Seligman, 1968; Seligman & Meyer, 1970), interferes with social functioning (Wegner, 1994), and is associated with psychological symptoms in early adolescence (Wagner & Compas), peer relations may be not only important for development, but also a primary source of stress. Indeed, peer relations have been found to be associated with social, cognitive, and emotional development indicative of adjustment (Berndt, 1982; Hartup, 1996; Piaget, 1932; Sullivan, 1953) and (for "at risk" children) psychopathology (Asher & Coie, 1990; Boivin et al., 2001; Coie & Dodge, 1998; Parker & Asher; 1987; Snyder et al., 1986). Moreover, to the extent that stress is associated with emotion and peer relations (Gross, 1999), it follows that emotion regulation strategies target not only stress, but also emotion and social functioning (Eisenberg et al., 1993, 1997, 2000; Fabes, Eisenberg, Karbon, Bernzweig, et al., 1994; Fabes, Eisenberg, Karbon, Troyer et al., 1994). In this regard, mindfulness, which is considered a form of emotion regulation, was expected to directly (i.e., as predictor) or indirectly (i.e., as moderator or mediator) influence early adolescents' stress, emotion, and social functioning.

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Since two aspects of mindfulness have been argued to exist (i.e., trait, state) (Brown & Ryan, 2003), both aspects were investigated. Since traits generally coexist and predate state experience, traits have the potential to: (a) correlate with or moderate among each other, and (b) predict or moderate outcomes such as state experience. Trait mindfulness was, therefore, analyzed as both correlate and/or moderator of other traits (i.e., trait perceived stress, trait emotion, and peer relations) and as a predictor of elements of state experience (i.e., state mindfulness, state perceived stress, state emotion). The experience sampling method (Csikszentmihalyi & Larson, 1987) was used to measure co-occurring elements of state experience. Moreover, since these elements co-occur, they may correlate with and mediate each other (Shapiro et al., 2006). Consequently, state mindfulness was investigated as both *correlate* and *mediator* of state perceived stress and state emotion. The discussion is, therefore, organized to reflect both the trait and state aspects of mindfulness, beginning with the former and concluding with the latter.

Relation Between Trait Mindfulness and Other Traits

Trait mindfulness was expected to correlate with and moderate between trait perceived stress, trait emotion, and peer relations. The results are discussed separately as follows.

Correlational analyses. Trait mindfulness was hypothesized to: correlate positively with age; correlate positively with trait positive emotion, and correlate negatively with trait perceived stress and trait negative emotions (i.e., since effective means of emotion regulation have been found associated with increased subjective well-being and decreased psychosocial stress); and, correlate positively with social functioning (i.e., since those who optimally regulate have been shown to have better social skills and

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to be more popular, see Eisenberg, 2001). Empirical support was found for the majority of these hypotheses; the one exception was that trait mindfulness was *not* significantly associated with age.

With regards to the hypotheses for which support was found, the first of these was that early adolescents who reported more trait mindfulness also reported less stress. Insofar as mindfulness is an emotion regulation strategy that stabilizes internal experience through awareness and an attitude of acceptance, this findings may be conceptualized in terms of the work of earlier researchers. First, insofar as more mindful early adolescents reported less stress, mindfulness appears consistent with the mechanism termed "homeostasis" (Cannon, 1939), through which the organism maintains a relatively stable internal condition. Second, more mindful early adolescents reported less stress in a manner similar to Grinker and Spiegel's (1945) observation that combat soldiers who were more psychologically stable could withstand more stress. Third, when viewed from the perspective of stress-diathesis models of psychopathology (Zuckerman, 1999), according to which a diathesis influences how one responds to stress, mindfulness appears to palliates against stress-diathesis interactions (Zuckerman, 1999) that might otherwise be pathogenic by altering how the individual responds to stress. Consistent with this line of reasoning is Selye's (1956/1976) contention that the effect of a stressor depends not so much on the situation as upon the "way we take it." Inherent to mindfulness is an orientation to experience that involves an attitude of *acceptance* of internal experience. By adopting this attitude in conjunction with awareness, the individual is thought to not only alter his or her psychological response to the stressor, but also his or her physiological response by way of cybernetic feedback to the limbic system

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and HPA axis (see Green & Green's, 1977, model in Figure 1). Fourth, inasmuch as mindfulness may be considered a positive personality trait (disposition) that is correlated with flexibility of response (Langer, 1989), having friends, and being socially accepted it may be considered a protective factor against stress (Garmezy, 1983). Fifth, insofar as self-awareness is central to mindfulness, mindfulness enables the individual to recognize what Selye termed the "danger signs" that signal the malfunctioning of more vulnerable parts of one's constitution, and the need to discontinue potentially harmful activities. Thus, the finding that more mindful early adolescents reported less stress is consistent with the findings and observations of a number of earlier researchers.

The second hypothesis for which support was found is that more mindful early adolescents reported less negative emotion, less anxiety, and less depression. Though it is of little surprise that individuals who are less stressed also experience less negative emotionality, this finding can be specifically explained through reference to extant emotion regulation conceptual frameworks. First, Bowers' (as cited in Teasdale, 1993) associative network theory of mood and memory states that: (a) past events that are consistent with our present mood become more accessible in memory, and (b) the concepts previously used to interpret these events are more likely to be used to interpret ongoing events. With regard to item (a), mindfulness is unlikely to short-circuit this, at times, functionally adaptive input based on past experience; rather, it is thought that, by being mindful of one's mood and emotion-laden memories that arise in the present-moment, the individual is able to dispassionately observe the mood and its effects on memory and present-moment emotion. In so doing, neural connections between the limbic system and the prefrontal cortex are thought to be reinforced, enhancing one's

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insight into the connection between one's moods and associated emotion-laden memories. Moreover, by maintaining an attitude of acceptance toward mood and associated memories, the individual does not become invested in trying to change, avoid, or push away these aspects of internal experience, thereby allowing them to pass from the stream of consciousness in the same way they appeared: gradually and without resistance. With regard to item (b), inasmuch as mindfulness involves attending to present-moment experience with an attitude of *beginner's mind*, the individual remains open to experience and repeatedly shifts attention back to the present moment, and thereby avoids re-using concepts previously used to interpret similar events. In this way, individuals undermine cognitive-affective links to past experience (Teasdale, 1993) that contribute to often deleterious forms of elaborative processing such as rumination (Nolen-Hoeksema, 1991; Nolen-Hoeksema et al., 1993).

A second perspective on the finding that more mindful early adolescents reported less negative emotionality stems from Levenson's (1999) two-system model of emotion. Insofar as individuals learn about themselves, others, and their environment through dispassionate observation, mindfulness is thought to contribute to the development of increasingly fine-tuned *control mechanisms*. That is, mindfulness is thought to foster a more cognitively complex re-perceiving of the situation that brings verbal processes under increased contextual control, and thereby modifies input to the *core system*. In this way, more mindful adolescents are thought to reduce tendencies toward deleterious impulsivity and improve their emotion regulation. Alternately, through the insertion of a pause of awareness, mindfulness may act on output from the core system by intercepting its tendency to respond in a stereotyped way to events that sufficiently match prototypic

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situations. Moreover, inasmuch as more mindful individuals more effectively inhibit behavioural responses that are detrimental to their social interactions, they are likely to benefit from more harmonious and enjoyable peer relations that run counter to negative emotionality. When conceptualized in this way, it stands to reason that more mindful early adolescents reported less negative emotionality.

The third hypothesis for which support was found is that more mindful early adolescents reported more positive emotion. Although this finding stands in contrast to Brown and Ryan's (2003) non-significant finding of the same correlation, based on the following conceptual frameworks it was not surprising. First, to the extent that mindfulness may be considered an emotion regulation strategy, several findings are revealing. Emotion regulation has been found to be: an element of emotional intelligence, and predictor of positive and prosocial behaviours (Mayer et al., 2004); a positive correlate of self-perceived quality of interactions with peers (Lopes et al., 2003) and friends (Lopes et al, 2004); a positive correlate of friends' reports of more positive interactions, less negative interactions, and higher emotional support (Lopes et al., 2003); and a negative correlate of self-perceive negative interactions with close friends (Lopes et al., 2003). In this respect, since more mindful early adolescents are thought to more optimally regulate their emotions and to enjoy more effective social functioning (i.e., more accepted, more friends) than their less mindful counterparts, it is follows that they are more likely to experience positive emotion.

With regard to the lack of a significant association between trait mindfulness and age, there may be several explanations. Meta-cognition has been argued to emerge during early adolescence (Inhelder & Piaget, 1958); thus, the capacity for meta-cognition

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(and in turn mindfulness) was expected to increase with age. This non-significant

association may be due to the manner in which cognitive development progresses. That

is, cognitive development (as it relates to meta-cognition) may not increase linearly with

age, but rather change in a step-wise manner as early adolescents transition into formal

operations thinking. Moreover, since most participants were aged between 10 and 11 ½

years (i.e., the beginning of early adolescence), it is likely that the assessed age range was

too small. Alternately, the non-significant association between trait mindfulness and age

may be an artifact of self-report measurement. Due to the face validity of the mindfulness

questionnaire, children of all ages were likely to be have been equally influenced by

demand characteristics and social desirability biases. In future, this could be controlled

for by introducing a measure of social desirability.

Three other trait-level correlations for which support were *not* found were the

non-significant associations between trait mindfulness and: peer-nominated trait anxiety,

peer-nominated trait depression, and likeability. One explanation for the former two

findings is that early adolescents may not be the best judges of each other's at times

covert emotions. That is, unless the target child explicitly conveys his or her feelings to

the participant in question (i.e., is a close friend), the participant may have difficulty

discerning the target child's internal experience. An alternate explanation of the former

two findings is that, to the extent that an individual is unaware or critical of his or her

own internal reactions, he of she may defensively project "undesirable" or "unwanted"

characteristics such as anxiety or depression onto the target child. As to the third finding,

the non-significant association between trait mindfulness and likeability may be

explained in several ways. First, it may be that this association is confounded by

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unmeasured participant variables such as the tendency to antisocial behaviour. For example, it is unlikely that mindfulness (insofar as it fosters prosocial qualities such as social perspective-taking and empathy) would be a desirable quality among the friends of "at risk" youths who congregate to perpetrate antisocial acts such as vandalism or bullying. Second, when role of mindfulness as moderator is taken into consideration (see Multiple Regression section below), it appears that high levels of mindfulness may, in some cases, be a risk factor. For example, when high levels of mindfulness are combined with a lack of other functional coping skills (see Figure M1) such as perhaps social skills, gregariousness, or a sense of humour, early adolescents were found to be not well-liked by their peers. Thus, it may be that, by dint of their more mindful nature, early adolescents who are high in trait mindfulness are more predisposed toward reflectiveness, which, in conjunction with their low coping skills, limits their interaction abilities, and inadvertently creates a distance from their peers. Finally, it may be that mindfulness, on its own, does *not* predispose early adolescents to like one another. In fact, inasmuch as early adolescents tend to like others that resemble them (Hartup & Stevens, 1997; Kandel, 1978a, 1978b) in terms of interests or needs (Byrne & Griffitt, 1973), more mindful early adolescents may befriend peers that identify with, admire, or are drawn to them due to the empathy received or what he or she might learn about dealing with stressful situations from that peer. Thus, insofar as mindfulness moderated the relation between coping skills and likeability, it is not surprising, empirically speaking, that the zero-order correlation between mindfulness and likeability was non-significant.

Multiple regression analyses. In this section, trait mindfulness was hypothesized to moderate between: trait perceived stress and trait emotion, trait perceived stress and peer

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relations, and trait emotion and peer relations. Moderation of these relations by trait mindfulness was expected for the following reasons. First, mindfulness may be characterized by *emotion-focused* coping and *engagement* coping, two types of coping shown repeatedly to result in fewer internalizing symptoms, fewer externalizing symptoms, and higher social competence (Compas et al., 2001). Second, inasmuch as mindfulness is an emotion regulation strategy, and children who regulate their emotional reactivity when exposed to others in distress have been found to be less distressed, more likely to express appropriate emotions (e.g., empathy), and more likely to voluntarily engage in prosocial behaviours (e.g., comforting) (Fabes, Eisenberg, Karbon, Bernzweig, et al., 1994; Fabes, Eisenberg, Karbon, Troyer, et al., 1994), trait mindfulness was hypothesized to moderate the effect of stress on emotions and the effect of stress on social functioning. Third, attention regulation, which is a key component of mindfulness, has been found to predict socially appropriate behaviour and social status (e.g., popularity) (Eisenberg et al., 2000). Unexpectedly, from all of the possible combinations of scales from each of these three areas, the only scales between which trait mindfulness moderated were: *trait cope* and *likeability*; *self-report trait depression* and *number of same-sex friends*; and, *trait negative emotion* and *number of same-sex friends*.

These findings are consistent with the assertions that trait mindfulness moderates between trait-level stress and social functioning, and between trait-level emotion and social functioning. Moreover, the former finding (i.e., moderation between coping and likeability) is consistent with earlier work (Eisenberg et al., 1997; Newcomb et al., 1993; Parker & Asher, 1987), as are the latter two findings (i.e., moderation between negative emotionality and friendship extensivity) (Eisenberg et al., 1993, 1997, 2001; Fabes,

Eisenberg, Karbon, Bernzweig et al., 1994; Fabes, Eisenberg, Karbon, Troyer et al., 1994). These findings indicate that mindfulness interacts synergistically with other personality traits (i.e., coping skills, negative emotionality, depression), moderating their impact on social outcomes (by extension, moderation by trait mindfulness may extend to other personality traits such as extraversion, neuroticism, and agreeableness). Whereas the first of these moderations (i.e., between coping and likeability) was discussed in the previous section, the latter two moderations (i.e., between trait negative emotion and number of friends, and between trait depression and number of friends) are discussed here. With regard to the moderating role of trait mindfulness between trait depression and number of friends (see Figure M2), as expected, the combination of high mindfulness and low depression was found to predict a more extensive friendship network. Conversely, that the combination of high mindfulness and high trait depression predicted a very limited friendship network (i.e., few, if any, friends) was unanticipated. It may be that mindful and depressed early adolescents, though self-aware, actively withdraw from social interaction, or are perceived by peers as uninteresting to interact with. Moreover, that they are self-aware of their depression-related cognitions and emotions may render it more difficult for them to reach out to peers. An interesting aspect of Figure M2 was that early adolescents who were low in trait depression and low in trait mindfulness had few friends. It may be that these individuals, while upbeat, may lack self-awareness to the point that they come across as insensitive to others' needs or lack judgment as to the appropriateness of particular emotional behaviours depending on the context. In this regard, their happy-go-lucky attitude may seem "disconnected" from context to the point of naivete. Finally, an expected finding in Figure M2 was that early adolescents who

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were low in mindfulness and high in depression had a relatively extensive friendship network. It may be that these individuals counter the potentially negative impact of depression on their social interactions through denial and by engaging in distracting activities that rendered them active and socially engaging. In this way, they may be perceived as interesting or exciting to interact with.

With regard to the moderating role of trait mindfulness between trait negative emotion and number of friends (see Figure M3), several interesting patterns emerged from the data. First, as expected, individuals who reported low negative emotionality and high mindfulness had the most extensive friendship networks. These early adolescents are likely to come across as both engaging and emotionally supportive. Second, early adolescents who were high in negative emotion and high in mindfulness were found to have relatively few friends. Although these individuals may be self-aware, it appears that their negative emotionality may be off-putting (i.e., hurtful, inconsiderate, unpleasant) to others and, therefore, detrimental to their social functioning. Third, unexpectedly, early adolescents who were low in negative emotion and low in mindfulness had relatively few friends. It may be these individuals reported few negative emotions because they lack self-awareness or engage in denial as a means of coping. Consequently, to the detriment of their friendship networks, they may speak in a way that is incongruent with their non-verbal cues and thereby come across as disingenuine, defensive, or difficult to relate with authentically. Finally, early adolescents who were high in negative emotionality and low in trait mindfulness were found to have extensive friendship networks. These individuals may cope with their negative emotions through an engaging, humourous, or rebelliousness that is appealing to their same-aged peers. In sum, though mindfulness

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may be an effective emotion regulation strategy, other personality factors need to be accounted for in order to predict its effect on social outcomes among early adolescents.

That trait mindfulness did not moderate the relation between trait perceived stress and trait emotion among early adolescents was an unanticipated finding. Possible explanations for this involve: (a) the nature of the stressor, and (b) the underlying factor structure of measured variables. With respect to the nature of the stressor, one important distinction lies in whether or not the stressor was objectively or subjectively controllable (Losoya et al., 1998). In the present study, perceived stress was tapped using items from a self-report measure that tapped the unexpectedness and general uncontrollability of life events, and associated feelings of "nervousness" and anger. Since stressor interviews were not used, contextual threat (e.g., parental divorce, death of a grandmother who was the primary caregiver versus death of a grandmother who lived far away and was only seen occasionally) could not be controlled for when examining the moderating role of mindfulness nor when investigating the relation between perceived stress and other scales. It was therefore not possible to examine whether or not trait mindfulness moderated between uncontrollable stressors and other measures such as trait emotions. In sum, given that mindfulness can be characterized as a combination of emotion-focused coping and engagement coping that is particularly effective in dealing with uncontrollable stressors (e.g., interpersonal stressors such as the breakup of a relationship), the lack of sensitivity of the stress measure may have masked moderation by trait mindfulness between perceived *uncontrollable* stress and trait emotions.

With regard to the underlying factor structure of the trait measures, it was anticipated that: trait stress variables (i.e., stress, cope) would load on a stress-related

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factor; trait emotion-related variables (i.e., depression, anxiety, negative emotion, positive emotion) would load on an emotion-related factor; trait mindfulness would load alone on a mindfulness-related factor; and, social functioning variables (i.e., popularity, social acceptance, number of same-sex friends, likeability) would load together on a interpersonal functioning factor. Consequently, it was thought that trait mindfulness would readily moderate between the other trait areas. However, Sturctural Equation Modeling as revealed a different factor structure, wherein trait stress, trait emotions, and trait mindfulness loaded on the same factor. Since these variables all loaded on the same factor and were significantly intercorrelated, it is not surprising that trait mindfulness did not moderate between trait stress and trait emotion. The following section, on Structural equation modeling, further elucidates the role of trait mindfulness relative to trait stress, trait emotion, and peer relations.

Structural equation modeling. Exploratory factor analyses formed the basis for SEM measurement models. The third and final structural model (see Figure 9) was particularly informative as to the role of trait mindfulness among the other traits; the model consisted of two factors, had excellent fit indices, and revealed that trait mindfulness loaded negatively on the same factor onto which trait perceived stress, trait negative emotion, and self-report trait depression loaded positively; this factor was therefore labelled "preoccupied non-acceptance." This model suggests that the attention and acceptance that characterize mindfulness are antithetical to stress and negative emotion, and that more mindful individuals experience less stress and less negative emotion. Moreover, insofar as depression and anxiety have been found to be inseparable in childhood and adolescence (Compas et al., 2001), more mindful early adolescents

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appear to experience fewer internalizing symptoms. This model therefore appears consistent with Selye's (1974) observation that self-awareness (such as that involved in mindfulness) enables one to notice "danger signs" that signal impending dysregulation. Further, this model is consistent with earlier work (Ayers et al., 1998; Daleiden & Vasey, 1997). In keeping with the positive zero-order correlation between trait anxiety and the factor "preoccupied non-acceptance" (i.e., avoidance, distraction) in the present model, Daleiden and Vasey found that anxious children select more avoidant responses to stressors and are more distractible. According to Ayers and colleagues (1998), avoidance correlated positively with anxiety, depression, psychological distress, and conduct problems; in the present model, trait anxiety, trait depression, and trait stress were positively correlated with the factor "preoccupied non-acceptance." As such, coping strategies that are emotion-focused and involve *disengagement* have been argued to be problematic (Compas et al., 2001). In this regard, that mindfulness is emotion-focused, yet involves an *engagement* orientation to experience, appears to fundamentally alter emotional outcomes for the better. As such, mindfulness might enable early adolescents to notice and more appropriately respond to internal or external events that would otherwise trigger a deterioration of emotion or mood.

The remaining scales in the third structural model (i.e., same-sex social acceptance, number of same-sex friends, popularity) loaded positively on the second factor. In keeping with Lindsey's (2002) work, which suggested that friendship and popularity are indices of social competence, the second factor was labelled "social competence." The two factors were negatively correlated to each other. This suggests that the more popular and more friended (socially competent) early adolescents experienced

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less stress and negative emotion, and were more nonjudgmentally attentive to present-moment experience. Socially competent early adolescents therefore appear to be more self-aware and nonjudgmental, and thereby more able to understand the meaning of events, their consequences, and the appropriateness of emotion-related behaviours. This finding is consistent with Levenson's (1990) "working out of an etiquette of action and interaction between the two emotion systems," (p. 491) (i.e., the *core system*, and the *control mechanisms*) insofar as more socially competent individuals are thought to be more capable of modulating responses by the core system through altering input to or output from it. Further, the structural model is consistent with the findings from studies that describe the social, cognitive, and emotional outcomes benefits afforded to popular and friended children (Asher & Parker, 1989; Dodge et al., 1989; Newcomb et al., 1993). In sum, this model indicates that: (a) trait mindfulness is antithetical to preoccupied non-acceptance and its correlates (i.e., dispositional stress, negative emotion, and depression); and (b) trait mindfulness is associated with social acceptance, popularity, and an extensive friendship network. Finally, insofar as the present findings are consistent with earlier work that indicates that coping skills are associated with reduced internalizing symptoms, reduced externalizing symptoms, and increased social competence (Compas et al., 2001), mindfulness in conjunction with other coping skills appears to contribute meaningfully to both emotion regulation and social functioning in early adolescence.

Relationship of Trait Mindfulness to State Scales

Mindfulness has been characterized as a means of cultivating emotional intelligence and emotional well-being (Goleman, 1995), and as a means of providing real-time meta-cognitive feedback that contributes to emotion regulation (Shapiro et al.,

2006). That is, through mindfulness, internal and external events that trigger negative emotion are identified sooner after they have occurred, and negative thought patterns defused before they fully take hold (Segal et al., 2002; Teasdale et al., 2002). Consequently, trait mindfulness was hypothesized to stabilize emotion and cognition and, therefore, be predictive of less variability in state measures. Recall that several hypotheses involving trait mindfulness and state scales were posited. First, trait mindfulness was hypothesized to correlate negatively with the variability in: state mindfulness, state stress, state positive emotion, and state negative emotion (i.e., as trait mindfulness increases, variability decreases). Second, trait mindfulness was hypothesized to predict: state mindfulness, state stress, state positive emotion, and state negative emotion. Third, due to the temporal proximity of state mindfulness to state outcomes, state mindfulness was expected to correlate more strongly with state outcomes than trait mindfulness. That is, relative to trait mindfulness, state mindfulness would be: more negatively related to state perceived stress, more positively related to state positive emotion, and more negatively related to state negative emotion.

Trait mindfulness and variability in state scales. Support was found for the hypotheses that trait mindfulness would correlate negatively with the variability in each of: state mindfulness, state stress, state positive emotion, and state negative emotion. This finding is consistent with the seminal work of Grinker and Spiegel (1945), which indicated that more psychologically stable individuals were able to withstand more stress. As such, trait-level internal stability may be considered a protective factor against state stress (i.e., challenging circumstances) insofar as the level of pre-existing trait stress due to internal stressors (e.g., trait anxiety, perceived vulnerability, self-judgment) would be

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lower. In keeping with Selye's (1974) metaphor that the body's nonspecific response to the overall demand for adaptation may be likened to the household demand for electricity, more psychologically stable individuals generally have a lower demand for electricity, and thus have more remaining capacity with which to meet momentary demands without exceeding the total capacity. An alternate explanation for the negative correlation between trait mindfulness and the variability in state mindfulness is that a ceiling effect or social desirability bias may have produced the correlation. That is, participants who strongly endorsed items on the trait mindfulness scale, responded in kind on the state mindfulness scale. That the skewness and kurtosis values for trait mindfulness indicate only a slight negative skew and slightly flattened distribution (see Table 1), suggests that both ceiling effect and/or response bias are unlikely. A more plausible explanation is that more mindful individuals more consistently attend nonjudgmentally to moment-to-moment experience and thereby stabilize their internal experience.

The significant negative correlation between trait mindfulness and variability in state stress suggests that more mindful early adolescents experience less variable perceived stress. When this result is considered alongside the negative correlation between trait mindfulness and trait stress (see Table M2), it seems that more mindful early adolescents have both an everyday and consistent moment-to-moment tendency to perceive situations as less stressful. This tendency is thought to arise for two reasons. First, by embracing a challenging experience as it arises, the individual is thought to increase his or her self-assurance that sufficient inner resources exist to cope with the experience, and thereby allays fear when a similar experience arises thereafter. Second, by remaining present to the distressing elements of an experience (e.g., cognitions,

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emotions, bodily sensations), it is believed that one's distress tolerance is increased and that the experience is more thoroughly processed. An alternate explanation, though unlikely since the *trait mindfulness* and *variability in state stress* scales were normally distributed, relates to item face validity and social desirability – participants who wanted to consistently present well may have reported more attending and less stress.

Trait mindfulness was also negatively correlated with variability in state positive emotion, indicating that participants who reported higher levels of *mindful attending to* everyday experience had less variable reports of the intensity of their positive emotions throughout the study. Given the positive association between trait mindfulness and trait positive emotion (see Table M3), this finding suggests that more dispositionally mindful early adolescents may experience more intense and more consistent positive emotion. While this is thought to contribute to emotional well-being, the greater consistency of state positive emotion may be perceived by peers as a lack of spontaneity or responsiveness to peers and thereby diminish likeability in keeping with Figure M1. In sum, this finding suggests that by cultivating mindfulness, early adolescents may experience greater subjective well-being. As above, the alternate explanation relates to social desirability.

The negative correlation between trait mindfulness and variability in state negative emotion indicated that the more participants reported *attending to* everyday experience, the less variable was the intensity of their momentary negative emotions. Social desirability and psychometric arguments notwithstanding, since trait mindfulness is also negatively associated with trait negative emotion (see Table M3), it appears that more dispositionally mindful early adolescents experience less intense negative emotion

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generally, and more consistently from moment to moment than their less mindful counterparts. This finding is also consistent with the contention that more mindful early adolescents appear to enjoy greater internal stability, and momentary experiences therefore elicit less variable negative emotional responses.

Finally, an unexpected and telling set of results was found. Characteristics antithetical to trait mindfulness (i.e., trait perceived stress, trait negative emotion, trait depression) predicted greater variability in state perceived stress, state mindfulness, state positive emotion, and state negative emotion (see Table 4). Thus, it appears that individuals who are experiencing more trait stress and trait negative emotion to begin with are predisposed to react more strongly to state experience; this suggests that trait and state negative emotion interact synergistically in a manner consistent with Bowers' (as cited in Teasdale, 1993) associative network theory of mood and memory. When taken together with the obverse findings for trait mindfulness, these results suggest that the everyday tendency to attend nonjudgmentally to ongoing internal experience stabilizes aspects of internal experience (e.g., reduced emotional lability).

Trait mindfulness as predictor of state scales. Hierarchical linear modeling was conducted to investigate the hypotheses that trait mindfulness predicts state mindfulness, state stress, state positive emotion, and state negative emotion. The first of these hypotheses (i.e., trait mindfulness predicts state mindfulness) was investigated with state mindfulness as the outcome variable, and demographic variables (sex, age), time series variables (time of day, and day of study), and trait mindfulness as the predictors. It was revealed that trait mindfulness, indeed, predicted state mindfulness. That is, those who reported more trait mindfulness reported more state mindfulness as well. This finding is

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consistent with the contention that trait and state mindfulness run in parallel across time such that the more regularly one engages state experience mindfully the more it reinforces (within the brain, both structurally and functionally) the individual's general tendency to do so. Second, an unexpected findings was that state mindfulness *was* predicted by *day of study*, indicating that state mindfulness increased as the study progressed. Possible explanations include: (a) a social desirability response bias may have inflated reported levels of state mindfulness (presumably uniformly across age); (b) in retrospect, the general mood among participants when filling out the state scales in a group format seemed increasingly animated across days, and may have bred a positive bias or somewhat more cavalier approach to responding; or, (c) due to demand characteristics of the study (i.e., completing state questionnaires that cue participants to consider their level of awareness multiple times daily for several consecutive individuals), one likely by-product is that participants may actually become more mindful of their internal experience for the duration of the study and possibly longer.

As to the hypotheses relating to the remaining outcome variables (state stress, state positive emotion, state negative emotion), support was found for most. Trait mindfulness was negatively associated with both state stress and state negative emotion, suggesting that it buffers against momentary stress and negative emotions among early adolescents. That is, insofar as trait mindfulness precedes a state experience and, to a corresponding extent, predisposes the individual to respond effectively to challenging momentary events it may be likened to ballast that stabilizes a ship when broadsided by a wave. Trait mindfulness did *not* predict state positive emotion; this finding was not entirely unexpected, however, since it replicated that found by Brown and Ryan (2003).

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These findings suggest that, whereas mindfulness may buffer against momentary negative emotion, it does not seem to influence momentary positive emotion. It may be that, due to its pleasant hedonic tone, state positive emotion is unlikely to elicit avoidance; rather, it is likely to elicit an *engagement* orientation to experience irrespective of the individual's level of trait mindfulness. Consequently, any difference apparent between more and less mindful early adolescents during situations that elicit state negative emotion becomes non-significant during situations that elicit state positive emotion.

Trait versus state mindfulness: Which the better predictor of state experience?
Since state mindfulness was assessed at the same time as other state scales, it was expected that, due to its temporal proximity, it would be a stronger predictor of other state scales than trait mindfulness. *When both aspects of mindfulness were tested simultaneously as predictors*, the results revealed that: (a) *state stress* was predicted by both state mindfulness and trait mindfulness, however, state mindfulness was the stronger predictor; (b) *state negative emotion* was predicted by state mindfulness, and not by trait mindfulness; and (c) *state positive emotion* was not predicted by state mindfulness or trait mindfulness. The first finding is consistent with the hypothesis that state mindfulness is a better predictor of state experience than trait mindfulness since ratings of state mindfulness were completed contiguously with ratings of state stress. The second finding indicates that the null hypothesis – trait mindfulness does not predict state negative emotion more than expected by chance – cannot be rejected; this result does not come unanticipated since it replicates earlier findings by Brown & Ryan (2003). Moreover, when considered in conjunction with the finding that trait mindfulness significantly predicts state negative emotion when state mindfulness is not simultaneously entered as a

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predictor, this finding indicates that trait mindfulness does not provide any incremental prediction of state negative emotion over and above that by state mindfulness. The third finding stands in contrast to its homologous result in Table 8 (i.e., trait mindfulness predicted state negative emotion) when state mindfulness was not simultaneously tested as a predictor. Similar to the second finding, the diminished parameter estimate of trait mindfulness when tested alongside state mindfulness indicates that state mindfulness captured much of the variance in state negative emotion common to both predictors; thus, further support is provided for the hypothesis that state mindfulness is a stronger predictor of state experience than trait mindfulness. In sum, these results strongly support the contention that state mindfulness is a better predictor of state experience (with the exception of positive emotion) than trait mindfulness.

State Mindfulness as Mediator of Other State Scales

There were two competing views on mediation by state mindfulness. Although there was evidence for both views (models), the evidence for one model was stronger than for the other. These models were based upon data from the innovative experience sampling method (Csikszentmihalyi & Larson, 1987). The proposed model asserted that state mindfulness mediates between state stress and state emotion (see Figure 2). Conceptually speaking, trait mindfulness can be argued to precede the emergence of a state stimulus (i.e., thought, emotion, bodily sensation) in the same way that one's vision exists prior to the appearance of a visual stimulus in one's field of vision. On the other hand, state mindfulness can arise in each successive moment to observe ongoing internal experience in the same way that one perceives a visual stimulus only once it is within one's field of vision and one focuses on it. In sum, according to the proposed model,

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mindfulness can be likened to a form of inwardly-turned vision: as a trait, it pre-exists internal experience; and, as a state, it immediately follows the momentary internal experience. Therefore, according to the proposed model, state stress precedes state mindfulness, which then mediates the effect of state stress on state emotion. According to the alternate model (see Figure 3), high state mindfulness reduces state stress, which in turn palliates the effect of stress on negative emotion. Conversely, when a person is not in a mindful state, the level of stress is believed to be higher, and thereby exacerbates state negative emotions.

According to the proposed model, state mindfulness was specifically hypothesized to mediate between: (i) state perceived stress and state positive emotion, and (ii) state perceived stress and state negative emotion. Since state positive emotion did not regress significantly on state mindfulness (i.e., condition (c) of mediation, see Results chapter), however, state mindfulness could *not* mediate between state stress and state positive emotion. For the alternate model, that state positive emotion did not regress significantly on state mindfulness also precluded mediation, though because condition (a) of mediation (see Results section) was not met.

With regard to the proposed model, support was found for the assertion that state mindfulness mediates between state stress and state negative emotion. Specifically, findings indicated a significant indirect effect of state stress on state negative emotion acting via state mindfulness (i.e., the mediator), and a significant reduction in the direct effect of state stress on state negative emotion due to the introduction of state mindfulness. State mindfulness partially mediated (14.9% of the effect) between state stress and state negative emotion. These findings further suggest that mindfulness, in its

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state aspect, partially buffers between momentary stressors and their deleterious effect on momentary negative emotions.

With regard to the alternate model, support was also found for the assertion that state stress mediates between state mindfulness and state negative emotion. Specifically, findings indicated a significant indirect effect of state mindfulness on state negative emotion acting via state stress (i.e., the mediator), and a significant reduction in the direct effect of state mindfulness on state negative emotion due to the introduction of state stress. State stress was found to partially mediate (58.9% of the effect) between state mindfulness and state negative emotion. These findings indicate that there is stronger empirical support for the alternate model than for the proposed model. That is, mindfulness, in its state aspect, appears to reduce momentary stress, which in turn diminishes the deleterious effect of stress on momentary negative emotions. In this regard, by engaging ongoing experience mindfully, one remains less stressed than otherwise, thereby diminishing the impact on state stress on state negative emotion. It must be remembered, however, that studying a state process requires multiple forms of assessment. Moreover, in order to adequately model a state process, a longitudinal design would be needed to examine the reciprocal effects of state stress and state mindfulness. It is as yet uncertain whether or not such a longitudinal design may be beyond the capabilities of the experience sampling method. In sum, mindfulness appears to regulate negative emotion by reducing the intensity of perceived stress associated with experience.

Conclusions

The present study had three aims. With regard to the first aim (i.e., the elucidation of the operational definition), trait and state levels of mindfulness were investigated. Trait

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mindfulness was associated with everyday and moment-to-moment subjective well-being, and moderated between measures of trait perceived stress and measures of trait emotion. State mindfulness mediated between moment-to-moment stress and emotion. As such, it appears that mindfulness possesses characteristics of both state and trait. Moreover, when moment-to-moment experience is repeatedly and consistently engaged in a mindful way, it is thought trait mindfulness increases as well.

As to the second aim (i.e., evaluate whether mindfulness improves early adolescent social functioning), mindfulness was positively associated with improved social functioning (based on zero-order correlations and a pathway model), and was found to moderate between measures of subjective well-being and social functioning. A notable caveat is that when trait mindfulness is combined with a lack of coping skills, high levels of depression, or high levels of negative emotion, it may be detrimental to social functioning. In sum, by dint of engaging experience mindfully, experience seems to be more completely processed, thereby availing internal resources to respond to one's own negative emotions in a way that is more beneficial (or less detrimental) to social relationships or to remain more responsive to others.

With regard to the third aim (i.e., investigate whether mindfulness is naturally occurring at a stage when meta-cognition is nascent), participants who had little to no familiarity with mindfulness were found to differ in their predisposition to mindfulness. Although mindfulness was *not* associated with age, this may be due to the limited age range of participants. Moreover, it appears that other factors (e.g., cognitive skills, temperament, parenting style) may also account for individual differences. In sum, mindful early adolescents appear to be "collected" and "connected."

Limitations

Foremost among the limitations of the present study is its research design. Insofar as the study was conducted with fifth and sixth grade children, it had a cross-sectional design. Moreover, since the questionnaire (from which trait scores were derived) was administered less than one week before experience sampling (from which state scores were determined) began, this aspect of the research design could be at best considered a short-term longitudinal design. However, since the design is neither truly longitudinal or experimental, causality cannot be inferred (Kenny, 1979; Weston & Gore, 2006). Moreover, since early adolescence presents a unique window of opportunity to observe the emergence of meta-cognition (and mindfulness), a longitudinal design would enable the measurement of age-related within-person change in: trait mindfulness; variables considered static in the present study (e.g., extensivity of social network) (Parker & Seal, 1996); and, the relations between mindfulness and variables (e.g., popularity) across longer time periods.

Another area of limitation relates to the sociometric assessment techniques used. First, although two levels of friendship were assessed (i.e., friendship status, friendship extensivity), friendship quality was not. Thus, aspects of friendship (e.g., the amount of time spent together, how positive or negative interactions were) went unmeasured. Second, it is conceivable that participants nominated classmates they liked, but with whom they did not share a personal relationship. Third, restricting friendship nominations to classmates likely underestimates the target child's number of friends, since a child may have friends in another class or outside of school. Fourth, for reasons of parsimony, two-dimensional sociometric classification (social preference, social impact) was not used.

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Rather, social acceptance (which combines with rejection to determine to social preference), likeability (i.e., social preference), and popularity nominations were used. To more accurately determine the peer relations correlates of trait mindfulness, it would be useful to examine popularity in terms of its two-dimensional sociometric classification, rather than primarily as a one-dimensional social preference measure. Finally, it is possible that the processes measured during the four successive days of data collection were not reflective of ordinary intra-class interaction (and thereby inner experience) insofar as the presence of the researchers may have fostered more interaction or group cohesion.

A third area of limitation in this study was its partial reliance on self-report. In addition to widely acknowledged concerns about self-report data (e.g., reliability, demand characteristics), others concerns apply to this study. First, given the tendency to accentuate the positive and downplay the negative (i.e., social desirability bias, denial, or wishful thinking), it seems reasonable to assume that this would equally apply to sociometric measurement. In fact, Leung (as cited in Cairns, Xie, & Leung, 1998) found that children's self-reports of their social networks tended to inappropriately omit those individuals with the least valued qualities, and inappropriately include those with much sought after characteristics. Second, since participants were asked to recall and report on their experience of recent events, the very acts of recalling and reporting (i.e., demand characteristics) may have increased the tendency to self-monitor during subsequent data collection. This may account for the increase in estimates of state mindfulness as the study progressed. Third, research with adults has demonstrated that retrospective measures of stress and coping are biased by the degree to which problems (stressors) are

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resolved at the time of testing and by poor recall (Ptacek, Smith, Espe, & Rafferty, as cited in Compas et al., 2001). Although this does not apply to the state scales used in this study, it does apply to the trait scales. Moreover, it has been argued that when participants are asked to make global inferences about their emotions for an extended time period, they are not veridical indicators of the momentary emotional states that unfolded. Rather, these inferences reflect systematic heuristic biases based on the information that is accessible at the time (Kahnemann, as cited in Davidson et al., 2000). That is, participants tend to adopt the *peak-end rule*, wherein they weigh excessively information about the most intense episode (i.e., the peak) and the most recent levels of the emotion in question (e.g., anxiety). Consequently, the veridicality of participants' retrospective reports of their levels of trait stress, trait emotion, and trait mindfulness is uncertain, and interpretations of these findings therefore need be treated as tentative. In sum, several relevant confounds may be present due to having used self-report scales.

The fourth limitation relates to the measurement of stress. Measurement was limited to self-report, which may be problematic for several reasons. Objective measures of stress (e.g., cortisol) were not examined in the present study, and thus the relation between stress-related physiological activation and other constructs could not be ascertained. Also, since stressor interviews were not employed, contextual threat could not be controlled for when examining the relation between perceived stress and other scales.

A fifth area of limitation relates to analyses of trait and state mindfulness. First, when examining the effects of trait mindfulness and state mindfulness on state outcomes, *time of day* and *day of study* were partialled out. Consequently, only the incremental

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variance in the outcome variables unique to mindfulness was estimated. The overall effect of mindfulness is therefore likely to have been underestimated. This limitation does not apply to the SEM analyses of trait outcomes, since these accounted for the relations among the scales. Second, due to the data-driven nature of the SEM structural models, it is as yet uncertain to what extent the results may generalize to other samples. As such, these models must necessarily be considered preliminary and require replication.

A sixth limitation relates to the sample used. First, since measurement was limited to a narrow age range (i.e., the first half of early adolescence), the extent to which these findings can be generalized to other age groups is uncertain. Second, since the data from children who were taking psychostimulants (e.g., Ritalin) at the time of the study were eliminated from the analyses, the extent to which findings apply to children with Attention Deficit Hyperactivity or other clinical disorders is unknown.

Despite these limitations, the preliminary findings of the present study add to the rapidly growing corpus of literature pointing to the efficacy of mindfulness as a: moderator between coping and peer relations and between emotion and peer relations; means of regulating emotion; and, mediator of the impact of momentary stress on momentary emotion. The present study is also among the first to examine the relation between mindfulness and social functioning in childhood. Finally, the present findings strongly suggest the utility of mindfulness-based programs for teachers, educational policymakers, and parents alike in their efforts to enhance the subjective well-being, social functioning, and adjustment of early adolescents.

Finally, future research is required to further refine the operational definition of mindfulness and obtain more data that elucidate the associated social-developmental

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benefits to children. It will be important for future research to examine between-person factors that influence the emergence of mindfulness and to identify the opportune timing of mindfulness-based interventions. Moreover, investigation of the construct validity of mindfulness in early adolescence is an essential early step in the implementation of programs aimed at cultivating this attribute in this age group. Insofar as mindfulness is associated with empathy (Shapiro & Schwartz, 1999) and emotional intelligence (Lopes et al., 2003, 2004; Mayer et al., 2004), mindfulness is thought to be consistent with the friend characteristics that increase in importance during early adolescence (e.g., intimacy, help, support, see Bigelow, 1977). In this regard, basic research is needed to address age-related changes in the relations between mindfulness, emotional adjustment, and social adjustment. Such research would contribute to understanding the ontogenetic challenges and probable benefits of mindfulness in children making the transition into adolescence.

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Appendix A

Solicitation Letter / Parental Consent Form

Dear Parents,

I am a professor at Concordia University, where I teach courses and do research on children and adolescents. One of the topics I study is how children's friendships, skills, and behaviors help them cope with daily hassles and stress in their lives. This topic is of interest to many parents, teachers, and health professionals. I am writing to tell you about a study my students and I are conducting with fifth- and sixth-graders at St. Jean School. This study will help us learn more about children and their development.

As part of the study I am conducting, I will meet with the participating children in their school, and ask them to complete a set of questionnaires about themselves and their friends. In these questions, the children will be asked to tell us (a) who they typically associate with in school, (b) whether or not the other participating children in the class have particular characteristics, (c) how much they engage in behaviors like helping or leading a group, and (d) how they feel about themselves. All the questionnaires will be completed at the child's desk in school and none of the other children will know how any other child has answered the questions. We ask the children to maintain the privacy of their answers and we make certain that their answers are confidential. A copy of this questionnaire may be obtained at the school principal's office.

In the second part of the project, the participating children will be asked to answer a set of questions about how they're feeling and provide a sample of saliva (to measure cortisol, a chemical produced by the body when one experiences stress). This will be done five times per day (early morning after waking, following arrival at school, late morning, after lunch, and before the end of the school day) on each of four consecutive days. My staff and I will enter the classrooms to signal the children and assist them in completing the questionnaire and providing the saliva sample.

As a token of thanks, all participating children will receive $20.00, and an additional $5.00 if they provide all of the samples requested in the study. In addition, we will be providing lectures to the students about mental health, and about ways to cope with the stressors they encounter in their daily lives.

We would also like to ask you to complete a questionnaire for us. This questionnaire will ask you some questions about your family's financial resources, the family environment, your child's behaviour and whether you take part in any "games" of chance such as buying lottery tickets. It will take you about 15 minutes to complete this questionnaire. All of the information in this questionnaire will be completely confidential. We will send the questionnaire home with your son or daughter and you will return it to us via standard mail in a stamped and addressed envelope that we will provide. *As a token of our appreciation, all families who participate in this part of the project will paid $20.00.* Although we hope that as many families as possible will participate in this part of the project, children may

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participate in the classroom part of the project even if their parents choose not to complete the family questionnaire. A copy of the questionnaire for families can be seen at the school principal's office.

People who do research with children or adults are required to describe the risks and benefits related to participating in their studies. This study poses no risks, other than the risks that are part of children's normal daily lives. It is not a treatment study, and it is not intended to provide direct benefits to the students who participate. Most children enjoy participating in studies like this one.

The information collected in this study will be <u>completely confidential,</u> and participation is entirely voluntary. Your child is not required to take part; even if you give your permission for him/her to participate, you may change your mind at any time. If your child decides that he/she does not wish to participate, he or she does not have to.

This study has been approved by both the School Board and the Concordia University Human Research Ethics Committee. If at any time you have questions or concerns regarding your rights or your child's rights as research participants, please feel free to contact Adela Reid, Office of Research (Secretary to the Concordia University Human Research Ethics Committee) at (514) 848-2424 x4887.

If you have any other questions about the study, please call me at 848-2424 x2184 or send a letter to me at: Department of Psychology, Concordia University, 7141 Sherbrooke Ouest, Montreal QC H4B 1R6. You can also email me at <u>bukowsk@vax2.concordia.ca.</u>

Please fill out the attached form and have your child return it to his/her teacher tomorrow.

As an incentive for the children to return the permission slip, any child who returns a slip, regardless of whether his/her parent has given permission for participation, will get a twoonie ($2.00).

Thank you for your help. We very much appreciate it.

Sincerely,

William M. Bukowski
Professor

Heart, Soul, Mind and Body Project
St. Jean School
(Grades 5 & 6)
Winter 2005

PERMISSION SLIP

Please read and sign the following:

I understand that I am being asked if my daughter/son can take part in a research study conducted by Dr. W. M. Bukowski. I know that the purpose of the study is to examine how children's friendships, skills, and behaviors help them cope with daily hassles and stress in their lives. I know that if my daughter/son participates she/he will be asked to answer some questionnaires at his/her desk in the classroom, and provide saliva samples and responses to a small set of questions five times per day on four consecutive days. I have been told that the questionnaires are about the social relations of young people and how they think and feel about themselves and their friends. I know that my daughter/son does not have to participate in the study, and that even if she/he starts to take part in it, she/he can quit at any time. I also know that all answers will remain confidential and will NOT be shown to anyone. Only Dr. Bukowski and his assistants will know what is in the questionnaires.

Please check one of the following and ask your daughter/son to bring this permission slip into the homeroom class tomorrow.

____ My daughter/son has permission to take part in Dr. Bukowski's study.

____ My daughter/son **does not** have my permission to take part in Dr. Bukowski's study.

(SIGN)_____

DATE:_____

Child's Name: _____

Child's Sex: ____ Male   ____ Female

Child Consent Form
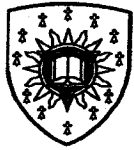
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U N I V E R S I T Y

HSMB Study / Concordia 2005

☐ Male   Age: ☐☐   Grade: ☐
☐ Female

Please read and sign the following if you wish to participate in the study:

"I understand that I have been asked to be in a research study that Dr. W. M. Bukowski is doing about how young people feel about themselves and how they get along with others.

I know that I will be asked to answer some questionnaires in class. I know that I do not have to participate in the study, and that even if I start to take part in it, I can stop participating at any time. I also know that all answers will be kept confidential and will NOT be shown to anyone. Only Dr. Bukowski and his assistants will know my answers."

(SIGN) _____   Date: ☐☐ - ☐☐ - ☐☐
                                                   (day - month - year)

Please fill in the boxes completely: ■

and not like this ⬚ ☑ ⊙2⟩

If you make a mistake, cross out the incorrect box and fill in the correct one:

■1 ☐2 ☐3 ☒4 ☐5

■ HSMB Study - Cover Page   ■

Appendix C

Sample Questionnaire

Who are your friends?

First we would like to know who you are friends with and who you like to spend time with.

We want to know which boys and which girls are your friends.

In the box beside the name of the boy who is your best friend put a "1".
In the box beside the name of the boy who is your second best friend put a "2".
In the box beside the name of the boy who is your third best friend put a "3".
In the box beside the name of any other boys who are one of your friends put a "4".
You can put a "4" beside as many names as you wish. Just be sure you think of the person as a friend.

Now, do the same for the names of the girls.

Bill Bukowski	☐	☐	Britney Spears
Darth Vader	☐	☐	Cara Santo
George Bush	☐	☐	Catherine Janeway
Harry Leroy	☐	☐	Celine Dion
James Kirk	☐	☐	Hillary Clinton
Jean Piaget	☐	☐	Holly Recchia
Jean-Luc Picard	☐	☐	Juliet Capulet
Jimmy Hoffa	☐	☐	Katherine Kozina
John Kerry	☐	☐	Leia Skywalker
Jonathan Santo	☐	☐	Lina Lopez
Kayser Soze	☐	☐	Margaret Atwood
Kevin Bacon	☐	☐	Martha Stewart
Lev Vygotsky	☐	☐	Melissa Bergevin
Luke Skywalker	☐	☐	Michaela Joy
Paul Martin	☐	☐	Nina Howe
Rick Miners	☐	☐	Rosy Cotton
Ryan Adams	☐	☐	Shari Mayman
Titus Andronicus	☐	☐	Tanya Bergevin

HSMB Study - Peer Nomination and Assessment

Now we would like to know how much you like the other people in your class at school.

Beside each person's name you will see a scale that goes from 1 to 5.

Check the box that best represents how much you like each person. On this scale:

"1" Means you do not like the person
"2" Means you usually do not like the person
"3" Means you sort of like this person
"4" Mean you usually like this person
"5" Means you like the person very much

	Do not like the person	Usually do not like the person	Sort of like this person	Usually like this person	Like the person very much
Bill Bukowski	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Britney Spears	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Cara Santo	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Catherine Janeway	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Celine Dion	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Darth Vader	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
George Bush	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Harry Leroy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Hillary Clinton	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Holly Recchia	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
James Kirk	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Jean Piaget	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Jean-Luc Picard	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Jimmy Hoffa	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
John Kerry	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Jonathan Santo	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Juliet Capulet	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Katherine Kozina	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Kayser Soze	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Kevin Bacon	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Leia Skywalker	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Lev Vygotsky	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Lina Lopez	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Luke Skywalker	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Margaret Atwood	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Martha Stewart	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Melissa Bergevin	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Michaela Joy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Nina Howe	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Paul Martin	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Do not like the person	Usually do not like the person	Sort of like this person	Usually like this person	Like the person very much

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What are they like?

Instructions: Below you will see several different characteristics. Each one describes a different way that a person could be or could act. After each characteristic there are the names of the persons in your class. Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

01. Someone who is nervous or tense	02. Someone who hurts others physically	03. Someone who is cranky	04. Someone who is a good athlete
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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HSMB Study - Class Rating

What are they like?

Class ID

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

05. Someone who likes to do new things	06. Someone who has trouble controlling themselves	07. Someone who would rather play alone than with others	08. Someone who gets stressed a lot
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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What are they like?

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

09. Someone who always knows the right answer	10. Someone who is easily annoyed	11. Someone who worries a lot	12. Someone who tries to keep others out of the group when it's time to play
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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HSMB Study - Class Rating

What are they like?

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

13. Someone who does well in sports	14. Someone who is by themselves because they prefer to be	15. Someone who is liked by lots of people	16. Someone who hits, pushs or shoves people
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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HSMB Study - Class Rating

What are they like?

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

17. Someone who is always busy	18. Someone who is lonely	19. Others do mean things to him/her	20. Someone who gets involved in physical fights
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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HSMB Study - Class Rating

What are they like?

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

21. Someone who is popular	22. Someone who talks bad about others behind their backs to hurt them	23. Someone who has trouble making friends	24. Someone who is smart and does well in school
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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HSMB Study - Class Rating

188

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

25. Someone who reacts quickly without thinking	26. Someone who when mad at someone, ignores or stops talking to him/her	27. Someone who likes fun and excitement	28. Someone who loves to be active
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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Class ID

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

29. Others try to hurt him/her	30. Someone who prefers being by themselves	31. Someone who is often left out	32. Someone who is rarely in a good mood
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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HSMB Study - Class Rating

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What are they like?

Class ID

Fill in the box beside the name of any person who fits the characteristics. Please put a mark beside the name of anyone who you think fits the characteristics.

33. Others call him/her names	34. Someone who is shy	35. Someone who can't get others to listen	36. Someone who is sad
Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐	Bill Bukowski ☐
Britney Spears ☐	Britney Spears ☐	Britney Spears ☐	Britney Spears ☐
Cara Santo ☐	Cara Santo ☐	Cara Santo ☐	Cara Santo ☐
Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐	Catherine Janeway ☐
Celine Dion ☐	Celine Dion ☐	Celine Dion ☐	Celine Dion ☐
Darth Vader ☐	Darth Vader ☐	Darth Vader ☐	Darth Vader ☐
George Bush ☐	George Bush ☐	George Bush ☐	George Bush ☐
Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐	Harry Leroy ☐
Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐	Hillary Clinton ☐
Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐	Holly Recchia ☐
James Kirk ☐	James Kirk ☐	James Kirk ☐	James Kirk ☐
Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐	Jean Piaget ☐
Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐	Jean-Luc Picard ☐
Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐	Jimmy Hoffa ☐
John Kerry ☐	John Kerry ☐	John Kerry ☐	John Kerry ☐
Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐	Jonathan Santo ☐
Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐	Juliet Capulet ☐
Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐	Katherine Kozina ☐
Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐	Kayser Soze ☐
Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐	Kevin Bacon ☐
Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐	Leia Skywalker ☐
Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐	Lev Vygotsky ☐
Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐	Lina Lopez ☐
Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐	Luke Skywalker ☐
Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐	Margaret Atwood ☐
Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐	Martha Stewart ☐
Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐	Melissa Bergevin ☐
Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐	Michaela Joy ☐
Nina Howe ☐	Nina Howe ☐	Nina Howe ☐	Nina Howe ☐
Paul Martin ☐	Paul Martin ☐	Paul Martin ☐	Paul Martin ☐
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HSMB Study - Class Rating

What am I like?

Now, we'd like to know about you. Read each description and tell us how well that description fits you. Check the box on the scale that best describes you.

Check the box on the scale that is best for you. Be sure to read carefully and answer as honestly as possible.

How true is this for you?	Never true	Rarely true	Someti- mes true	Often true	Always true
01. I have a lot of trouble sleeping	□ 1	□ 2	□ 3	□ 4	□ 5
02. I am ill/sick often	□ 1	□ 2	□ 3	□ 4	□ 5
03. I get stressed a lot	□ 1	□ 2	□ 3	□ 4	□ 5
04. I try to keep others out of the group when it's time to play	□ 1	□ 2	□ 3	□ 4	□ 5
05. I hit, push or shove people	□ 1	□ 2	□ 3	□ 4	□ 5
06. I get annoyed easily	□ 1	□ 2	□ 3	□ 4	□ 5
07. I worry a lot	□ 1	□ 2	□ 3	□ 4	□ 5
08. Others do mean things to me	□ 1	□ 2	□ 3	□ 4	□ 5
09. Others try to hurt me	□ 1	□ 2	□ 3	□ 4	□ 5
10. When I am mad at someone, I ignore or stop talking to him/her	□ 1	□ 2	□ 3	□ 4	□ 5
11. I get involved in physical fights	□ 1	□ 2	□ 3	□ 4	□ 5
12. I prefer being by myself	□ 1	□ 2	□ 3	□ 4	□ 5
13. I hurt others physically	□ 1	□ 2	□ 3	□ 4	□ 5
14. I am often sad	□ 1	□ 2	□ 3	□ 4	□ 5
15. I often don't feel like eating	□ 1	□ 2	□ 3	□ 4	□ 5
16. I have many aches and pains	□ 1	□ 2	□ 3	□ 4	□ 5
17. I would rather play alone than with others	□ 1	□ 2	□ 3	□ 4	□ 5
18. I help others when they need it	□ 1	□ 2	□ 3	□ 4	□ 5
19. I feel tired a lot of the time	□ 1	□ 2	□ 3	□ 4	□ 5

Never true	Rarely true	Someti- mes true	Often true	Always true

HSMB Study - Self Rating

What am I like?
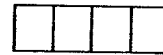
Remember, how true is this for you?

	Never true	Rarely true	Someti- mes true	Often true	Always true
20. I try to treat everyone equally	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
21. I feel cranky	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
22. I am often left out	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
23. I care about others more than others do	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
24. I try to play fairly	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
25. I am nervous or tense	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
26. I have trouble making friends	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
27. I feel that nothing will ever work out for me	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
28. I talk bad about others behind their backs to hurt them	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
29. Others won't listen to me	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
30. I am rarely in a good mood	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
31. I am shy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
32. I am lonely	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
33. I am called names by others	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
	Never true	Rarely true	Someti- mes true	Often true	Always true

Draft
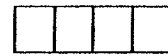
Here is a list of words that describe different feelings and emotions. Read each word and check the box for the appropriate answer. Write down <u>how much you have felt this way during the past month</u>. Choose from the options below for your answers:

	Not at all	A little	"In the middle" or Medium	Quite a bit	Extremely

During the past <u>month</u>, I have felt...

	Not at all	A little	"In the middle" or Medium	Quite a bit	Extremely
1. happy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2. worried/anxious	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3. frustrated	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4. pleased	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5. angry/hostile	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
6. enjoyment/fun	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7. unhappy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
8. depressed/blue	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
9. joyful	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

	Not at all	A little	"In the middle" or Medium	Quite a bit	Extremely
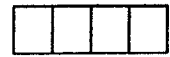
HSMB Study - Mindfulness - Trait

Instructions: Below are some sentences about ordinary things that can happen. Using the choices (from 1 to 6) below, check the box for how often each thing happens to you. Please answer according to what *really* happens instead of what you think it should be like. Please answer each sentence separately from every other sentence.

	Almost Always	Very Often	Sort of Often	Some- times	Rarely	Almost Never

1. I could be feeling something and not realize it until later.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

2. I break or spill things because of carelessness, not paying attention, or thinking of something else.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

3. I find it hard to concentrate on what's happening.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

4. I tend to walk quickly to get where I'm going without paying attention to what I notice, feel or do along the way.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

5. I don't notice when my body feels tense or uncomfortable until it gets really bad.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

6. I forget a person's name almost as soon as I've been told it for the first time.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

7. It seems I am doing things without realizing what I'm doing.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

8. I rush through activities without paying much attention to them.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

9. I I think so much about the goal that I forget what I'm doing right now to get there.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

10. I do chores or work without realizing what I'm doing.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

11. When someone's talking to me, I sort of listen and do something else at the same time.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

12. I ride my bicycle/skateboard/roller blades places and then wonder why I went there.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

13. I find myself thinking a lot about the future or the past.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

14. I find myself doing things without paying attention.

| | ☐ 1 | ☐ 2 | ☐ 3 | ☐ 4 | ☐ 5 | ☐ 6 |

15. I snack without being aware that I'm eating. ☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5   ☐ 6

	Almost Always	Very Often	Sort of Often	Some- times	Rarely	Almost Never

■ HSMB Study - Mindfulness - Trait   ■

How I Manage
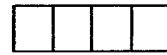
The questions you see below ask about your feelings and thoughts *during the past month*. For each question, you will be asked to check the box for *how often* you felt or thought a certain way. Even though some of the questions seem similar, there are differences between them and you ought to treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, instead write down what seems like a reasonable guess of the number.

For each question choose your answer from these options:

Never	Almost Never	Some-times	Fairly Often	Very Often

During the past month, how often have you...

1. Been upset because something happened that you did not expect?
   □ 1   □ 2   □ 3   □ 4   □ 5

2. Felt that you were not able to control the important things in your life?
   □ 1   □ 2   □ 3   □ 4   □ 5

3. Felt nervous and "stressed"?
   □ 1   □ 2   □ 3   □ 4   □ 5

4. Handled annoying situations well?
   □ 1   □ 2   □ 3   □ 4   □ 5

5. Felt you were dealing well with important changes that were happening in your life?
   □ 1   □ 2   □ 3   □ 4   □ 5

6. Felt like you could handle your problems?
   □ 1   □ 2   □ 3   □ 4   □ 5

7. Felt that things were going your way?
   □ 1   □ 2   □ 3   □ 4   □ 5

8. Found that you could not deal with all the things that you had to do?
   □ 1   □ 2   □ 3   □ 4   □ 5

9. Been able to control things that bugged you?
   □ 1   □ 2   □ 3   □ 4   □ 5

10. Felt that you were on top of things?
    □ 1   □ 2   □ 3   □ 4   □ 5

11. Been angry because of things that happened that you couldn't control?
    □ 1   □ 2   □ 3   □ 4   □ 5

12. Found yourself thinking about things that you have to do in the future?
    □ 1   □ 2   □ 3   □ 4   □ 5

13. Been able to choose the way you spend your time?
    □ 1   □ 2   □ 3   □ 4   □ 5

14. Felt problems were piling up so high that you could not overcome them?
    □ 1   □ 2   □ 3   □ 4   □ 5

Never	Almost Never	Some-times	Fairly Often	Very Often

Appendix D

Sample Booklet

HSMB Study / Concordia 2005 Daily Booklet
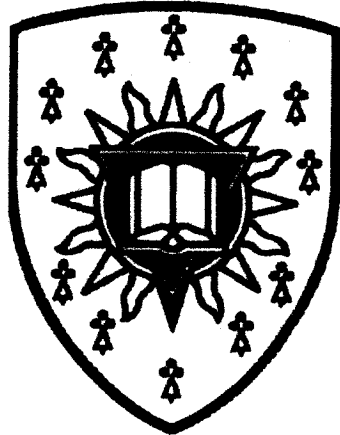
Draft

Day: ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday

Time: ☐☐ : ☐☐ ☐ AM ☐ PM

Where are you?

☐ Home ☐ Public place (e.g., restaurant)

☐ School ☐ Friend's house

☐ Traveling ☐ Other (Please specify:)

Who were you just with?

☐ Alone ☐ Boyfriend/girlfriend

☐ Parents ☐ Classmate(s)

☐ Sister(s)/brother(s) ☐ Stranger(s)

☐ Best friend ☐ Teacher(s)

☐ Friend(s): ☐ Others (Please specify:)
  ☐ Male
  ☐ Female

What were you doing?

What were you thinking/talking about?

Describe the event with your friends) and/or classmates(s) with as much detail as you can:

What were you thinking/talking about?

Length of interaction with your friend(s): ☐☐ minutes

Draft

How was the interaction with your friends)/classmate(s)?
(Check the box for your answer)

	1	2	3	4	5	6	7	
1. Not at all important	☐	☐	☐	☐	☐	☐	☐	Very important
2. Very negative:	☐	☐	☐	☐	☐	☐	☐	Very positive

3. Disagreement:

	1	2	3	4	5	6	7	
Low	☐	☐	☐	☐	☐	☐	☐	High

4. Support:

	1	2	3	4	5	6	7	
Low	☐	☐	☐	☐	☐	☐	☐	High

5. I felt:

	1	2	3	4	5	6	7	
Accepted	☐	☐	☐	☐	☐	☐	☐	Rejected

6. How did you feel towards the other person(s)?

	1	2	3	4	5	6	7	
Not at all close	☐	☐	☐	☐	☐	☐	☐	Very close

7. Did you feel like you belonged to a group?

	1	2	3	4	5	6	7	
Not at all	☐	☐	☐	☐	☐	☐	☐	Very much

8. Did you talk about personal things?

	1	2	3	4	5	6	7	
Not at all	☐	☐	☐	☐	☐	☐	☐	Very much

Right now... (Check the box)	Really Disagree				Really Agree
I feel like a am a good person	□1	□2	□3	□4	□5
I feel well liked	□1	□2	□3	□4	□5
I feel I'm good at sports	□1	□2	□3	□4	□5
I feel popular	□1	□2	□3	□4	□5
I like myself	□1	□2	□3	□4	□5
I feel happy with the way I look	□1	□2	□3	□4	□5
I feel like I have many friends	□1	□2	□3	□4	□5
I feel happy with the way I am	□1	□2	□3	□4	□5

How important was what you were doing?

1. Not at all important	1 □	2 □	3 □	4 □	5 □ Very important

How did you feel about it?

2. Very negative:	1 □	2 □	3 □	4 □	5 □ Very positive

Draft

Instructions: Below are some sentences about ordinary things that can happen. Using the choices (from 0 to 6) below, check the box for how much each thing was happening to you *in the last 15 minutes*. Please answer according to what *really* happened instead of what you think it ought to be like. Please answer each sentence separately from every other sentence.

Not at all	Somewhat	Very much

In the last 15 minutes, how much were you having these experiences?

1. I have found it hard to concentrate on what's happening.
   □0 □1 □2 □3 □4 □5 □6

2. I have been rushing through activities without paying much attention to them.
   □0 □1 □2 □3 □4 □5 □6

3. I have been doing things without realizing what I'm doing.
   □0 □1 □2 □3 □4 □5 □6

4. I have been caught up in thought about the future or the past.
   □0 □1 □2 □3 □4 □5 □6

5. I have been doing things without paying attention.
   □0 □1 □2 □3 □4 □5 □6

The questions you see below ask about your feelings and thoughts *during the past 15 minutes*. For each question, you will be asked to check the box for how much you felt or thought a certain way. Even though some of the questions seem similar, there are differences between them and you ought to treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to figure out how much you felt a particular way, instead write down what seems like a reasonable guess at the number.

For each question choose your answer from these options:	Not at all	A little	"In the middle"	Quite a bit	Very much

During the past 15 minutes, how much were you having these experiences?

1. I felt upset because something happened that I did not expect.
   □1 □2 □3 □4 □5

2. I felt nervous and "stressed".
   □1 □2 □3 □4 □5

3. I had difficulty dealing with all the things I had to do.
   □1 □2 □3 □4 □5

4. I found myself thinking about things I still need to do in the future.
   □1 □2 □3 □4 □5

Draft

Here is a list of words that describe different feelings and emotions. Read each word and then check the box for the appropriate answer in the space next to the word. Write down how much you have felt this way *during the past 15 minutes*. Choose from the options below for your answers:

	Not at all	Very slightly	A little	"In the middle"	Quite a bit	A lot	Extre -mely

During the past 15 minutes, I have felt...

happy	□1	□2	□3	□4	□5	□6	□7
worried/anxious	□1	□2	□3	□4	□5	□6	□7
frustrated	□1	□2	□3	□4	□5	□6	□7
pleased	□1	□2	□3	□4	□5	□6	□7
angry/hostile	□1	□2	□3	□4	□5	□6	□7
enjoyment/fun	□1	□2	□3	□4	□5	□6	□7
unhappy	□1	□2	□3	□4	□5	□6	□7
depressed/blue	□1	□2	□3	□4	□5	□6	□7
joyful	□1	□2	□3	□4	□5	□6	□7

Please produce the saliva sample now.

Appendix E

Composition and Reliabilities for the Trait Version of the

Modified Perceived Stress Scale (MPSS)

Scale	**Item No.**	**Scale Item**
Stress (α = .74)	1	Been upset because something happened that you did not expect.
	2	Felt that you were not able to control the important things in your life.
	3	Felt nervous and "stressed".
	11	Been angry because of things that happened that you couldn't control.
Cope (α = .72)	6	Felt like you could handle your problems.
	7	Felt that things were going your way.
	9	Been able to control things that bugged you.
	10	Felt that you were on top of things.
	13	Been able to choose the way you spend your time.

Appendix F

Composition and Reliabilities for the Trait Version of the

Modified Positive and Negative Emotion Scale (MPNES)

Scale	Item No.	Scale Item
Trait Positive emotion (α = .73)	1	Happy
	4	Pleased
	6	Enjoyment/fun
	9	Joyful
Trait Negative emotion (α = .71)	2	Worried/anxious
	3	Frustrated
	5	Angry/hostile
	7	Unhappy
	8	Depressed/blue

Appendix G

Composition and Reliabilities for the Trait Versions of the Self-Report Anxiety and Self-

Report Depression Scales

Scale	Item No.	Scale Item
Self-report trait anxiety ($\alpha = .75$)	3	I get stressed a lot.
	7	I worry a lot.
	25	I am nervous or tense.
Self-report trait depression ($\alpha = .74$)	1	I have a lot of trouble sleeping.
	2	I am ill/sick often.
	6	I get annoyed easily.
	14	I am often sad.
	15	I often don't feel like eating.
	16	I have many aches and pains.
	19	I feel tired a lot of the time.
	21	I feel cranky.
	32	I am lonely.

Appendix H

Composition and Reliabilities for the Trait Version of the Peer-Nominated Anxiety,

Peer-Nominated Depression, and Peer-Nominated Popularity Scales

Scale	Item No.	Scale Item
Peer-nominated trait anxiety ($\alpha = .73$)	1, Same-sex	Someone who is nervous or tense.
	1, Other-sex	Someone who is nervous or tense.
	8, Same-sex	Someone who gets stressed a lot.
	8, Other-sex	Someone who gets stressed a lot.
Peer-nominated trait depression ($\alpha = .85$)	3, Same-sex	Someone who is cranky.
	3, Other-sex	Someone who is cranky.
	10, Same-sex	Someone who is easily annoyed.
	10, Other-sex	Someone who is easily annoyed.
	18, Same-sex	Someone who is lonely.
	18, Other-sex	Someone who is lonely.
	32, Same-sex	Someone who is rarely in a good mood.
	32, Other-sex	Someone who is rarely in a good mood.
	36, Same-sex	Someone who is sad.
	36, Other-sex	Someone who is sad.
Peer-nominated Popularity ($\alpha = .87$)	15, Same-sex	Someone who is liked by lots of people.
	15, Other-sex	Someone who is liked by lots of people.
	21, Same-sex	Someone who is popular.
	21, Other-sex	Someone who is popular.

Appendix I

Composition and Reliability for the Trait Version of the

Modified Mindful Attention Awareness Scale (MMAAS)

Items on the Trait Version of the Modified Mindful Attention Awareness Scale

(MMAAS)

Scale	Item No.	Scale Item
Trait mindfulness (α = .88)	1	I could be feeling something and not realize it until later.
	2	I break or spill things because of carelessness, not paying attention, or thinking of something else.
	3	I find it hard to concentrate on what's happening.
	4	I tend to walk quickly to get where I'm going without paying attention to what I notice, feel or do along the way.
	5	I don't notice when my body feels tense or uncomfortable until it gets really bad.
	6	I forget a person's name almost as soon as I've been told it for the first time.
	7	It seems I am doing things without realizing what I'm doing.
	8	I rush through activities without paying much attention to them.
	9	I think so much about the goal that I forget what I'm doing right now to get there.
	10	I do chores or work without realizing what I'm doing.
	11	When someone's talking to me, I sort of listen and do something else at the same time.
	12	I ride my bicycle/skateboard/roller blades places and then wonder why I went there.

Items on the Trait Version of the Modified Mindful Attention Awareness Scale
(MMAAS)

Scale	Item No.	Scale Item
Trait mindfulness (cont'd)	13	I find myself thinking a lot about the future or the past.
	14	I find myself doing things without paying much attention.
	15	I snack without being aware that I'm eating.

Appendix J

Composition and Reliabilities for the State Version of the

Modified Perceived Stress Scale (MPSS)

<u>Scale</u>	<u>Item No.</u>	<u>Scale Item</u>
Stress	1	I felt upset because something happened that I did not expect.
	2	I felt nervous and "stressed".
	3	I had difficulty dealing with all the things I had to do.
	4	I found myself thinking about things I still need to do in the future.

Note. Internal consistencies at the four randomly sampled times were: α = .70, .87, .86, and .87. (For details refer to Measures and Variable Definitions subsection of Method).

Appendix K

Composition and Reliabilities for the State Version of the

Modified Positive and Negative Emotion Scale (MPNES)

Scale	**Item No.**	**Scale Item**
State Positive emotion	1	Happy
	4	Pleased
	6	Enjoyment/fun
	9	Joyful
State Negative emotion	2	Worried/anxious
	3	Frustrated
	5	Angry/hostile
	7	Unhappy
	8	Depressed/blue

Note. Internal consistencies for *state positive emotion* at the four randomly sampled times were: α = .91, .86, .84, and .87. The same internal consistencies for *state negative emotion* were: α = .85, .93, .93, and .92. (For details refer to Measures and Variable Definitions subsection of Method).

Appendix L

Items on the State Version of the Modified

Mindful Attention Awareness Scale (MMAAS)

Scale	Item No.	Scale Item
State mindfulness	1	I have found it hard to concentrate on what's happening.
	2	I have been rushing through activities without paying much attention to them.
	3	I have been doing things without realizing what I'm doing.
	4	I have been caught up in thought about the future or the past.
	5	I have been doing things without paying attention.

Note. Internal consistencies at the four randomly sampled times were: $\alpha = .82, .93, .97,$ and .97 (For details refer to Measures and Variable Definitions subsection of Method).

Appendix M

Analyses of Scales, and Correlational and Multiple Regression Analyses

for the Relation Between Trait Mindfulness and Other Traits

<u>Analyses of Scales</u>

The factor structure and internal consistency of derived scales were determined using the Principal Component extraction method and Varimax rotation with Kaiser Normalization, and the Cronbach's alpha index of reliability, respectively. Since both trait and state aspects of participants' experience were of interest, the item content of scales and the analytic procedures used were adapted in several ways to meet the measurement issues particular to each aspect of experience. First, since children generally have ample opportunity to observe and/or interact with their peers across an extended time period, peer assessment provided a reliable means of assessing participant traits (e.g., popularity, social acceptance, perceived anxiety). Peer assessment was of limited utility, however, for reliably assessing *state* experience, since it stands to reason that any one child would be hard pressed to be aware of the internal state of multiple classmates at any given time. Consequently, whereas the trait aspect of experience was tapped using both peer-assessment and self-assessment, the state aspect was measured using only self-assessment. Second, due to limited administration time during experience sampling, the state versions of scales contained fewer items. Finally, since the measurement of the state aspect of experience involved a repeated-measures design, reliability analyses for these scales followed a random sampling procedure designed to maximize the likelihood of statistical independence (the latter two points are discussed in detail in the Method chapter). The factor structure and reliability of trait scales are indicated in appendices E, F, G, H, and I. The same for state scales are located in appendices J, K, and L.

<u>Relation Between Trait Mindfulness and Other Traits</u>

Both the *degree* and *nature* of the relationships between trait measures were of interest. Whereas the results from structural equation modeling were presented in the Results chapter, this appendix contains the results from correlational analyses and multiple regression analyses. Correlational analyses served not only as an index of relatedness, but were also later used in the variance/covariance matrix for EQS analyses. Multiple regression analyses were conducted to determine whether or not trait mindfulness moderated between the other trait scales. For purposes of organization, the multiple regressions were divided into parts. Each part consists of a series of multiple regression analyses that address whether trait mindfulness moderated the relation between two specific trait areas (e.g., whether trait mindfulness moderates between *trait emotion* and *peer relations*). In sum, the multiple regression section is divided into parts, in which mindfulness' role as moderator between two specific scales from other trait areas was investigated.

<u>Correlational analyses.</u> Due to the large number of correlations, the trait scales have been tabulated as follows for presentation purposes: mindfulness-demographic variables (Table M1); mindfulness-perceived stress (see Table M2), mindfulness-emotion (see Table M3), mindfulness-peer relations (Table M4), perceived stress-emotion (Table M5), perceived stress-peer relations (Table M6), and emotion-peer relations (Table M7). Recall that trait mindfulness was hypothesized to correlate: (a) correlate positively with age; (b) correlate negatively with trait perceived stress; (c) correlate positively with trait positive emotion; (d) correlate negatively with trait negative emotion, trait anxiety, and trait depression; and, (h) correlate positively with peer relations scales (i.e., number of

same-sex friends, same-sex social acceptance, likeability, and popularity). These correlations have been presented in bold font in Tables M1, M2, M3, and M4. Tables M5, M6, and M7 indicate the correlations between the other trait areas, which were used in subsequent analyses.

The correlations between trait scales revealed support for several hypotheses, and a lack of support for others. Those supported are addressed first, followed by a commentary on those that went unsupported. In keeping with expected results, trait mindfulness was significantly negatively associated with: trait perceived stress, $r = -.42$, $p < .001$; trait negative emotion, $r = -.40$, $p < .001$; trait positive emotion, $r = .16$, $p < .05$; self-report trait anxiety, $r = -.23$, $p < .01$; and self-report trait depression, $r = -.40$, $p < .001$ (see Tables M2 and M3). Of note was that the association between trait mindfulness and trait positive emotion was significant only when, in keeping with the directional nature of the hypothesis (i.e., as mindfulness increases, positive emotion is expected to increase as well), the analysis was conducted as one-tailed. With respect to the peer relation scales, as expected, trait mindfulness was significantly positively related with: number of same-sex friends, $r = .28$, $p < .01$; same-sex social acceptance, $r = .18$, $p < .05$, and popularity, $r = .21$, $p < .05$ (see Table M4). In sum, trait mindfulness was associated with less negative emotion, more positive emotion, less anxiety, less depression, more friends, and more popularity.

The trait scale associations did *not* provide support for the following predictions. First, a significant relationship was not found between trait mindfulness and age, $r = .09$, $p = .35$ (see Table M1). Second, contrary to prediction, no significant association was found between an individual's trait mindfulness and: the number of anxiety-related

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Table M1

Correlations between Trait Mindfulness and Demographic Variables

Scale	Age	Sex [a]
	(*n* = 111)	
Mindfulness	**.09**	.06

Note. Bold font indicates correlations specifically relevant to hypotheses.

[a]Boys coded as 1, girls as 2.

Table M2

Correlations between Trait Mindfulness and Trait Perceived Stress Scales

Scale	1	2	3
	(*n* = 111)		
1. Mindfulness	(.88)	**-.42**[+++]	**.00**
2. Stress		(.74)	-.08
3. Cope			(.72)

Note. Values in parentheses along the diagonal represent the internal consistencies of the scales. Bold font indicates correlations relevant to hypotheses.

[+++] $p < .001$, one-tailed.

Table M3

Correlations between Trait Mindfulness and Trait Emotion Scales

Scale	1	2	3	4	5	6	7
			($n = 111$)				
1. Mindfulness	(.88)	**.16^{+}**	**-.40^{+++}**	**-.23^{++}**	**-.40^{+++}**	**.03**	**-.09**
2. Positive Emotion		(.73)	-.24*	-.06	-.15	-.04	-.25**
3. Negative Emotion			(.71)	.38***	.47***	.04	.11
4. Self-report anxiety				(.75)	.60***	.19*	.22*
5. Self-report depression					(.74)	.15	.22*
6. Peer-nominated anxiety						(.73)	.49***
7. Peer-nominated depression							(.85)

Note. Values in parentheses along the diagonal represent the internal consistencies of the scales. Bold font indicates correlations relevant to hypotheses.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed. $^{+}$ $p < .05$, one-tailed. $^{++}$ $p < .01$, one-tailed. $^{+++}$ $p < .001$, one-tailed.

Table M4

Correlations between Trait Mindfulness and Peer Relations Scales

Scale	1	2	3	4	5
	($n = 111$)				
1. Mindfulness	(.88)	**.28^{++}**	**.18^{+}**	**.03**	**.21^{+}**
2. Number of same-sex friends		--	.74***	.29***	.47***
3. Same-sex social acceptance			--	.17	.46***
4. Likeability				--	.16
5. Popularity					(.87)

Note. Values in parentheses along the diagonal represent the internal consistencies of the scales. Bold font indicates correlations relevant to hypotheses.

*** $p < .001$, two-tailed. $^{+}p < .05$, one-tailed. $^{++}p < .01$, one-tailed.

Table M5

Correlations between Trait Perceived Stress Scales and Trait Emotion Scales

Trait emotion scales	Trait perceived stress scales	
	Stress	Cope
(n = 111)		
Positive Emotion	-.28**	.26**
Negative Emotion	.55***	-.20*
Self-report anxiety	.39***	-.10
Self-report depression	.31***	-.07
Peer-nominated anxiety	.10	.05
Peer-nominated depression	.32***	-.04

Note. * $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

Table M6

Correlations between Trait Perceived Stress Scales and Peer Relations Scales

Peer relations scales	Trait perceived stress scales	
	Stress	Cope
(*n* = 111)		
Number of same-sex friends	-.13	.12
Same-sex social acceptance	-.16	.00
Likeability	-.02	.18
Popularity	-.17	.28**

Note. ** *p* < .01, two-tailed.

Table M7

Correlations between Trait Emotion Scales and Peer Relations Scales

Trait emotion scale	Peer relations scales			
	Number same-sex friends	Same-sex social acceptance	Likeabilty	Popularity
	($n = 111$)			
Positive emotion	.08	.04	.20*	.26**
Negative emotion	-.25**	-.23*	.04	-.24*
Self-report anxiety	-.15	-.25**	.11	-.15
Self-report depression	-.33***	-.24*	.03	-.21*
Peer-nominated anxiety	-.21*	-.16	-.05	-.31***
Peer-nominated depression	-.17	-.12	-.08	-.30***

Note. * $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

nominations received from peers, $r = .03, p = .77$; and, the number of depression-related nominations received from peers, $r = -.09, p = .33$ (see Table M3). One explanation for this is that early adolescents may not be the best judges of each other's covert emotional experiences. Finally, that trait mindfulness was not significantly associated with *likeability*, $r = .03, p = .74$ (see Table M4), indicates that mindfulness does not appear to predispose early adolescents to like one another.

Multiple regression analyses. This section was divided into three parts (series of analyses), each having a specific focus. In each series of analyses, multiple regression analyses were conducted to identify those scales from each of the three trait areas that mindfulness moderated (e.g., the relation between *trait negative emotion* and *number of same-sex friends*). Thus, moderation by trait mindfulness was assessed between: trait perceived stress and trait emotion; trait perceived stress and peer relations; and, trait emotion and peer relations.

The first series consisted of three analyses that assessed mediation by trait mindfulness in the relationship between trait perceived stress and trait emotion. The second series, consisting of the fourth through seventh regression analyses, investigated the role of trait mindfulness in the relationship between trait perceived stress and peer relations. The third series, comprised of the eighth through fourteenth regressions, elucidated whether or not trait mindfulness moderated the relationship between trait emotion and peer relations. Moreover, since it is preferable that the moderator variable be uncorrelated with both the predictor variable and the criterion variable to provide a clearly interpretable interaction term (Baron & Kenny, 1986; Holmbeck, 1997), each series of multiple regression analyses began with an analysis conducted as follows.

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Consider the following example used to determine whether or not trait mindfulness moderates the relationship between trait perceived stress and trait emotion. The scale (e.g., *cope*) from the *predictor* area (e.g., trait perceived stress) that was least associated with trait mindfulness was selected as the predictor variable. The scale (e.g., positive emotion) from the *criterion* area (e.g., trait emotion) that was least associated with trait mindfulness was then chosen as the criterion variable. The criterion variable, positive emotion, was then regressed on trait mindfulness (i.e., the proposed mediator) and the predictor variable, cope. In the second step of the regression, the interaction term between trait mindfulness and the predictor, cope, was then entered. In this manner, the most clearly interpretable interaction term for the relation between the predictor area (trait perceived stress) and the criterion area (trait emotion) was singled out to determine whether or not moderation occurred.

In keeping with the aforementioned example, the first series, in fact, examined whether trait mindfulness moderated between trait perceived stress and trait emotion. Since stress has been shown to produce deleterious effects (Glaser et al., 1999; Selye, 1950), it was considered a predictor of emotion. Thus, *cope* and *trait mindfulness* were entered in the first step of the first regression, followed by their interaction term in the second step. Results for the regression analyses are presented in Table M8. The first step revealed an overall $F(2, 108) = 5.47, p < .01$. Whereas a significant main effect was found for *cope*, $\beta = .26, p < .01$, none was found for *trait mindfulness*, $\beta = .16$, n.s. The interaction term in the second step was not significant, $\beta = .30$, n.s. These results indicate that trait mindfulness did not account for significant variance in *positive emotion* (when *cope* was controlled for), and that it does not moderate between *cope* and *positive*

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emotion. Hence, trait mindfulness appears to be play little to no role in predicting or moderating positive emotion.

The second and third multiple regression analyses focus on the role of trait mindfulness in the relationship between trait stress and unpleasant emotions (i.e., *trait negative emotion*, and *self-report trait depression*). Separate analyses were conducted with each unpleasant emotion scale as the criterion variable. For the first of these, *trait negative emotion* was regressed on *trait perceived stress* and *trait mindfulness* in the first step, and the interaction term was entered in the second step (see Table M9). The first and second steps revealed overall F-scores of $F(2, 108) = 26.75$, $p < .001$, and $F(3, 107) = 17.80$, $p < .001$. Whereas significant main effects were found for *trait stress*, $\beta = .46$, $p < .001$, and *trait mindfulness*, $\beta = -.20$, $p < .05$, their interaction term was not significant, $\beta = .19$, n.s. These results indicate that, whereas trait stress and trait mindfulness were both significantly associated with trait negative emotion, trait mindfulness did not moderate the relation between trait stress and trait negative emotion.

The third regression analysis examined whether trait mindfulness moderated the relationship between *trait perceived stress* and *self-report trait depression* (see Table M10). Trait stress and trait mindfulness were entered in the first step, followed by their interaction term in the second step. Results revealed F-scores of $F(2, 108) = 11.93$, $p < .001$, and $F(3, 107) = 7.99$, $p < .001$, for steps 1 and 2, respectively. Whereas a significant main effect was found for trait mindfulness, $\beta = -.32$, $p < .001$, the main effect of self-report trait depression was not significant, $\beta = .17$, n.s. The interaction term did not explain significant incremental variance, $\beta = -.21$, n.s. In sum, the results indicate that trait mindfulness was associated with self-report trait depression, but did not moderate the

Table M8

Multiple Regressions to Predict Positive Emotion from Trait Cope and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		5.47**	.303	.092		
Trait cope	.26**					
Trait mindfulness	.16					
Step 2		3.69*	.306	.094	.214	.002
Trait cope X Trait mindfulness	.30					

Note. * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table M9

Multiple Regressions to Predict Trait Negative Emotion from Trait Stress and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		26.75***	.576	.331		
Trait Stress	.46***					
Trait Mindfulness	-.20*					
Step 2		17.80***	.577	.333	.264	.002
Trait Stress X Trait Mindfulness	.19					

Note. * $p < .05$, two-tailed. *** $p < .001$, two-tailed.

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relationship between trait stress and self-report trait depression.

The second series, consisting of the fourth through seventh multiple regression analyses, investigated whether trait or not mindfulness moderated the relationship between trait perceived stress and peer relations (see Table M11). Again to ensure the clearest possible interpretation of interaction findings, the first of these analyses was conducted with *trait cope* as predictor and *likeability* as the criterion since these scales had the lowest zero-order correlations with trait mindfulness (i.e., the potential moderator, trait mindfulness, was non-significantly correlated with both the predictor and the criterion). Trait cope and trait mindfulness were entered in the first step, and their interaction term in the second step. The analysis found F-scores of $F(2, 108) = 1.78$, n.s., and $F(3, 107) = 2.46$, $p < .05$, for steps 1 and 2, respectively. Significant main effects were *not* found for trait cope, $\beta = .18$, n.s., or trait mindfulness, $\beta = .03$, n.s., yet the interaction term was significant, $\beta = 1.41$, $p < .05$, indicating that trait mindfulness moderated the relation between early adolescents' self-reported degree of coping and their likeability (see Figure M1).

The fifth regression examined whether trait mindfulness moderated the relationship between *trait perceived stress* and *number of friends* (two scales to which trait mindfulness was significantly correlated). *Trait stress* and *trait mindfulness* were entered in the first step, their interaction term in the second (see Table M12). The first and second steps revealed F-scores of $F(2, 108) = 3.03$, $p < .05$, and $F(3, 107) = 2.11$, n.s. A significant main effect was found for *trait mindfulness*, $\beta = .22$, $p < .05$, but not for *trait stress*, $\beta = -.03$, n.s. The interaction term was non- significant, $\beta = -.25$, n.s. These results indicate that, whereas trait mindfulness was significantly associated with the number of

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Table M10

Multiple Regressions to Predict Self-Report Trait Depression from Trait Stress and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		11.93***	.425	.181		
Trait stress	.17					
Trait mindfulness	-.32***					
Step 2		7.99***	.428	.183	.262	.002
Trait stress X Trait mindfulness	-.21					

Note. *** $p < .001$, two-tailed.

Table M11

Multiple Regressions to Predict Likeability from Trait Cope and Trait Mindfulness

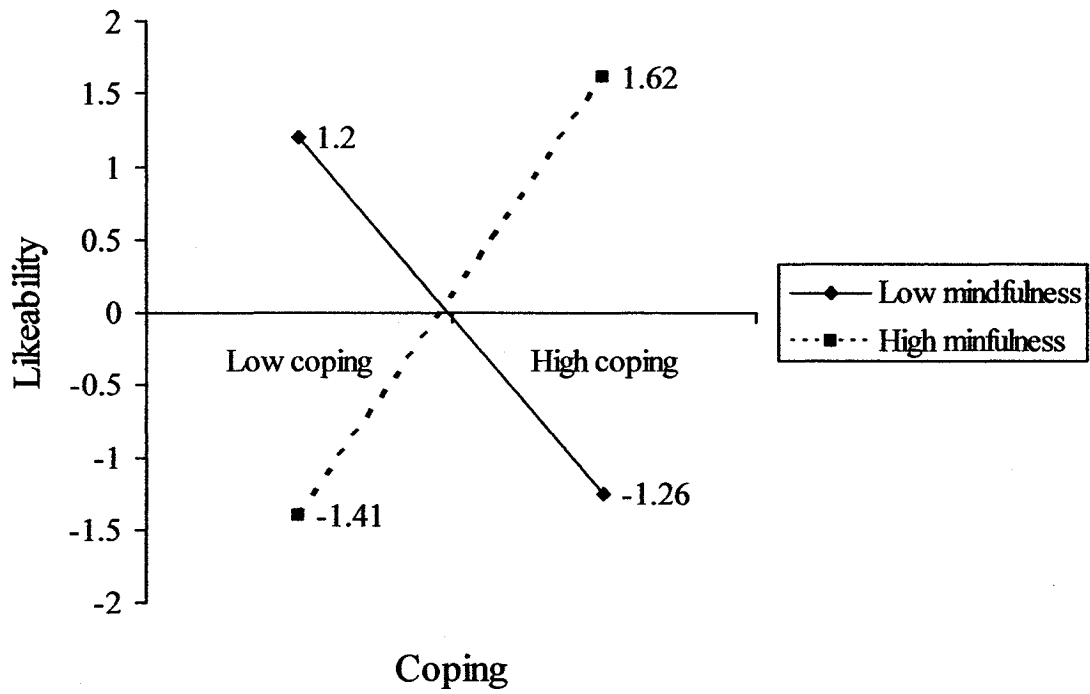| Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		1.78	.179	.032		
Trait cope	.18					
Trait mindfulness	.03					
Step 2		2.76*	.268	.072	4.59	.040
Trait cope X Trait mindfulness	1.41*					

Note. * $p < .05$, two-tailed.

Figure M1. Trait mindfulness as moderator between standardized coping and standardized likeability scores

same-sex friends even when trait stress was controlled for, it did *not* moderate between trait perceived stress and number of friends.

The sixth regression in this series examined whether trait mindfulness moderated the relationships between *trait perceived stress* and *same-sex social acceptance*. *Trait stress* and *trait mindfulness* were entered in the first step, the interaction term in the second (see Table M13). F-scores for the first and second step were $F(2, 108) = 2.34$, n.s., and $F(3, 107) = 1.72$, n.s., respectively. All effects were non-significant: main effect for *trait mindfulness*, $\beta = .14$, n.s.; main effect for *trait stress*, $\beta = -.10$, n.s; and, interaction term, $\beta = .32$, n.s. Thus, neither predictor (trait stress or trait mindfulness) accounted for significant, unique variance in same-sex social acceptance when the other predictor was partialled out, nor did trait mindfulness moderate between trait stress and same-sex social acceptance.

The seventh multiple regression analysis in this series examined whether trait mindfulness moderated the relation between trait perceived stress and popularity. *Trait perceived stress* and *trait mindfulness* were entered in the first step, the interaction term in the second (see Table M14). F-scores for the first and second step were $F(2, 108) = 3.25$, $p < .05$, and $F(3, 107) = 2.19$, n.s., respectively. Although the overall F-score of the first step was significant, the individual main effects were not significant: for *trait mindfulness*, $\beta = .12$, n.s.; and, for *trait perceived stress*, $\beta = -.16$, n.s. The interaction term was also non-significant, $\beta = .15$, n.s. Thus, neither predictor (trait stress or trait mindfulness) accounted for significant, unique variance in popularity, nor did trait mindfulness moderate between trait stress and popularity. In sum, the fourth through seventh multiple regression analyses in this subsection revealed that trait mindfulness was

Table M12

Multiple Regressions to Predict Number of Same-Sex Friends from Trait Stress and

Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		3.03*	.231	.053		
Trait Stress	-.03					
Trait Mindfulness	.22*					
Step 2		2.11	.237	.056	.311	.003
Trait Stress X Trait Mindfulness	-.25					

Note. * $p < .05$, two-tailed.

Table M13

Multiple Regressions to Predict Same-Sex Social Acceptance from Trait Stress and

Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		2.34	.204	.041		
Trait stress	-.10					
Trait mindfulness	.14					
Step 2		1.54	.214	.046	.498	.005
Trait stress X Trait mindfulness	.31					

significantly associated with *trait perceived stress* and one of the peer relation scales (i.e., number of same-sex friends), yet it did *not* moderate the relations between trait stress and peer relations.

The third series of analyses, which included the eighth through fourteenth multiple regression analyses, investigated whether trait mindfulness moderated the relation between trait emotion and peer relations. The eighth multiple regression analysis examined whether trait mindfulness moderated the relation between *trait positive emotion* and *likeability*. For reasons mentioned previously, the scale selected from the predictor area (emotion) and the scale selected from the criterion area (peer relations) for the first regression of this subsection were the least associated with trait mindfulness. Trait positive emotion and trait mindfulness were entered in the first step of the multiple regression, followed by the interaction term in the second step (see Table M15). *F*-scores for the first and second step were $F(2, 108) = 2.26$, n.s., and $F(3, 107) = 2.55$, n.s., respectively. The main effects were not significant: for *trait positive emotion*, $\beta = .20$, n.s.; and, for *trait mindfulness*, $\beta = .00$, n.s. The interaction term was also non-significant, $\beta = 1.09$, n.s. This analysis confirmed what previously determined zero-order intercorrelations suggested – non-significant amounts of unique variance in the criterion were accounted for by the predictors – and further indicated, via a non-significant interaction term, that trait mindfulness did *not* moderate between trait positive emotion and likeability.

The ninth regression examined whether trait mindfulness moderated the relation between *self-report trait depression* and *number of same-sex friends* (two scales with which trait mindfulness was significantly zero-order correlated). Self-report trait

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Table M14

Multiple Regressions to Predict Popularity from Trait Stress and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		3.25*	.238	.057		
Trait stress	-.16					
Trait mindfulness	.12					
Step 2		2.19	.241	.058	.121	.001
Trait stress X Trait mindfulness	.15					

Note. * $p < .05$, two-tailed.

Table M15

Multiple Regressions to Predict Likeability from Trait Positive Emotion and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		2.26	.201	.040		
Trait positive emotion	.20					
Trait mindfulness	.00					
Step 2		2.55	.258	.067	3.034	.027
Trait positive emotion X Trait mindfulness	1.09					

depression and trait mindfulness were entered in the first step, the interaction term in the second (see Table M16). The first and second steps revealed significant F-scores of $F(2, 108) = 5.08$, $p < .01$, and $F(3, 107) = 6.40$, $p < .01$. A significant main effect was found for *self-report trait depression*, $\beta = -.20$, $p < .05$, but not for *trait mindfulness*, $\beta = .15$, n.s. The interaction term was significant, $\beta = -1.29$, $p < .01$ (see Figure M2). In sum, these results indicate that: (a) participants' self-report trait depression accounted for a significant amount of unique variance in number of same-sex friends and, (b) trait mindfulness moderated the relation between self-report trait depression and the number of same-sex friends.

The tenth regression examined whether trait mindfulness moderated the relationship between *self-report trait depression* and *same-sex social acceptance* (again, two scales with which trait mindfulness was significantly zero-order correlated) (see Table M17). Self-report trait depression and trait mindfulness were entered in the first step, their interaction term in the second. The first and second steps revealed F-scores of $F(2, 108) = 3.86$, $p < .05$, and $F(3, 107) = 2.58$, n.s. A trend approaching significance was found for the main effect of self-report trait depression, $\beta = -.20$, $p = .054$. The main effect was not significant for *trait mindfulness*, $\beta = .11$, n.s. The interaction term was not significant, $\beta = -.14$, n.s. These results indicate that self-report trait depression accounted for a near significant amount of unique variance in same-sex social acceptance when trait mindfulness is controlled for, and that trait mindfulness did *not* moderate between self-report trait depression and same-sex social acceptance.

The eleventh regression examined whether trait mindfulness moderated the relation between *self-report trait depression* and *popularity* (trait mindfulness was significantly

Table M16

Multiple Regressions to Predict Number of Same-Sex Friends from Self-Report Trait Depression and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		5.08**	.293	.086		
Self-report trait depression	-.20*					
Trait mindfulness	.15					
Step 2		6.40***	.390	.152	8.35	.066
Self-report trait depression X Trait mindfulness	-1.29**					

Note. * $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

Table M17

Multiple Regressions to Predict Same-Sex Social Acceptance from Self-Report Trait Depression and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		3.86*	.258	.067		
Self-report trait depression	-.20 [a]					
Trait mindfulness	.11					
Step 2		2.58	.260	.067	.084	.001
Self-report trait depression X Trait mindfulness	-.14					

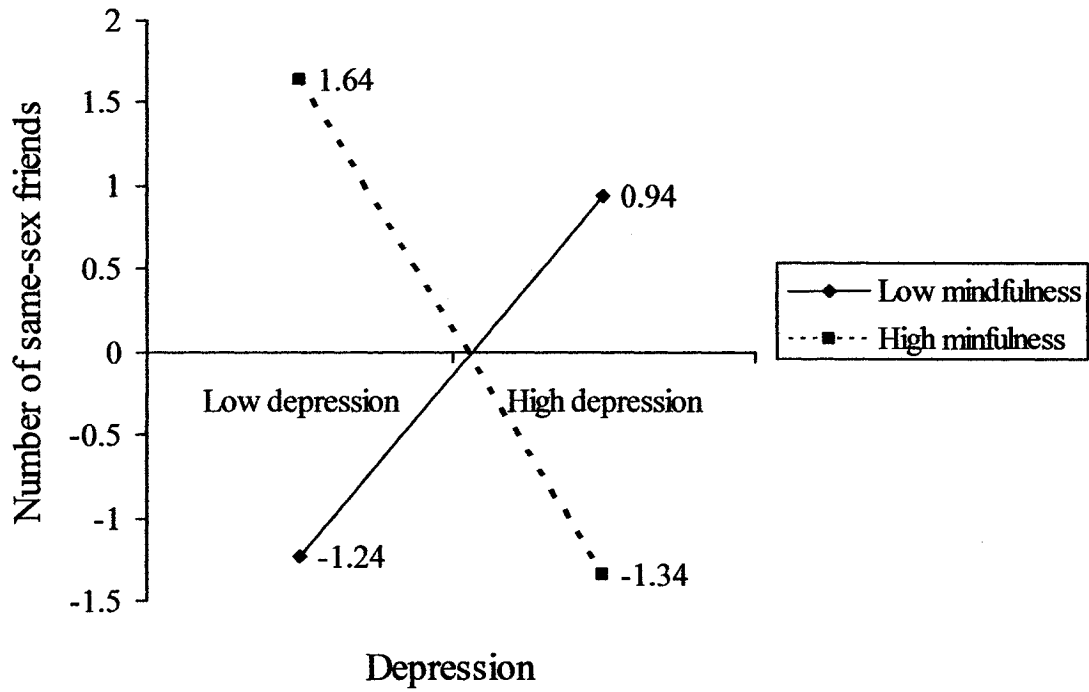*Note.* [a] trend: $p = .054$, two-tailed. * $p < .05$, two-tailed.

Figure M2. Trait mindfulness as moderator between standardized trait depression and standardized number of same-sex friends.

mindfulness were entered in the first step, their interaction term in the second (see Table M18). The first and second steps revealed F-scores of $F(2, 108) = 3.09, p < .05$, and $F(3, 107) = 2.10$, n.s., respectively. The main effects of self-report trait depression, $\beta = -.15$, n.s., and trait mindfulness, $\beta = .13$, n.s, revealed that neither of these scales accounted for significant unique variance in popularity when the other was partialled out. The interaction term was not significant, $\beta = -.19$, n.s., indicating that trait mindfulness did *not* moderate between self-report trait depression and popularity.

The twelfth regression focused on the role of trait mindfulness in the relation between trait negative emotion and number of same-sex friends. *Trait negative emotion* and *trait mindfulness* were entered in the first step, their interaction term in the second (see Table M19). The first and second steps revealed significant F-scores of $F(2, 108) = 3.55, p < .05$, and $F(3, 107) = 3.71, p < .05$. The main effects of trait negative emotion, $\beta = -.11$, n.s., and for trait mindfulness, $\beta = .19$, n.s, revealed that neither of these scales accounted for significant unique variance in number of same-sex friends. The interaction term was significant, $\beta = -.86, p < .05$, indicating that trait mindfulness moderated the relation between trait negative emotion and number of same-sex friends (see Figure M3).

The thirteenth multiple regression analysis investigated the role of trait mindfulness in the relation between *trait negative emotion* and *same-sex social acceptance*. Trait negative emotion and trait mindfulness were entered in the first step, their interaction term in the second (see Table M20). The first and second steps revealed F-scores of $F(2, 108) = 3.55, p < .05$, and $F(3, 107) = 2.37$, n.s. The main effects of trait negative emotion, $\beta = -.18, p = .077$, and trait mindfulness, $\beta = .11$, n.s, revealed that neither of these scales accounted for significant unique variance in same-sex social

Table M18

Multiple Regressions to Predict Popularity from Self-Report Trait Depression

and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		3.09*	.233	.054		
Self-report trait depression	-.15					
Trait mindfulness	.13					
Step 2		2.10	.236	.055	.155	.001
Self-report trait depression X Trait mindfulness	-.19					

Note. * $p < .05$, two-tailed.

Table M19

Multiple Regressions to Predict Number of Same-Sex Friends from Trait

Negative Emotion and Trait Mindfulness

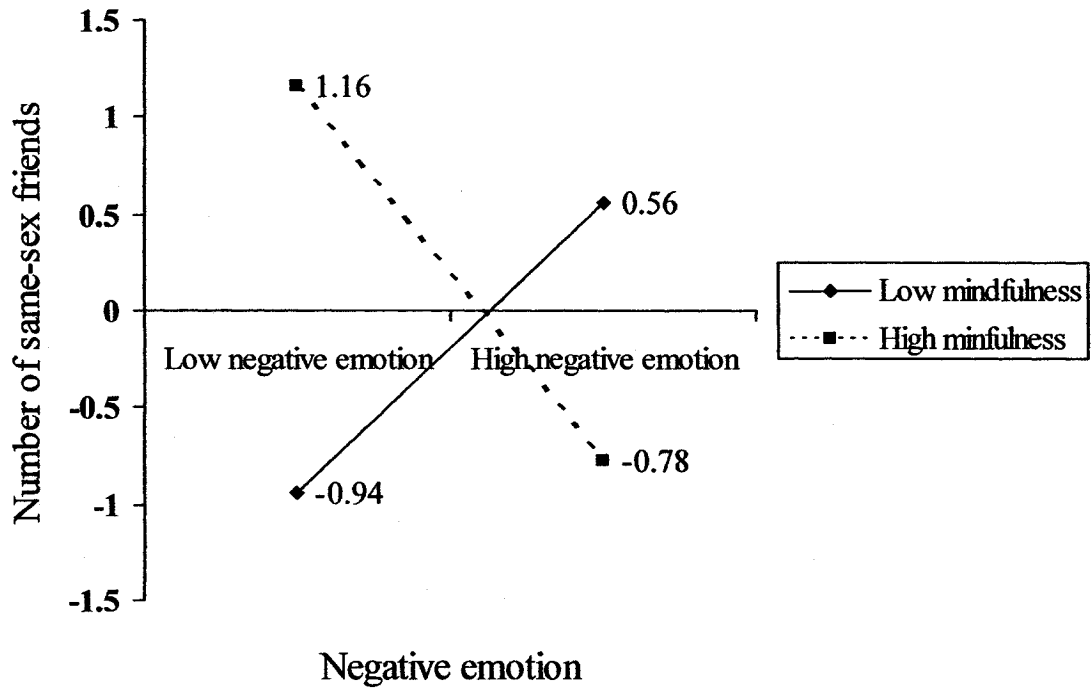| Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		3.55*	.248	.062		
Trait negative emotion	-.11					
Trait mindfulness	.19					
Step 2		3.71*	.307	.094	3.84	.033
Trait negative emotion X Trait mindfulness	-.86*					

Note. * $p < .05$, two-tailed.

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Figure M3. Trait mindfulness as moderator between trait negative emotion and number of

same-sex friends.

acceptance. However, the main effect of trait negative emotion did indicate a trend toward statistical significance, suggesting that, with increased sample size, there would have been adequate power to detect a significant main effect for trait negative emotion. The interaction term was not significant, $\beta = -.10$, n.s., indicating that trait mindfulness did *not* moderate between trait negative emotion and same-sex social acceptance.

The fourteenth and final regression analysis investigated whether trait mindfulness moderated the relation between *trait negative emotion* and *popularity* (see Table M21). Trait negative emotion and trait mindfulness were entered in the first step, their interaction term in the second. The first and second steps revealed F-scores of $F(2, 108) = 3.64, p < .05$, and $F(3, 107) = 3.40, p < .05$. The main effects of *trait negative emotion*, $\beta = -.18, p = .074$, and for *trait mindfulness*, $\beta = .11$, n.s, revealed that neither of these scales accounted for significant unique variance in same-sex social acceptance. However, the main effect of *trait negative emotion* did indicate a trend toward statistical significance, suggesting that with increased sample size power would be adequate to detect a significant main effect for trait negative emotion. The interaction term was not significant, $\beta = -.74, p = .096$. This finding suggests a trend toward moderation by trait mindfulness in the relation between trait negative emotion and popularity.

In sum, in the multiple regression analysis subsection, analyses focused on elucidating the role of trait mindfulness in the relations between scales from the following areas: trait perceived stress and trait emotion (see Tables M8 to M10), trait perceived stress and peer relations (see Tables M11 to M14), and trait emotion and peer relations (see Tables M15 to M21). Results indicated that trait mindfulness moderated three relationships and tended toward moderation in another. Specifically, trait mindfulness

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Table M20

Multiple Regressions to Predict Same-Sex Social Acceptance from Trait Negative

Emotion and Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		3.55*	.248	.062		
Trait negative emotion	-.18 [a]					
Trait mindfulness	.11					
Step 2		2.37	.249	.062	.051	.000
Trait negative emotion X Trait mindfulness	-.10					

Note. [a] trend: $p = .077$, two-tailed. * $p < .05$, two-tailed.

Table M21

Multiple Regressions to Predict Popularity from Trait Negative Emotion

And Trait Mindfulness

Scale	β	F	R	R^2	ΔF	ΔR^2
Step 1		3.64*	.251	.063		
Trait negative emotion	-.18 [a]					
Trait mindfulness	.11					
Step 2		3.40	.295	.087	2.82	.024
Trait negative emotion X Trait mindfulness	-.74 [b]					

Note. [a] trend: $p = .074$, two-tailed. [b] trend: $p = .096$, two-tailed. * $p < .05$, two-tailed.

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moderated the relations between: (a) *trait cope* and *likeability*, (b) *self-report trait depression* and *number of same-sex friends*, and (c) *trait negative emotion* and *number of same-sex friends*. Finally, trait mindfulness showed a trend toward moderation in the relation between *trait negative emotion* and *popularity*.

Test of Mediation Effect for State Mindfulness as Mediator between

State Stress and State Negative Emotion

<u>Test of indirect effect of predictor on outcome:</u>

$$\text{T-value} = \frac{a \; * \; b}{\text{Square Root} (S_a^2 b^2 + S_b^2 a^2 - S_a^2 S_b^2)}$$

$$= \frac{(-.681) (-.213)}{\text{Square Root} ((.062)^2(-.213)^2 + (.028)^2(-.681)^2 - (.062)^2(.028)^2)}$$

$$= \frac{.145}{.023} = 6.269$$

T-value $=$ 6.269, df $= 104$, therefore p-value $< .001$.

Indirect effect of predictor on outcome (i.e., via mediator) significant at $p < .001$.

<u>Test of direct effect of predictor on outcome:</u>

$$\text{T-value} = \frac{c \; - \; c'}{\text{Square Root} (S_a^2 b^2 + S_b^2 a^2 - S_a^2 S_b^2)}$$

$$= \frac{.397 - .338}{\text{Square Root} ((.052)^2(.338)^2 + (.058)^2(.397)^2 - (.052)^2(.058)^2)}$$

$$= \frac{.059}{.029} = 2.030$$

T-value $=$ 2.030, df $= 104$, therefore p-value $= .016$.

Direct effect of predictor on outcome (when mediator present) significant at $p < .05$.

<u>Proportion mediation</u> $= \dfrac{.059}{.397} = .149 =$ **14.9% mediation (i.e., partial mediation)**

Note. a = parameter estimate of effect of predictor on mediator (i.e., effect of state stress on state mindfulness).

b = parameter estimate of effect of mediator on outcome (i.e., effect of state mindfulness on state negative emotion).

c = parameter coefficient of direct effect of predictor on outcome when mediator absent.

c' = parameter estimate of direct effect of predictor on outcome when mediator present.

Test of Mediation Effect for State Stress as Mediator between

State Mindfulness and State Negative Emotion

Test of indirect effect of predictor on outcome:

$$\text{T-value} = \frac{a \ * \ b}{\text{Square Root} \ (\ S_a^2 \ b^2 + S_b^2 \ a^2 - S_a^2 \ S_b^2 \ )}$$

$$= \frac{(-.681 \ ) \ (.397 \ )}{\text{Square Root} \ ((.062)^2(.397)^2 + (.052)^2(-.681)^2 - (.062)^2(.052)^2)}$$

$$= \frac{-.270}{.043} = 6.280$$

T-value = 6.280, df = 104, therefore p-value < .001.
Indirect effect of predictor on outcome (i.e., via mediator) significant at p < .001.

Test of direct effect of predictor on outcome:

$$\text{T-value} = \frac{c \ - \ c'}{\text{Square Root} \ (\ S_a^2 \ b^2 + S_b^2 \ a^2 - S_a^2 \ S_b^2 \ )}$$

$$= \frac{-.213 \ - \ (-.088)}{\text{Square Root} \ ((.028)^2(-.088)^2 + (.029)^2(-.213)^2 - (.028)^2(.029)^2)}$$

$$= \frac{-.125}{.007} = 17.86$$

T-value = 17.86, df = 104, therefore p-value < .0001.
Direct effect of predictor on outcome (when mediator present) significant at p < .0001.

Proportion mediation = $\frac{-.125}{-.213}$ = .589 = **58.9% mediation (i.e., partial mediation)**

Note. a = parameter estimate of effect of predictor on mediator (i.e., effect of state stress on state mindfulness).
b = parameter estimate of effect of mediator on outcome (i.e., effect of state mindfulness on state negative emotion).
c = parameter coefficient of direct effect of predictor on outcome when mediator absent.
c' = parameter estimate of direct effect of predictor on outcome when mediator present.