Relationships Between Positive and Negative Affect in Happiness and Hypomania Risk

DISSERTATION

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By

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Abstract

Happiness is among the most enduring goals in human existence, and confers myriad psychological benefits. Happiness is also frequently characterized by – indeed, often indistinguishable from – experiences of positive affect. Yet, recent research has suggested that frequent experiences of positivity may also be linked to pathological functioning, including hypomania risk. These separate lines of research underscore the importance of identifying how, when, and why positive emotions can be linked to psychological health or illness. This dissertation builds on the evaluative space model of affect (Cacioppo & Berntson, 1994) to suggest that happiness and positive affect are not equivalent, and that investigating the full spectrum of affective experience is necessary to understand the distinction between happiness and hypomania risk. Five studies directly compare affective experience between happiness and hypomania risk, two outcomes that are both linked with positive affect. These studies show that positive affect is linked differentially to happiness and hypomania risk depending on the presence or absence of negative affect and variables associated with negative affect, and that the relationship between positive and negative affect in both happiness and hypomania risk differs when affect is measured at the trait level compared to when affect is measured in the moment. Taken together, these studies support different relationships between positive and negative affect for happiness and hypomania risk.
For Tessa, Hannah, and Theo. Wishing you lasting happiness.
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Chapter 1: Introduction

One of the most enduring goals in American society is happiness, beginning with the Declaration of Independence, which puts striving for happiness on the same level as the fundamental concepts of life and liberty. Today, American bookstores are filled with many rows of popular psychology and self-help books promising to unlock the secrets to becoming – and staying – happy. Self-help is the world’s bestselling genre, representing an $11 billion industry each year (Lindner, 2009), and the majority of U.S. residents rate personal happiness as very important (Diener, Suh, Smith, & Shao, 1995; Triandis, Bontempo, Leung, & Hui, 1990) and think about happiness frequently (Freedman, 1978). This pursuit of happiness is not just an American phenomenon, but has become a global one, driven and maintained by ideals of personal, political, and economic freedom (Diener et al., 1995) and the ability to maximize personal well-being. Research has suggested that such a focus appears justified: the ability to be happy and contented with life is central to psychological adjustment, adaptation, and positive mental health (e.g., Diener, 1984; Jahoda, 1958; Taylor & Brown, 1988).

Yet, skeptics have pointed out that happiness may not be unilaterally beneficial for health and functioning. One such skeptic even suggested that happiness meets all criteria for a psychological disorder, including that it is sufficiently infrequent in the
general population, consists of a discrete cluster of symptoms, and reflects abnormal cognitive functioning, including a lack of contact with reality (Bentall, 1992). Although the extent to which such arguments should be taken seriously is unclear, trait happiness – typically defined as frequent positive affect – can have some aspects of pathology. For example, some work has suggested that unrealistic optimism may lead to poor decisions (Weinstein & Klein, 1996), including ignoring or discounting important cues with implications for well-being (Norem & Chang, 2002); people who are “too” chipper may be seen as out of touch with reality and alienate themselves from others (Fredrickson, 2009), particularly if displaying situationally inappropriate affect (Erber & Erber, 2000); and pursuing positive emotional states may paradoxically make people feel worse (Mauss, Tamir, Anderson, & Savino, 2011). Indeed, happiness has also recently been associated with psychological dysfunction: for example, hypomania may be “too much happiness” (Gruber, Mauss, & Tamir, 2011, p. 229), and valuing happiness to an extreme has been associated with symptoms of both depression (Ford, Shallcross, Mauss, Floerke, & Gruber, 2014) and bipolar disorder (Ford, Mauss, & Gruber, 2015).

These separate lines of research highlight the difficulty in identifying how, when, and why the positive emotions that so many people strive for also put them at risk for dysfunction and disorder. This dissertation suggests that happiness and positive affect are not equivalent, and that investigating the full spectrum of affective experience is necessary to understand the distinction between flourishing and dysfunction. This dissertation compares correlates of affective experience between happy people and those
at risk for hypomania, two groups that share the experience of positive affect but differ in psychological health, and suggests that the dynamic interplay between positive and negative affect may be crucial to disentangling the beneficial and harmful outcomes with which positive affect has been associated. This chapter reviews the literature showing that positive affect has been associated with both happiness and hypomania risk, then outlines an integrative approach, the evaluative space model, that may help to explain when positive and negative affect covary and when they are more independent. Considering the spectrum of possible relationships between positive and negative affect may clarify the role of positive affect in happiness and hypomania risk.

Positive Affect and Well-Being

Classical Views of Positivity

Since the beginning of intellectual history, scholars, philosophers, artists, and others have contemplated the path to optimal experience and well-being. Such work has delineated two approaches to well-being: hedonia and eudaimonia. Whereas the hedonic approach defines well-being in terms of attaining pleasure and avoiding pain, the eudaimonic approach defines well-being in terms of attaining meaning and self-realization (Ryan & Deci, 2001). These two approaches are founded on different views of human nature and prescribe different approaches to the enterprise of living well.

The hedonic view of well-being suggests that happiness is a matter of raw subjective feeling: maximizing feelings of pleasure, and minimizing feelings of pain.
Pleasure is understood broadly as including all pleasant feeling or experience, such as enjoyment, exhilaration, exultation, gratitude, joy, love, relief, satisfaction, and so on, whereas pain includes all unpleasant feeling or experience: anguish, boredom, despair, dread, grief, irritation, remorse, shame, and so on. Happy people smile frequently and are buoyant and cheerful; their pleasures are many and their displeasures are few. This view is supported by the early teaching of Aristippus, a Greek philosopher from the fourth century B.C., who suggested that the goal of life is to experience the maximum amount of pleasure, and that happiness is the sum of one’s hedonic moments. Aristippus taught that we should not delay current pleasures for the sake of future pleasures, and indulged in behavior devoted to sensual gratification that often broke social conventions. Thomas Hobbes (1651) also argued that humans naturally pursue their own self-interest, pursuing pleasure and avoiding pain, and that happiness comes from the successful pursuit of our human appetites. Hobbes suggested that understanding the moral concepts of “good” and “evil” is as simple as understanding what people desire or avoid, and that these are linked to fundamental emotions of hope and fear. And Sigmund Freud, an influential theorist in the early years of the field of psychology, suggested that procuring pleasure and avoiding pain are fundamental human motives that underlie all thought and behavior (Freud, 1920/1952).

The hedonic view focuses not only on the pleasures of the body: hedonism can also include the preferences and pleasures of the mind (Kubovy, 1999). For example, Epicurus, a Greek philosopher from the third century B.C., regarded pleasures of the
mind as superior to pleasures of the body because of their variety and durability, and
strove for a life of tranquility characterized by the absence of fear, pain, or unsatisfied
desire. Hedonism can also include more general judgments about the good and bad
elements of life. Utilitarian philosophers such as Jeremy Bentham argued that a good
society is built from each person’s attempt to maximize pleasure and self-interest.
Happiness is therefore not reducible to physical hedonism, for it can be derived from
attainment of goals or valued outcomes in varied realms (Diener, Sapyta, & Suh, 1998;
Kirkland Turowski, Man, & Cunningham, 2014). Some have attempted to make this
calculation explicit: for example, Nobel Prize winner Daniel Kahneman outlines an
approach to maximizing happiness that focuses on calculating utilities, maximizing the
density of reward, and optimizing inputs associated with pleasure versus displeasure
(Kahneman, Diener, & Schwarz, 1999).

The eudaimonic view suggests that happiness lies in the actualization of human
potential, or fulfilling one’s true nature. Aristotle defined well-being as a life of virtuous
activity, by which he meant excelling at one’s activities. Virtue for the Greeks was
equivalent to excellence, and a virtuous person was someone who performs the
distinctive activity of being human well. Aristotle focused on the importance of
rationality as a means of separating humans from plants and animals. Since our
rationality is our distinctive activity as humans, he argued that exercising rational choices
in accordance with virtue meant living well. Early humanistic psychologists agreed with
the eudaimonic conceptualization of well-being: for example, Abraham Maslow (1943)
argued that the highest human goal is self-actualization, and Carl Rogers (1961) suggested that “the good life” results from optimal development, the continual process of striving to fulfill our full potential.

The eudaimonic view suggests a distinction between the things we desire and the things we need (Nussbaum, 1992). For example, Fromm (1976) argued that optimal well-being meant distinguishing between “subjectively felt needs and objectively valid needs – part of the former being harmful to human growth and the latter being in accordance with the requirements of human nature” (pp. 3-4). Eudaimonic approaches suggest that not all pleasures are good for people, and that subjectively felt pleasure cannot be equated with well-being. Indeed, Rogers’s (1961) definition of well-being included emotions that are rich and intensely experienced, whether positive or negative, and Ryff and Keyes (1995) suggested that striving for one’s potential is separate from subjective enjoyment of life. Their theory identified measurable psychological needs, including autonomy, personal growth, self-acceptance, life purpose, mastery, and positive relatedness.

Each of these perspectives has received criticism, with eudaimonic theorists suggesting that hedonia makes people slavish devotees to whim and desire, and hedonic theorists retorting that people should tell researchers what makes their life good, and not the other way around (Diener et al., 1998). Plato argued for balance, teaching that the good life is one in which our many conflicting desires (for truth and good, or for social standing, or for basic physical appetites) are in harmony with one another. One modern attempt to integrate these perspectives is self-determination theory, which posits that a
natural aim of human life is fulfillment of three basic psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2000). A complementary perspective suggests that flourishing is comprised of positive emotion, active engagement with activities, and having meaning or purpose in life (Seligman, 2002). These approaches are supported by research on flow, which suggests that the optimal human experience is built from moments in which we are fully present and actively engaged in a challenging, yet enjoyable activity (Csikszentmihalyi & Csikszentmihalyi, 1992). Such work points to the importance of mental engagement and personal fulfillment, while highlighting subjective well-being and positive emotion as an indicator of such wellness.

Early philosophical and psychological perspectives on the function of positive affect and its relationship to well-being have given rise to the blossoming field of positive psychology (Seligman & Csikszentmihalyi, 2000). Such work has primarily focused on subjective determinants of well-being, given the consistent theme in psychology that how people perceive their circumstances tends to matter more than what those circumstances are. A wealth of empirical work over the last three decades has demonstrated that positive affect is an important component of happiness and well-being (Diener, Suh, Lucas, & Smith, 1999; Ryan & Deci, 2001; Seligman, 2002). In addition to the hedonic consequences of positivity, research has suggested that positive affect meaningfully influences a variety of cognitive and behavioral processes. For example, Fredrickson’s (1998, 2001) broaden-and-build theory holds that positive emotions broaden people’s momentary thought-action repertoires in the short run and lead to actions that build
enduring personal resources over the long run. The broad range of domains in which positivity is influential suggests that positive affect fulfills an important function, serving as a cue about one’s standing relative to the environment.

**Hedonic Benefits of Positive Affect**

Positive affect fulfills an important hedonic function in life. Not only do positive emotions feel good in the moment, but they can also predict flourishing over the long term (Fredrickson, 2001). People with a dispositional tendency to experience positive affect are happier (Gross, Sutton, & Ketelaar, 1998), with low reactivity and high capacity for emotion regulation (Davidson, 2004). Moreover, savoring positive experiences can maintain or enhance positive affect and positive emotions (Bryant, Chadwick, & Kluwe, 2011), leading to greater well-being (Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Positive affect may also serve as a buffer from the consequences of stress (Folkman & Moskowitz, 2000) and as a way to recover from negative emotional experiences (Tugade & Fredrickson, 2004). These data speak to the hedonic value of positive affective states.

**Cognitive Benefits of Positive Affect**

Positive affect also plays an integral role in shaping thought. Positive emotions function to widen the array of thoughts and actions that come to mind (Fredrickson, 1998), broadening perception, attention, motivation, reasoning, and social cognition. At the most basic level, positive affect broadens visual search patterns (Wadlinger & Isaacowitz, 2006), leading to increased attention to peripheral stimuli (Derryberry &
Tucker, 1994). People experiencing positive affect show patterns of thought that are flexible (Isen & Daubman, 1984), creative (Isen, Daubman, & Nowicki, 1987; Isen, Johnson, Mertz, & Robinson, 1985), integrative (Isen, Rosenzweig, & Young, 1991), open to information (Estrada, Isen, & Young, 1997), engaged (Murray, Sujan, Hirt, & Sujan, 1990), and efficient (Isen & Means, 1983; Isen, Rosenzweig, & Young, 1991).

When it comes to the effects of these cognitive processes on behavior, people experiencing positive affect show an increased preference for variety and accept a broader array of behavioral options (Kahn & Isen, 1993). In many ways, then, positive affect encourages broadened mindsets and motivated behavior.

Trait positivity also fuels the tendency to evaluate information in a positively biased manner. Motivation to reach desired conclusions and avoid undesired conclusions can affect reasoning and decision-making through reliance on a biased set of cognitive processes (e.g., Kunda, 1990). Consistent with the metaphor of happy people wearing “rose colored glasses” when they evaluate information, people with high trait positivity make more favorable judgments of ambiguous stimuli (Isen & Shalker, 1982), are able to find positive meaning in negative circumstances (Affleck & Tennen, 1996; Tugade & Fredrickson, 2004), and evaluate options and outcomes in a biased way, such as casting events and situations in a more positive light, being less responsive to negative feedback, and more strongly denigrating opportunities that are not available to them (Lyubomirsky & Ross, 1999). Happier people are also more optimistic about their future (Campbell,
1981) and demonstrate greater resilience to negative outcomes (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009).

Social Benefits of Positive Affect

Positive affect has several beneficial social consequences. Positive affect leads people to be more helpful (Batson, Coke, Chard, Smith, & Taliaferro, 1979; Isen & Levin, 1972), generous (Isen, 1970), and understanding of others. Displaying positive affect also leads other people to evaluate individuals more favorably, indicating that positivity carries valuable social currency. For example, smiling people are liked more by others and foster more positive interpersonal feelings than non-smiling people (Lau, 1982), and are more likely to have satisfying marriages and overall high well-being across the lifespan, independent of physical attractiveness (Harker & Keltner, 2001). Furthermore, people who experience frequent positive affect tend to socialize more and have stronger social relationships (Diener & Seligman, 2002). Dispositionally positive people are judged as more intelligent and socially skilled (Diener & Fujita, 1995), more friendly, warm, and self-confident (Schimmack, Oishi, Furr, & Funder, 2004), and more physically attractive (Diener, Wolsic, & Fujita, 1995).

A Functional Perspective on the Benefits of Positive Affect

One reason positive affect has such powerful consequences is that it plays an important functional role in signaling our current status in the environment. Many early American philosophers suggested that positive affect can be interpreted as a sign of right or correct thinking; psychological research has substantiated this idea, showing that affect
cues people as to how they are doing relative to their environments, helping to determine the optimal course of action within a given context (e.g., Tamir, 2009). Positive affect functions as a sign that things are going well, and facilitates approach behavior (Cacioppo, Gardner, & Berntson, 1999), continued action (Carver & Scheier, 1990; Clore, Gasper, & Garvin, 2001), or reallocation of resources (Carver, 2003). Whereas the immediate course of action is more clear-cut with negative emotions (e.g., escape from or deal directly with a clear threat), a greater variety of potential behavior options exist for positive emotions (Fredrickson & Branigan, 2005). Experiences of positive affect may prompt individuals to engage with their environments and explore novel stimuli, or motivate them to continue along any line of thinking or action they have initiated. Just as the self-esteem system serves to monitor others’ reactions and alert the individual to the possibility of social exclusion (Leary, Tambor, Terdal, & Downs, 1995), the affect system serves to monitor one’s own standing relative to the physical and social environment, and to track one’s progress on a current set of goals.

Positive affect helps people to monitor and attain goals. The control-process theory of behavior suggests that people continuously monitor their progress toward goals, adjusting behavior to match expectations and minimizing discrepancies between expectations and reality. When the rate of progress toward a particular goal is higher than expected, people experience positive affect, which facilitates their ability to shift attention and effort toward another goal (Carver & Scheier, 1990). Positivity therefore can help an individual to effectively manage multiple goals. This type of reciprocally-
managed cycle can also predict an upward spiral of positivity when it comes to the consequences of positive affect (Fredrickson & Joiner, 2002): for example, one study found that achieving one’s goals leads to better adjustment, higher self-confidence, and increased likelihood of achieving one’s goals in the future (Sheldon & Houser-Marko, 2001). Positive affect also influences motivation: for example, a goal that has been implicitly linked with positive affect becomes more desirable, and people experience greater motivation to attain those goals (Custers & Aarts, 2005). Positive affect makes people more intrinsically motivated to engage with tasks, while not shirking responsibility when it comes to uninteresting tasks that must be completed (Isen & Reeve, 2005). Thus, positive affect seems crucial to helping people orient toward relevant goals, persevere in their attempts to complete those goals, and switch appropriately between competing goals, depending on one’s progress.

On the whole, people with high trait positive affect are better equipped to cope with life’s challenges and stresses compared to people with low trait positive affect (Folkman & Moskowitz, 2000), and one meta-analysis of 293 samples concluded that trait positive affect causes success and health as much as it reflects these outcomes (Lyubomirsky, King, & Diener, 2005). Positive emotions promote survival over the long run by accumulating enduring personal resources that can be drawn on when facing later threats (Cohn et al., 2009; Fredrickson, 1998), such as physical wellness, social support, resilience, agency, and the ability to savor positive experiences (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). Consistent with these functional benefits of positive affect,
people who experience frequent positive affect are in better physical health (Richman, Kubzansky, Maselko, Kawachi, Choo, & Bauer, 2005; Pressman & Cohen, 2005) and even live longer (Danner, Snowdon, & Friesen, 2001; Diener & Chan, 2011). Taken together, these findings suggest that positive affect is healthy, beneficial, and serves to promote happiness.

Positive Affect and Dysfunction

Although experiencing high positive affect often leads to beneficial outcomes, other research has suggested that the affective changes that positively influence thoughts and decisions can also lead to irrational thoughts and poor decision-making. This work suggests that a single-minded drive to maximize positive affect may not be an ideal approach (Oishi, Diener, & Lucas, 2007), and may even be problematic at times (Friedman, Schwartz, & Haaga, 2002). One line of research has investigated the logical extreme of this idea, finding that positive affect is associated with substantial psychological and behavioral dysfunction (Gruber, Mauss, & Tamir, 2011), including mania, the core diagnostic criterion for bipolar disorder (American Psychiatric Association, 2000). Indeed, a surge of recent research exploring the “dark side” of positive affect has found several negative consequences of positivity.

Hedonic Costs of Positive Affect

Positive affect feels good, but recent research suggests that it may be best in moderation. For example, an extremely positive event can make other events seem less
positive by comparison; naturally occurring intense positive experiences are often preceded by negative ones; and the processes that amplify or dampen positive affect may carry over to negative affect (Diener, Colvin, Pavot, & Allman, 1991). Pursuing positive emotional states may paradoxically make people feel worse (Mauss, Tamir, Anderson, & Savino, 2011), suggesting that the more that people value positive states, the worse they might end up.

**Cognitive Costs of Positive Affect**

The ways that positive affect shapes thought also imply several negative consequences. The broadening function of positive affect encourages focus on global as compared to local features (Gasper & Clore, 2002), which leads to a reduction in attention to detail. For example, positive affect is correlated with worse performance on a visual task that requires participants to narrow their range of attention (Rowe, Hirsch, & Anderson, 2007). This global focus can sometimes lead to an overreliance on heuristics, expectations, or stereotypes (Bless, Clore, Schwarz, Golisano, Rabe, & Wölk, 1996; Bodenhausen, Kramer, & Süsser, 1994; for a review, see Bless, Schwarz, & Kemmelmeier, 1996) and worsens memory for non-prototypical people (Forgas, 1992). Feeling positive also leads people to process things less deeply, which makes them equally receptive to strong and weak arguments and easier to persuade (Petty & Cacioppo, 1986), and can increase attention to irrelevant information (Biss & Hasher, 2011). Positive affect also makes people reach decisions more quickly while being less likely to check their work (Isen, 1984) and increases susceptibility to misinformation.
effects on memory (Forgas, Laham, & Vargas, 2005; Storbeck & Clore, 2005). When a situation requires thinking carefully and realistically about a decision, the research suggests that one would be better off being in a negative mood than a positive one (Alloy & Abramson, 1979).

The “rose colored glasses” facilitated by positive affect may also have their downsides for the individual. For example, people who are in a good mood are less likely to have a realistic view of their circumstances (Taylor & Brown, 1988), and unrealistic optimism may lead to poor decisions (Weinstein & Klein, 1996), including ignoring or discounting important cues with implications for well-being (Norem & Chang, 2002). Positive illusions about the self, while beneficial in the short term, may also have long-term costs. For example, self-enhancing tendencies are related to narcissism (Robins & John, 1997) and narcissistic tendencies (Colvin, Block, & Funder, 1995), and predict decreased academic engagement over time (Robins & Beer, 2001). It appears, therefore, that feeling good is associated with some very real cognitive costs, particularly when narrowed focus, careful thought, and realistic appraisals are needed.

**Social Costs of Positive Affect**

Some of the social consequences of positive affect – altruism, generosity, and understanding – can be harmful in the wrong context, such as when interacting with someone who does not have one’s best interests in mind. People who are in a good mood judge others more favorably (Forgas & Bower, 1987) and place greater trust in others (Dunn & Schweitzer, 2005), particularly when superficial cues indicate trustworthiness.
(Lount, 2010); this could lead to situations in which others might take advantage of them. Moreover, people who experience positive affect are not always viewed favorably by others. The phrase “ignorance is bliss,” coined by poet Thomas Gray (1742), is commonly used to reference an assumption that positively-minded people are out of touch with the realities of the world; people who are viewed as “too” chipper may be seen as out of touch with reality and alienate themselves from others (Fredrickson, 2009), particularly if displaying situationally inappropriate affect (Erber & Erber, 2000).

Although there are many social benefits of positive affect, this research indicates that it is not always beneficial to feel positive when interacting with others – some sensitivity as to the likelihood that others will treat us well, and to the social context of the displayed affect, may be necessary.

**A (Dys)functional Perspective on the Costs of Positive Affect**

Positive affect can orient an individual to the environment and help her manage goals, yet there are ways this functional process can go awry. Positive affect experienced in the wrong context, such as a threatening environment, will not best serve the immediate needs of the individual, and positive affect that is not appropriately sensitive to goal progress can also be detrimental. For example, positive affect may lead people to set more ambitious goals, and control-process theory suggests that setting unrealistic goals may unintentionally backfire: as one monitors one’s progress toward a goal and realizes that things are going worse than expected, this can lead to rapid anger and negativity (Carver & Scheier, 1990). This may be particularly likely when setting
unattainable goals, which may make individuals vacillate between positive and negative mood states as they repeatedly pursue, then fail to achieve, their goals.

Research suggests that although positive affect may often serve us well, it can sometimes serve as a dysfunctional signal in the wrong context, and some people may misinterpret or rely too heavily upon positive affect in guiding behavior. Mania is a clinical state indicative of bipolar disorder and characterized by disrupted emotional functioning, including periods of abnormally and persistently elevated yet irritable mood (American Psychiatric Association, 2000), and dysregulated or volatile emotions (e.g., Johnson, Gruber, & Eisner, 2007; Phillips & Vieta, 2007). Mania involves greater positive affect in response to a variety of positive and even negative events, independent of current symptom levels (Gruber, 2011). Mania history has also been associated with other correlates of positive affect: for example, people with a history of mania are zealously engaged with goal pursuit, experiencing robust increases in confidence during positive moods (Johnson, 2005), yet the goals they set tend to be unrealistic; and bipolar disorder has also been linked to creativity (Andreasen, 1987).

Episodes of mania are temporary and occur in a small population, yet personality variables can predict risk for future manic episodes. A recent conceptual shift in psychiatry has suggested that major psychiatric illnesses, including bipolar disorder, are viewed as developmental illnesses whose etiologic roots begin long before the initial onset of symptoms (Reeves, Leibenluft, & Gruber, 2014). Hypomania risk is a subclinical analogue of mania and includes a constellation of affective, cognitive, and somatic
features that are associated with increased risk for the onset of mania (Eckblad & 
Chapman, 1986). Specifically, hypomania risk involves increased social engagement, 
mood volatility, and elevated positive mood. Hypomania risk is a good predictor of the 
development of future manic symptoms: among one 10-year prospective study, more than 
75% of people with high scores on a measure of hypomania risk developed manic or 
hypomanic episodes (Kwapil, Miller, Zinser, Chapman, Chapman, & Eckblad, 2000). We 
consider hypomania risk as crucial to predicting future episodes of mania.

Hypomania risk has been linked to positive affect in several studies. People with 
hypomania risk report greater positive affect in response to false success feedback 
(Meyer & Bauer, 2009), and an experience-sampling study suggests that people at risk 
for bipolar disorder (Hofmann & Meyer, 2006) report elevated levels of positive affect 
across varied daily life circumstances. Importantly, this intense positive affect can be 
characterized as dysfunctional given that it is apparently insensitive to context. As such, 
positive affect in mania and hypomania risk has been characterized as “too much of a 
good thing” (e.g., Gruber, Johnson, Oveis, & Keltner, 2008). Taken together, this 
research suggests that positive affect may be a signal of dysfunction for some individuals.

Positive Affect: Healthy or Harmful?

When considered together, these separate lines of research on happiness and 
hypomania risk present a theoretical inconsistency regarding the role of positive affect in 
functioning. Positive affect has been associated with both beneficial and harmful
consequences for feeling, thinking, and interacting with others. Moreover, both happiness and hypomania risk share this common feature of positivity, yet they are clearly different phenomena (Lester & Kaplan, 1994), with drastically different consequences for well-being. Social or goal-relevant context seems to be one variable that helps to specify whether positive affect is associated with beneficial or harmful outcomes (e.g., whether or not such affect is appropriate; Erber & Erber, 2000; Johnson, 2005). Another variable may be the affective context. To better understand the role of positive affect in flourishing and dysfunction, we suggest that it is crucial to investigate the full spectrum of affective experience, including the role of negativity.

Positive affect defines only part of the rich array of affective experience; our emotional lives are also characterized by the experience of negative affect. Even happy people do experience occasional negative moods (Diener & Seligman, 2002), and negative emotions serve a functional purpose (Damasio, 1994; Darwin, 1872; Frijda, 1988; Parrott, 2014; Schwarz, 1990). For example, fear helps people avoid danger (Mowrer, 1939) and prepare for stressful situations (Janis & Leventhal, 1968), anxiety can motivate people to work harder and to perform better (Norem & Cantor, 1986; Svanum & Zody, 2001), and guilt and shame can motivate people to avoid moral transgressions (Baumeister, Stillwell, & Heatherton, 1994). Indeed, although negative affect is unpleasant and often avoided, harmful consequences have been associated with the absence of negativity. For example, people with psychopathy may experience blunting of certain negative emotions, which leads to moral deficiencies and poor social
functioning (Patrick, Bradley, & Lang, 1993). The absence of expressed negativity can also be perceived as inauthentic and disingenuous (Fredrickson, 2009).

Making the best decisions may sometimes come from the integration of positive and negative information. For example, sometimes dealing with negativity in the moment (e.g., preventing something bad from happening) helps to ensure future well-being. Recent work has suggested that there may be an optimal ratio of positive to negative affect for psychological health (Fredrickson & Losada, 2005), emphasizing that negative affect can be appropriate in specific situations (Fredrickson, 1998) and can also serve as a useful contrast to positive affect, decreasing the tendency to habituate to a positive situation (Solomon, 1980). Moreover, the amygdala, a brain area that is sensitive to motivationally relevant information (Cunningham, Van Bavel, & Johnsen, 2008; Cunningham & Brosch, 2012), is equally responsive to positive and negative information for happier people (Cunningham & Kirkland, 2014), reflecting a balanced approach to evaluating positive and negative information.

Understanding the dynamic interplay between positive and negative affect, then, and the variety of relationships they can take, may help to integrate the divergent consequences for well-being. To gain perspective on these issues, we consider the evaluative space model, a theoretical framework that describes the structure of affect and the multiple forms that relationships between positive and negative affect can take (Cacioppo & Berntson, 1994; Cacioppo, Gardner, & Berntson, 1997). This model informs the prediction that the ways in which positive and negative affect intersect differ
between happiness and hypomania risk, making the subjective experience of positivity different and suggesting different perspectives within which positivity is experienced.

**The Structure of Affect**

A wealth of evidence suggests a structure of affect in which positive and negative affect serve as basic underlying dimensions (e.g., Cacioppo, Gardner, & Berntson, 1999; Diener & Emmons, 1984; Diener & Iran-Nejad, 1986; Reich, Zautra, & Davis, 2003; Watson, Wiese, Vaidya, & Tellegen, 1999). Each of these two dimensions is identified by a variety of affective markers, which tend to cluster together (e.g., sad and guilty as markers for negative affect; pleasant and happy as markers for positive affect). Although these markers may be distinct at lower levels of abstraction, at higher levels, their shared variance can be accounted for by a general positive or negative affective dimension (Cacioppo et al., 1999; Tellegen, Watson, & Clark, 1999).

Emotion research has debated, at times fiercely, whether positive and negative affect are distinct (bivariate view) or related (bipolar view) constructs (e.g., Russell & Carroll, 1999). The evaluative space model integrates these literatures by specifying multiple forms of relationships between positive and negative affect (Cacioppo & Berntson, 1994; Cacioppo, Gardner, & Berntson, 1997; Cacioppo, Gardner, & Berntson, 1999). The evaluative space model posits two related, yet functionally independent
motivational systems for positive and negative evaluations/affect\(^1\) (see also the dynamic model of affect; Reich, Zautra, & Davis, 2003). Activation of each system and the relationships between systems can be represented as points or lines within a two-dimensional bivariate space. These relationships are illustrated in Figure 1. According to this model, a bivariate relationship exists between positivity and negativity that frequently, in subjective experience and/or self-report, appears to be bipolar. This model proposes a distinction between subjective experience and process: affective experience is bipolar, whereas the underlying processes are bivariate (Larsen, McGraw, & Cacioppo, 2001). In other words, people often subjectively experience either positive or negative moods, supporting a bipolar model of affective experience, yet the underlying processes that shape subjective experience are dissociable, suggesting a bivariate model of affective processing. Thus, this model helps to explain both when positive and negative affect covary and when they may be distinct.

The evaluative space model suggests three types of relationships, or “modes of evaluative activation” (Cacioppo & Berntson, 1994, p. 402), between positive and negative affect. The inverse relationship, in which positivity increases as negativity decreases and vice versa, is called *reciprocity*. The direct relationship, in which positivity and negativity increase and decrease together, is called *coactivity*. Positive and negative affect may also vary independently, which the model describes as *uncoupled affect*.

\(^1\) For the purposes of this dissertation, I do not consider evaluation, motivation, and affect to be meaningfully different, and they will be discussed interchangeably with regard to this model; see Cunningham & Kirkland, 2012.
These varying combinations of positive and negative activation can lead to affective states that are primarily positive, primarily negative, or ambivalent. The following sections review evidence for positive and negative affect systems and detail the types of relationships that may exist between them.

**Positive and Negative Affect Systems**

A wealth of psychological literature converges on the idea that two fundamental systems shape feelings, motivations, and action tendencies, helping us to understand and interact with the world. One system corresponds to sensitivity to positive information, and the other corresponds to sensitivity to negative information. These systems have been discussed at a variety of levels and in a variety of contexts, such as self-regulation, motivation, personality, and neurobiology. They are described variously as approach and avoidance (withdrawal) tendencies, reward versus threat sensitivity, appetitive and aversive motivation, and so forth. Although not all of these approaches map perfectly onto the constructs of positive and negative affect, they all support the bivariate approach to positivity and negativity proposed by the evaluative space model, and a few examples are reviewed.

The idea of a basic orientation toward positive and negative information was discussed in psychology as early as Freud (1920/1952) and in early drive theories, which suggested that our fundamental motivations are to approach pleasurable or appetitive

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2 Some theories have proposed that these broad systems are heuristic devices used to organize more specific mechanisms (e.g., subtypes of valence; Shuman, Sander, & Scherer, 2013).
stimuli, and to avoid painful or aversive stimuli (Hull, 1932). Building on the approach-avoid theories, regulatory focus theory articulates two mindsets that influence self-regulation: promotion focus and prevention focus (Higgins, 1997). Whereas promotion focus is concerned with achieving positive outcomes (e.g., goals, accomplishments), prevention focus is focused on avoiding negative outcomes (e.g., concerns with safety, responsibilities). Regulatory focus theory suggests that when in promotion focus, meeting one’s goal elicits high-arousal positive affect (e.g., joy), whereas failing to meet one’s goal elicits low-arousal negative affect (e.g., sadness). By contrast, when in prevention focus, meeting one’s responsibility elicits low-arousal positive affect (e.g., calm) whereas failing to meet one’s responsibility elicits high-arousal negative affect (e.g., worry). These two types of motivation suggest different behaviors depending on whether one is attending to positive or negative aspects of a situation.

Another line of evidence focuses on individual differences in personality and neurobiology. This work suggests that differences in how people respond to reward and threat may originate from differences in their baseline sensitivity, and that extraversion and neuroticism represent the primary personality manifestations of reward and threat sensitivity, respectively (Clark & Watson, 2008; Depue & Collins, 1999). Whereas extraversion refers to reward sensitivity and the general tendency to approach, explore, and engage with novelty, neuroticism refers to punishment sensitivity and the general tendency to regulate or restrain potentially disruptive emotions and behaviors (Costa & McCrae, 1992). Extraversion and neuroticism are powerful predictors of affective
experience (Costa & McCrae, 1980): extraversion influences positive affect, whereas neuroticism influences negative affect. Research further suggests that approach and avoidance are governed by neurobiological systems: the behavioral activation system (BAS) refers to reward sensitivity and governs impulsivity, elation, and goal-seeking behavior in response to cues of reward, whereas the behavioral inhibition system (BIS) refers to punishment sensitivity and governs anxiety, vigilance for negative information, and the interruption of behavior in response to cues of threat (Gray, 1981, 1982; Carver & White, 1994). A common metaphor for understanding the distinction between BAS and BIS is to think of the BAS as similar to the gas pedal and the BIS as similar to the brake pedal on a car—they are separate systems, and some individuals tend to lean more heavily on one than the other. A subset of the behavioral inhibition system, the fight-flight-freeze system (FFFS) was proposed as a subsystem that reflects actively avoidant or attack responses to threats (Gray & McNaughton, 2000). Thus, BAS may be linked to extraversion and frequent positive affect, while BIS/FFFS may be linked to neuroticism and frequent negative affect (e.g., Clark, Watson, & Mineka, 1994). Supporting this link, an extensive literature supports separate neural mechanisms for experiencing pleasure and pain (Olds & Milner, 1954), and research has found that positive and negative affect may be associated with distinct neurochemicals. For example, dopaminergic activity in some regions of the brain is related to positive but not negative affect (Cacioppo, Gardner, & Berntson, 1999), and increased cortisol in response to stressful events is related to negative but not positive affect (van Eck, Berkhof, Nicolson, & Sulon, 1996).
These distinctions are also relevant at the level of subjective experience: one study found that people with higher BAS sensitivity report more positive affect in daily life, whereas people with higher BIS sensitivity report more negative affect (Gable, Reis, & Elliott, 2000).

Research has also focused directly on the separability of positive and negative affect in subjective experience (see Reich et al., 2003, for a review). One line of research dissociating positive and negative affect has studied self-reports of life events, finding that people are able to dissociate the impact of positive and negative events on well-being (Bradburn, 1969). For example, one meta-analysis found that positive life events relate to positive affect and life satisfaction, but not to negative states such as depression and psychological distress (Zautra & Reich, 1983), and another study found that several social activities increased positive affect but were unrelated to negative affect (Watson, Clark, McIntyre, & Hamaker, 1992). In another interesting study, students rated their positive and negative affect before and after exam performance feedback; students who had performed well showed change in positive but not negative affect, and students who had performed poorly showed change in negative but not positive affect (Goldstein & Strube, 1994).

A second line of research dissociating positive and negative affect uses the factor analytic approach to studying emotion categories, finding that a variety of emotions may be organized according to core underlying dimensions of positive and negative activated affect (Watson & Tellegen, 1985; Watson, Clark, & Tellegen, 1988; Watson, Wiese,
Vaidya, & Tellegen, 1999). This work uses multidimensional scaling to represent combinations of emotion words along these two dimensions in a circumplex. Emotions may vary along both of these dimensions simultaneously. Positive affect ranges from low (drowsy, sleepy) to high (enthusiastic, excited), and negative affect ranges from low (relaxed, calm) to high (fearful, hostile). One’s current affective state can be represented by the combination of currently activated positive and negative affect. These dimensional models posit that these underlying affective factors combine with cognitive labeling and interpretation to give rise to emotional experience, and suggest a common metric underlying the structure of affective experience (e.g., Barrett, 2006).

In summary, considerable evidence across a variety of psychological domains supports the existence of two affective/motivational systems corresponding to positive and negative information. According to the evaluative space model (Cacioppo & Berntson, 1994), positive and negative affect can combine in a variety of ways, and these combinations can be described as one of three types of relationships, discussed next.

**Reciprocity**

A reciprocal relationship between positive and negative affect is most common in subjective experience. The reciprocal relationship describes a bipolar view of affect in which positive and negative affect are inversely related. This perspective holds that positive and negative feelings are experientially opposite: the more positivity one experiences, the less negativity. This perspective is supported by classic work on the measurement of meaning (Osgood, Suci, & Tannenbaum, 1957), which found that
evaluative bipolar word pairs (e.g., pleasant-unpleasant, good-bad) are a fundamental way that people organize their understanding of the world (see also Green, Goldman, & Salovey, 1993).

Consistent with the idea of reciprocity, several multidimensional scaling studies of people’s conceptual organization of emotion words have suggested models of emotion that demonstrate relationships among emotional experiences, with two factors corresponding to positive and negative activation (Watson & Tellegen, 1985; Watson, Wiese, Vaidya, & Tellegen, 1999) or to valence and arousal (Russell, 1980). The labels are somewhat arbitrary, as a 45-degree rotation of one model produces the other, but both concepts suggest some degree of reciprocity between positive and negative affect. In the Watson and Tellegen (1985) model of positive and negative affect, although the dimensions are arranged to be orthogonal, the resulting emotions are organized as a circumplex such that low activation on one dimension corresponds to moderate activation on the orthogonal dimension, suggesting that for emotion, activation of one affect is not entirely independent from activation of the other. And in the Russell (1980) model, positive and negative affect are collapsed into a single bipolar scale and contrasted with physiological arousal. Inherent in both perspectives, then, is the idea that most affective experiences can be categorized as primarily positive or primarily negative, and that people’s conceptual organization of positive and negative affect tends to view these constructs as mutually interdependent.
A reciprocal relationship between positive and negative affect also characterizes examples of switching from one affective state to another. Emotion has a strong temporal component (Kirkland & Cunningham, 2012) and affective responses can change rapidly over time as a function of the immediate contingencies of the environment. The fact that these emotions are often perceived as sequential, compared to simultaneous, highlights the rapid reciprocal processes occurring between positive and negative affect.

**Coactivation**

It is also possible for positive and negative affect to be related in a nonreciprocal manner, in which positivity and negativity increase together (coactivation) or decrease together (coinhibition). The resulting state can range from low levels of both positive and negative (neutrality) to high levels of both positive and negative (ambivalence). This view suggests that any given stimulus potentially can activate positive affect, negative affect, both, or neither. If a stimulus activates both positive and negative affect, an individual experiences ambivalence (Cacioppo, Gardner, & Berntson, 1999). Ambivalence and coactivation are of greater interest in this dissertation compared to neutrality and coinhibition, which are affectless.

Individuals do sometimes experience ambivalent or mixed emotions. These mixed states are most commonly of the same hedonic valence (e.g., fear and anger) but opposing-valence emotions may also occur simultaneously, and do not necessarily reflect vacillation between one state and the other (Carrera & Oceja, 2007; Larsen & McGraw, 2011). For example, when participants rate their emotional state on unipolar scales, they
report co-occurring feelings of pleasure and displeasure (Schimmack, 2005), and in some situations (e.g., in after watching a bittersweet movie, while moving out of college dormitories, and when graduating from college), people report co-occurring feelings of happiness and sadness (Larsen, McGraw, & Cacioppo, 2001). Research on nostalgia suggests that such mixed states are often triggered by (i.e., are in response to) negative affect, potentially as a coping mechanism (Sedikides, Wildschut, Arndt, & Routledge, 2008). Indeed, some compelling research suggests that people frequently and automatically activate positive feelings in response to negative feelings, in order to minimize the impact of negativity (Solomon & Corbit, 1974; see Taylor, 1991), and that positive emotions may even reverse the physiological effects of negative emotions (Fredrickson & Levenson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000).

The experience of ambivalence is a precarious and temporary state, one that causes tension or dissonance which people are motivated to reduce (Cacioppo, Gardner, & Berntson, 1997). A long tradition of research has shown that people find internal psychological conflict aversive (e.g., Berlyne, 1960, Festinger, 1957; Monteith, 1996), and that people pay special attention to information that has the potential to reduce or resolve their ambivalence. Ambivalence can be reduced by focusing on a dominant response (e.g., Miller, 1959), and people are also generally more sensitive to negative than positive information (e.g., Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Kahneman & Tversky, 1979; Taylor, 1991), so ambivalence reduction may occur by choosing the least costly or risky option. However, the impact of dominant reactions
decreases as conflict increases (Priester & Petty, 1996). People may also sometimes reduce ambivalence by thinking carefully and systematically about both perspectives (Maio, Bell, & Esses, 1996), and other times by thinking in a biased manner (Nordgren, van Harreveld, & van der Pligt, 2006; see Kunda, 1990, and van Harreveld, van der Pligt, & de Liver, 2009). Biases can even be strategic: for example, given that high-arousal affect may be subject to multiple interpretations (Schacter & Singer, 1962), recent work suggests that a high-arousal, negative state (anxiety) can be reinterpreted as a high-arousal, positive state (excitement), which improves performance (Brooks, 2014).

Early work on drives can also speak to the nature of ambivalent conflict and conflict reduction. Basic drives are conceptualized in two ways: motivation to approach appetitive stimuli, and motivation to avoid aversive stimuli (Hull, 1932). Motivation increases as one nears the goal-related stimulus, spatially or temporally. Many complex stimuli, however, have both appetitive and aversive elements, resulting in a conflict: dueling motivations to both approach and avoid. This approach-avoidance conflict demonstrates a motivational asymmetry (Miller, 1944) such that the avoidance gradient is steeper than the approach gradient. For a negative target, compared to a positive one, animals will pull harder (away, compared to toward) when stopped near the target (Brown, 1948). This greater sensitivity to proximate negative compared to proximate positive information is commonly referred to as a negativity bias and helps to encourage protective behavior. But with novel stimuli, or when far from a target, animals are more motivated to approach than to avoid. This default approach motivation is called a
positivity offset and encourages exploratory behavior, which is also valuable for well-being (Cacioppo, Gardner, & Berntson, 1997). The evolutionary survival value of these biases is evident, but these biases also commonly manifest in everyday human decision-making. For example, when selecting a task that will be completed in the distant future, people are more influenced by the positive characteristics of that choice, but when the task will be completed in the near future, people are more influenced by the negative characteristics of that choice (Liberman & Trope, 1998).

Uncoupled Affect

Uncoupled affect occurs when positive and negative affect may be relatively less dependent on one another, such that variation in one type of affect has relatively less influence on variation in another. Uncoupled affect may result in occasional coactivation of positive and negative affect, such as when positivity increases without a corresponding decrease in negativity. It may also occur when a stimulus activates only positive (or only negative) affect, or when the salience of the positive (or negative) features of a target changes while the salience of the negative (or positive) features remains constant, such as with an approach-avoid conflict (Cacioppo, Gardner, & Berntson, 1997). Much of the work described above, in reviewing positive and negative affect systems, is consistent with uncoupled affect. For example, positive and negative affect can co-occur at mild and moderate levels of intensity, though they do not co-occur at high levels of intensity (Diener & Iran-Nejad, 1986; Reich, Zautra, & Davis, 2003). This research suggests that “mutual exclusion only at high levels of intensity characterizes the relation between
positive and negative affect” (Diener & Iran-Nejad, 1986, p. 1031). In other words, the relationship between positive and negative affect may be constrained when it comes to the extremes, but in moderation either dimension may vary with relative freedom without necessitating a change in the other dimension.

Additional research supporting the uncoupling of positive and negative affect comes from research on aging. One prominent study used a cross-sectional design to measure recent positive and negative affect and found that positive affect increases over the lifespan while negative affect decreases, but that their relationship is non-linear: positive affect increases exponentially between ages 25-74, while the decrease in negative affect is more steady and consistent (Mroczek & Kolarz, 1998). Another study using an experience-sampling procedure found that frequency of positive affect did not vary across the lifespan (ages 18-84) whereas frequency of negative affect decreased steadily to age 60, then leveled out (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000). Although more work needs to be done to discover when and why positive affect increases or stays stable over the lifespan, the point remains that levels of positive and negative affect can change independently.

As originally proposed in the evaluative space model (Cacioppo & Berntson, 1994), uncoupled affect describes evaluative situations in which one system changes while the other remains constant. However, some degree of uncoupled-ness describes a situation in which the relation between positive and negative affect varies from being perfectly linear (i.e., a one-to-one relationship), such as when one system changes a lot
and the other changes a little. It is suggested, then, that the broad categories of reciprocity and coactivation can capture a wide range of affective correspondence, with some relationships being more tightly woven than others. In this way, uncoupled affect can also be thought of as a term to help describe the looser variety of ways in which reciprocity and coactivation can manifest, rather than being more narrowly confined to characterizing only situations with zero change for one type of affect.

**Summary**

The evaluative space model is an integrative framework that is designed to describe and explain the multiple ways positive and negative evaluative processes can combine and interact with one another. This framework provides a structure with which to understand when and why emotions can vary from univalent to bivalent, why the relationship between positivity and negativity at some times appears bipolar and other times bivariate, and why at some times or for some individuals the strength of the relationship between positivity and negativity might change.

**Rationale for the Present Work**

The evaluative space model suggests that the relationship between positive and negative affect can take a variety of forms. This dissertation examines the implications of the evaluative space model for understanding affective differences between happiness and hypomania risk. Specifically, this dissertation builds on the evaluative space model to
argue that the ways positive and negative affect intersect differ between happiness and hypomania risk, making the subjective experience of positivity different.

Previous research focusing on the maladaptive consequences of positive affect in hypomania has typically contrasted hypomania risk with healthy participants, yet no research to date has compared hypomania with happiness – another group that is defined in part by positive affect. We suggest that it is critical that we compare hypomania risk directly with happiness (as opposed to “normal controls,” healthy but otherwise unremarkable individuals) to understand whether the observed patterns are due to positive affectivity itself or its relationship with negative affectivity. For example, one study found no differences in non-approach related negative affect between high and low hypomania risk (Gruber et al., 2008), whereas we would predict a difference in negative affect between hypomania risk and happiness, given that bipolar disorder includes descriptions of irritability and emotional volatility, whereas happiness includes descriptions of low negative affect. We are particularly interested in investigating how negative affect manifests in both of these conditions, since some degree of negativity or sensitivity to negative information is probably healthy and adaptive (Damasio, 1994).

This dissertation examines these questions by studying individual differences in affect, happiness, and hypomania risk across several samples of college students and community members. Chapter 2 describes three studies examining trait-level measures of affect and personality in happiness and hypomania risk. Chapter 3 describes two studies examining momentary measures of affect in happiness and hypomania risk.
Figure 1. Bivariate evaluative space (Cacioppo & Berntson, 1994). Copyright © by the American Psychological Association. Reprinted with permission.
Chapter 2: Happiness and Hypomania Risk Differ in Trait Affect and Personality Aspects


Positive affect is a general dimension of mood reflecting the extent to which people feel subjectively pleasant while being engaged with their environment. High positive affect indicates more subjective pleasure and engagement; low positive affect indicates less subjective pleasure and disengagement. For example, Watson et al. (1988) suggest that “high positive affect is a state of high energy, full concentration, and pleasurable engagement, whereas low positive affect is characterized by sadness and lethargy” (p. 1963). The temporary experience of positive affect functions as a sign that things are going well, widening the array of thoughts and actions that come to mind (Fredrickson, 1998) and facilitating approach behavior (Cacioppo, Gardner, & Berntson, 1999).

A wealth of empirical work over the last three decades has demonstrated that the frequent experience of positive affect is an important component of happiness (Diener, Suh, Lucas, & Smith, 1999; Ryan & Deci, 2001; Seligman, 2002). Happiness, also
referred to as subjective well-being, is a disposition defined by global positive
evaluations of one’s qualities and circumstances. Being a happy person carries many
benefits, as resilience (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009), positive
social relationships (Diener & Seligman, 2002), and even longevity (Diener & Chan,
2011). Moreover, frequent positive affect seems to cause success and health as much as it
reflects these outcomes (Lyubomirsky, King, & Diener, 2005), suggesting that positivity
is essential to happiness and psychological health.

Yet recently, some research has suggested that positive affect may not always be
beneficial (Diener, Sandvik, & Pavot, 1991). This work has demonstrated that “too
much” positive affect – including situationally inappropriate affect – may be linked to
substantial psychological and behavioral dysfunction (Gruber, Mauss, & Tamir, 2011),
such as hypomania risk: a predisposition for episodes of hypomania and mania. Mania is
a core feature of bipolar disorder, a severe and recurrent clinical disorder marked by
heightened and persistent disruptions in positive affectivity (Johnson, 2005). Episodes of
mania are temporary and occur in a small population, yet personality variables can
predict risk for future manic episodes. Hypomania risk is a subclinical analogue of mania
and includes a constellation of affective, cognitive, and somatic features that are
associated with increased risk for the onset of mania (Eckblad & Chapman, 1986).
Hypomania risk, which can be considered a stable, dispositional construct, has also been
linked to dysfunctional positive affect. For example, people with hypomania risk report
greater positive affect in response to false success feedback (Meyer & Bauer, 2009), as
well as elevated levels of positive affect across a variety of daily circumstances (Hofmann & Meyer, 2006). As such, positive affect in hypomania risk has been characterized as “too much of a good thing” (e.g., Gruber, Johnson, Oveis, & Keltner, 2008) in that it reflects intense positivity that is apparently insensitive to context. Taken together, this research suggests that positive affect may be a signal of dysfunction for some individuals.

To more deeply understand the divergent implications of positive affect for well-being and mental health, we consider the personality traits that underpin affective experience. Extraversion and neuroticism are powerful predictors of affective experience (Costa & McCrae, 1980): extraversion influences positive affect, whereas neuroticism influences negative affect. In this paper, we demonstrate that personality is important to consider when evaluating the seemingly divergent consequences positive affect yields for well-being (Gruber, Devlin, & Moskowitz, 2014). Using a taxonomy of personality, we propose that aspects of personality can shape experiences of positive affect into divergent outcomes such that the same general traits (extraversion and neuroticism) have different implications for well-being when examined with greater specificity. We focus in particular on comparing subjective happiness with hypomania risk, a negative outcome that has also been linked with positive affect. We demonstrate how personality aspects differentiate these outcomes.
Personality Aspects

The most basic way we understand the world is in terms of positive and negative information – reward and threat. Differences in how we respond to reward and threat may originate from differences in our baseline sensitivity. Considerable evidence suggests that extraversion and neuroticism represent the primary personality manifestations of reward and threat sensitivity, respectively (Clark & Watson, 2008; Depue & Collins, 1999). Whereas extraversion refers to reward sensitivity and the general tendency to approach, explore, and engage with novelty, neuroticism refers to punishment sensitivity and the general tendency to regulate or restrain potentially disruptive emotions and behaviors (Costa & McCrae, 1992). A long tradition of research has examined the structural and functional components of these traits. However, some compelling work has shed new light on the nature of personality by dividing each trait into two distinct aspects (DeYoung, Quilty, & Peterson, 2007) based on independent biological and genetic factors (Jang, Livesley, Aglieitner, Riemann, & Vernon, 2002). Based on these differences, some researchers have argued that higher-order traits such as extraversion and neuroticism may be best conceptualized as useful heuristic devices rather than discrete psychological structures (Jang et al., 2002).

According to this revised structure, extraversion is composed of assertiveness and enthusiasm (DeYoung, Quilty, & Peterson, 2007). Assertiveness reflects an orientation toward agency, drive, and social dominance (e.g., subjective potency for accomplishing goals), whereas enthusiasm denotes friendliness, sociability, and the tendency to
experience positive affect (Depue & Collins, 1999). These personality aspects correspond to complementary functional strategies for interacting with positive information: motivated approach toward rewards, or “wanting,” versus enjoyment of rewards, or “liking” (Berridge & Kringelbach, 2008). “Wanting” refers specifically to incentive salience, a type of motivation that promotes approach toward and consumption of rewards, and is distinguishable from more cognitive forms of desire that involve declarative goals or explicit expectations of future outcomes. By contrast, “liking” refers specifically to the positive hedonic impact of a reward, even in the absence of conscious awareness (Berridge, Robinson, & Aldrige, 2009). Because these strategies are also rooted in separate neurochemical systems (dopamine vs. opioids; Berridge & Robinson, 2003), they may at times become decoupled. This may help to explain diverse life outcomes associated with extraversion – which has been associated with positive behaviors, such as the sociability and excitement found in people who self-identify as happy, as well as with negative behaviors, such as poor impulse control and hypomania risk (Meyer, Johnson, & Winters, 2001), a dispositional predisposition to episodes of (hypo)mania (Eckblad & Chapman, 1986).

Neuroticism differentiates into volatility and withdrawal (DeYoung, Quilty, & Peterson, 2007). Volatility refers to emotional instability, difficulty controlling emotional impulses, and susceptibility to negative affect directed outward (disinhibition), whereas withdrawal refers to susceptibility to negative affect directed inward (inhibition). These personality aspects serve related yet distinct functional roles for dealing with negative
information. Volatility serves to orient the individual vigilantly toward negativity: when faced with a perceived threat, volatile individuals often choose to reduce the threat by confronting it directly. On the other hand, withdrawal serves to promote a passive avoidance strategy such that the individual reduces his or her chances of entering a situation in which threats could occur. Although these aspects can work together, they also may at times diverge. For example, individuals with hypomania risk are often volatile, demonstrating irritability and emotional instability (Eckblad & Chapman, 1986), yet are not necessarily prone to withdrawal; rather, they often demonstrate a maladaptive tendency to approach all stimuli regardless of their potential for benefit or harm (Gruber, 2011).

**Research Aims**

Because aspects of extraversion and neuroticism correspond to different functional strategies for dealing with reward and threat, we sought to discover whether examining these aspects would help to make sense of the diverse life outcomes associated with positive affect. The present work tests whether and how aspects of extraversion and neuroticism differentiate subjective happiness from hypomania risk, dispositions that are both associated with positive affect but which have divergent consequences for well-being. If personality aspects play an important role in differentiating functional outcomes, there should be different patterns in the prevalence of these aspects between subjective happiness and hypomania risk. The conceptual relationships described below are illustrated in Figure 2.
Aim 1: Aspects of extraversion differentiate subjective happiness and hypomania risk. We examined the possibility that although the broader construct of extraversion would be associated with both subjective happiness and hypomania risk, aspects of extraversion would differentiate between them. Specifically, assertiveness (“wanting”) without enthusiasm (“liking”) would be more likely to predict hypomania risk, whereas enthusiasm alone would be more likely to predict subjective happiness.

Aim 2: Aspects of neuroticism differentiate subjective happiness and hypomania risk. We examined the possibility that the aspects of neuroticism – volatility and withdrawal – would diverge for hypomania risk such that hypomania risk would be associated with high volatility and low withdrawal. Subjective happiness, by contrast, would be associated with lower overall neuroticism.

Studies 1-3: Method

Data Collection and Aggregation

We collected data in three studies. The differences between the studies were that our second and third studies included some additional clinical measures and were conducted online using a U.S. community sample rather than college undergraduates. To maximize power, we combined these three studies into a single data set for analyses. Our decision to collect data in multiple studies was based on the recent emphasis on
replication of studies in psychology (Carpenter, 2012)\textsuperscript{3}, but we chose to analyze all studies together following the recommendations of Schimmack (2012), who suggests that analyzing multiple replications of a study within a single statistical model increases the total power across studies and contributes to the credibility of findings. We conducted a \textit{post hoc} power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) to determine the effect sizes that could be detected in our study. Our study had high statistical power: all correlations of $r = .08$ ($R^2 = .006$) or stronger met or exceeded Cohen’s (1988) benchmark of .80 for power.

**Participants**

Our first study included 352 undergraduates (61% female; age $M = 19.29$, range = 18-45) who completed questionnaires online in exchange for course credit. No participants were removed from this sample.

Our second study included 471 U.S. community participants who were recruited through Mechanical Turk, a paid survey website run by Amazon.com that offers a demographically diverse sample and generally reliable data (Buhrmester, Kwang, & Gosling, 2011). Participants who incorrectly answered two catch questions designed to ensure attention were removed, leaving a sample of 466; however, seven participants (1.5% of the sample) failed to complete all measures, so analyses include data from only

\textsuperscript{3} This decision was not made \textit{a priori}. We initially conducted a single study, then decided to conduct a second one with additional measures to ensure our findings held controlling for clinical symptoms. After conducting our second study, we decided to conduct a third study to make sure the results replicated. Sample sizes were based on the size of the available volunteer research pool (Study 1) and available funds for paid participants (Studies 2, 3).
the 459 participants who completed all questions (62% female, age $M = 33.06$, range = 18-81).

Our third study included 201 U.S. community participants who were recruited through Mechanical Turk. All participants passed the attention check, but 23 people (11.4% of the sample) failed to complete all measures, so analyses include data from only the 178 participants who completed all questions (58% female, age $M = 34.5$, range = 18-82).

Across three studies, our total sample size for analysis was 989 participants. This research was approved by The Ohio State University Institutional Review Board and included written informed consent for all participants.

**Measures**

The following dispositional measures were included in all studies (i.e., participants reported on how they usually tended to think, feel, and act). Trait positive affect (PA) and negative affect (NA), were measured with the Positive Activation and Negative Activation Schedule (PANAS; Watson, Clark, & Tellegen, 1988; Watson, Wiese, Vaidya, & Tellegen, 1999), a 20-item scale that measures average levels of activated (i.e., aroused) PA and NA. Participants rate the extent to which they tend to feel each of several affective states “generally … that is, how you feel on average,” including items such as “irritable” and “enthusiastic.” As such, the PANAS is specifically designed

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4 Results did not differ when dropped participants were included in analyses.
to measure trait, or dispositional, affect. Internal consistency was $\alpha = .90$ (positive affect) and $\alpha = .91$ (negative affect).

*Extraversion and neuroticism* were measured using the Big Five Aspects Scale (DeYoung, Quilty, & Peterson, 2007), a 100-item scale that also assesses other personality traits and was used to measure separable aspects of extraversion and neuroticism. Extraversion and neuroticism (and their aspects) are considered stable, dispositional constructs that represent the personality variables governing our global responses to reward and threat. For the broad traits, internal consistency was $\alpha = .89$ (extraversion) and $\alpha = .91$ (neuroticism). For the aspects, internal consistency was $\alpha = .86$ (assertiveness), $\alpha = .87$ (enthusiasm), $\alpha = .89$ (volatility), and $\alpha = .86$ (withdrawal).

*Happiness* was measured with the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999), a four-item scale that measures self-reported trait subjective happiness. Participants rate themselves on a 1-7 semantic differential scale for each question, with labels only at the endpoints. A sample item is: “In general, I consider myself: (1) not a very happy person – (7) a very happy person.” Internal consistency was $\alpha = .88$.

*Hypomania risk* was measured with the Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986), a self-report questionnaire with high internal consistency ($\alpha = .89$ in the present study) and predictive validity for the onset of manic episodes. The Hypomanic Personality Scale consists of 48 true-false items capturing episodic shifts in emotion (“I often feel excited and happy for no apparent reason”), behavior (“there are
often times when I am so restless that it is impossible for me to sit still”) and energy (“I very frequently get into moods where I wish I could be everywhere and do everything at once”). Internal consistency was $\alpha = .89$.

Several studies suggest that elevated scores on the Hypomanic Personality Scale generalize to clinical samples of those diagnosed with bipolar disorder. First, previous research indicates that high scores on the Hypomanic Personality Scale correlate with clinical diagnoses of bipolar disorder (e.g., Eckblad & Chapman, 1986) and current mania symptoms (Klein, Lewinsohn, & Seeley, 1996). In these studies, 78% of undergraduates who scored above the high-risk cutoff reported experiencing hypomanic episodes, and 25% actually qualified for a DSM-IV diagnosis of bipolar disorder (Eckblad & Chapman, 1986). Second, in one study, participants who scored above the high-risk threshold were found to have an increased risk for the development of manic episodes (25% compared to 10%) at a 13-year follow up assessment (Kwapil et al., 2000).

To evaluate possible conceptual overlap between our measures of happiness and hypomania risk, we review research focused on the structure of each scale. Such work suggests that the Subjective Happiness Scale is a one-dimensional measure of happiness (Lyubomirsky & Lepper, 1999), focusing on an individual’s global self-evaluation of their happiness. In comparison to other measures or models of happiness, the Subjective Happiness Scale intentionally does not make a distinction between affective and cognitive components (e.g., Andrews & Withey, 1976; Diener, Emmons, Larsen, &
Griffin, 1985; Lucas, Diener, & Suh, 1996). By contrast, the Hypomanic Personality Scale is a multidimensional measure composed of a variety of latent constructs. For example, the initial report of the Hypomanic Personality Scale included a principal components analysis with 12 factors with eigenvalues greater than one; however, only two factors seemed to fit the items: fifteen items loaded onto one component reflecting hypomanic symptoms (e.g., hyperactivity, mood fluctuations), and six items loaded onto another component reflecting exhibitionism (Eckblad & Chapman, 1986). The remaining factors did not account for much additional variance. More recently, multidimensional scaling analyses of the Hypomanic Personality Scale have revealed three subscales: social vitality, mood volatility, and excitement (Schalet, Durbin, & Revelle, 2011). Social vitality and excitement are related to extraversion, and happiness is also related to extraversion; indeed, extraversion is considered to be the primary personality manifestation of high positive affect, supporting the importance of comparing positive affect between happiness and hypomania risk.

Although happiness and hypomania risk are related (i.e., self-reported feelings of happiness may be present among people with hypomania risk), they appear to be distinct constructs that, in our data, are at best weakly correlated, \( r = .07, .11, .02 \) (Waves 1, 2, and 3, respectively). Happiness, like hypomania risk, is a broader construct than social vitality and excitement; it may include these concepts, but does not exhibit a one-to-one mapping with them. For example, social vitality items on the Hypomanic Personality Scale include “I am so good at controlling others that it sometimes scares me” and “I
seem to have an uncommon ability to persuade and inspire others,” many of which seem to reflect attention-seeking and social manipulation. Excitement items on the Hypomanic Personality Scale include “I am frequently in such high spirits that I can’t concentrate on any one thing for too long” and “I often have moods where I feel so energetic and optimistic that I feel I could outperform almost anyone at anything.” These items reflect high arousal positive affective states that are not necessarily functional. By contrast, the Subjective Happiness Scale measures a person’s global self-evaluation as a happy or unhappy person. This leaves the idea of what constitutes a “happy person” up to the individual. Although individuals vary widely in the sources of their personal happiness, most people have an intuitive knowledge of what happiness means for them and whether or not they have achieved it (Freedman, 1978). These global self-evaluations on the Subjective Happiness Scale are meaningfully different from the moods, attitudes, and behaviors on the Hypomanic Personality Scale.

Given the goals of this work (i.e., comparing overall trait happiness to overall hypomania risk), we did not judge it appropriate to analyze the Hypomanic Personality Scale subscales separately in our main analyses. However, we include a secondary analysis section at the end of our Results in which we assess the degree of overlap between each Hypomanic Personality Scale subscale and our personality measures of interest.

Studies 2 and 3 also included measures of potential mood symptom confounds: mania symptoms, measured with the Altman Self-Rating Mania Scale (ASRM; Altman,
Hedeker, Peterson, & Davis, 1997), which consists of five items assessing cognitive, affective, and somatic symptoms of mania over the last two weeks, and depression symptoms, measured with the Beck Depression Inventory-Short Form (BDI; Beck, Rial, & Rickels, 1974), which consists of 13 items assessing cognitive, affective, and somatic symptoms of depression over the last two weeks. Both symptoms of mania and depression commonly co-occur with experiences of hypomania risk, so we controlled for these variables in secondary analyses to ensure our findings held independent of these clinical states (Gruber et al., 2008). This control seems especially relevant given the findings of a recent paper examining hypomania risk among patients with mood disorders, which suggests that the Hypomanic Personality Scale may be a measure of both personality style and current hypomanic/manic mood symptoms (Parker, Fletcher, McCraw, & Hong, 2014).

Table 1 reports descriptive statistics across three studies, and Table 2, Table 3, and Table 4 report the individual descriptive statistics for each study.

**Data Analyses**

We constructed a series of four general linear model analyses with subjective happiness and hypomania risk as outcome variables. The first two models examined the relationships of happiness and hypomania risk with affect (positive and negative affect) and personality (extraversion and neuroticism). The third model predicted happiness and hypomania risk from aspects of extraversion (assertiveness, enthusiasm) and neuroticism (volatility, withdrawal), as well as the interactions between each trait-related aspect.
Finally, in a fourth model, we demonstrate that these relationships with aspects of extraversion and neuroticism hold even when controlling for positive and negative affect. In a secondary set of analyses, we controlled for current symptoms of depression (BDI) or mania (ASRM) – both of which can be present in bipolar disorder – to rule out the hypothesis that these symptoms contributed to differences between happiness and hypomania risk. A secondary set of analyses use general linear models to assess the degree of overlap between each Hypomaniac Personality Scale subscale and our personality measures of interest. All variables remained unstandardized. Table 5 presents *t*-tests and *p*-values for each analysis.

**Studies 1-3: Results**

**Relationships among Affect, Personality Aspects, Happiness, and Hypomania Risk**

Our first set of analyses sought to confirm the relationships among positive and negative affect with happiness and hypomania risk. We predicted that happiness would be associated with high positive affect and low negative affect, whereas hypomania risk would be associated with high positive affect and high negative affect. We conducted two general linear models predicting happiness (SHS) and hypomania risk (HPS) from positive affect and negative affect. Consistent with previous work, happiness was associated with high positive affect, $\beta_{\text{HAP}} = .51$, and low negative affect, $\beta_{\text{HAP}} = -.35$, whereas hypomania risk was associated with high positive affect, $\beta_{\text{HYP}} = .27$, and high negative affect, $\beta_{\text{HYP}} = .32$. Controlling for current symptoms of mania (ASRM) and
depression (BDI), results for hypomania risk remained consistent, $\beta_{HYP} = .31$ (positive affect) and $\beta_{HYP} = .19$ (negative affect). In other words, both outcomes – happiness and hypomania risk – were consistent with positive affect, but diverged when it came to negative affect.

Our second set of analyses sought to confirm the relationship of personality traits – specifically, extraversion and neuroticism – with happiness and hypomania risk. We predicted that happiness would be positively related to extraversion and negatively related to neuroticism, whereas hypomania risk would be positively related to extraversion and positively related to neuroticism. We conducted two general linear models predicting happiness (SHS) and hypomania risk (HPS) from extraversion and neuroticism. Consistent with previous work, happiness was associated with high extraversion, $\beta_{HAP} = .39$, and low neuroticism, $\beta_{HAP} = -.43$, whereas hypomania risk was associated with high extraversion, $\beta_{HYP} = .46$, and high neuroticism, $\beta_{HYP} = .31$. Controlling for current symptoms of mania (ASRM) and depression (BDI) results for hypomania risk remained consistent, $\beta_{HYP} = .43$ (extraversion) and $\beta_{HYP} = .18$ (neuroticism). In other words, both outcomes – happiness and hypomania risk – were consistent for extraversion, but diverged for neuroticism.

Our third set of analyses was designed to examine the possibility that aspects of extraversion and neuroticism would diverge for happiness and hypomania risk. Within extraversion, we predicted that hypomania risk would be associated with assertiveness, whereas happiness would be associated with enthusiasm. Within neuroticism, we
predicted that hypomania risk would be associated with high volatility and low withdrawal, whereas happiness would be associated with lower overall neuroticism. We conducted two general linear models predicting happiness (SHS) and hypomania risk (HPS) from aspects of extraversion (assertiveness, enthusiasm, and their interaction) and neuroticism (volatility, withdrawal, and their interaction). We found not only that these aspects provided greater nuance in predicting happiness and hypomania risk but also that interactions among trait-related aspects suggested particular combinations of personality traits for whom happiness, or hypomania risk, would be most likely. Figure 3 illustrates all relationships among these constructs, and Figure 4, Figure 5, and Figure 6 illustrate the interactions.

When examining aspects of extraversion, happiness was not associated with assertiveness, $\beta_{\text{HAP}} = 0$, and was positively associated with enthusiasm, $\beta_{\text{HAP}} = .50$. There was no significant interaction between these aspects. By contrast, hypomania risk was not associated with assertiveness, $\beta_{\text{HYP}} = .02^5$, and negatively associated with enthusiasm, $\beta_{\text{HYP}} = -.24$; however, these relationships among assertiveness, enthusiasm, and hypomania risk were qualified by a significant interaction, $\beta_{\text{HYP}} = .61$, indicating that higher levels of assertiveness were always associated with hypomania risk, even if

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5 Assertiveness was significantly predicted by each of the aspects of neuroticism, $\beta_s = .56$ (volatility) and .43 (withdrawal), as well as their interaction, $\beta = -.48$. Because of this, when predicting hypomania risk from all personality variables simultaneously, the neuroticism interaction accounted for the main effect of assertiveness – but not the assertiveness/enthusiasm interaction. Further confirming this, when excluding the volatility/withdrawal interaction from the model, assertiveness significantly predicted hypomania risk, $\beta = .61$. 

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enthusiasm was low (Figure 4). The highest levels of hypomania risk were endorsed among people with both high assertiveness and high enthusiasm, and the lowest levels were endorsed among people with low assertiveness, regardless of enthusiasm. This interaction suggests that assertiveness is the aspect of extraversion that most influences hypomania risk. Controlling for current symptoms of mania and depression, relationships among assertiveness, enthusiasm, and hypomania risk remained consistent, $\beta_{HYP} = .04$ (assertiveness), $\beta_{HYP} = -.20$ (enthusiasm), and $\beta_{HYP} = .55$ (assertiveness × enthusiasm).

When examining aspects of neuroticism, happiness was not associated with volatility, $\beta_{HAP} = .13$, and negatively associated with withdrawal, $\beta_{HAP} = -.19$. These relationships among volatility, withdrawal, and happiness were qualified by a significant interaction, $\beta_{HAP} = -.37$, indicating that volatility had more of a negative impact on happiness at high levels of withdrawal compared to low levels: the highest levels of happiness were endorsed among people with low withdrawal, regardless of volatility, and the lowest levels of happiness were endorsed among people with high withdrawal and high volatility (Figure 5). This interaction suggests that withdrawal is the aspect of neuroticism that most influences happiness. By contrast, hypomania risk was associated with high volatility, $\beta_{HYP} = .44$, and high withdrawal, $\beta_{HYP} = .22$; however, these relationships among volatility, withdrawal, and hypomania risk were also qualified by a significant interaction, $\beta_{HYP} = -.33$, indicating that the highest levels of hypomania risk were endorsed among people with high volatility, regardless of withdrawal, whereas the lowest levels of hypomania risk were endorsed among people with both low volatility
and low withdrawal (Figure 6). This interaction suggests that volatility is the aspect of neuroticism that most influences hypomania risk. Controlling for current symptoms of mania (ASRM) and depression (BDI), the relationship between volatility and hypomania risk remained consistent, $\beta_{HYP} = .20$ (volatility), but withdrawal was no longer a significant predictor, $\beta_{HYP} = 0$ (withdrawal), $\beta_{HYP} = -.02$ (volatility $\times$ withdrawal). In summary, our data indicate that subjectively happy people are most likely to be highly enthusiastic and not withdrawn, whereas people with a hypomania risk are mostly likely to be highly assertive and volatile.

Finally, to understand the extent to which personality aspects predict happiness and hypomania risk above and beyond the influence of affect, the fourth model predicted happiness (SHS) and hypomania risk (HPS) from aspects of extraversion and neuroticism while controlling for positive and negative affect. Within aspects of extraversion, happiness remained unrelated to assertiveness, $\beta_{HAP} = -.06$, and positively associated with enthusiasm, $\beta_{HAP} = .38$, with no significant interaction. Hypomania risk remained unrelated to assertiveness, $\beta_{HYP} = -.01$, and negatively related to enthusiasm, $\beta_{HYP} = -.24$; the assertiveness $\times$ enthusiasm interaction remained significant, $B_{HYP} = .61$, and its interpretation was consistent with the third set of analyses: the highest levels of hypomania risk were endorsed among people with high enthusiasm and high assertiveness, and the lowest levels among people with low assertiveness, regardless of enthusiasm. Controlling for current symptoms of mania (ASRM) and depression (BDI), relationships among assertiveness, enthusiasm, and hypomania risk remained consistent,
$\beta_{HYP} = .02$ (assertiveness), $\beta_{HYP} = -.20$ (enthusiasm), and $\beta_{HYP} = .55$ (assertiveness $\times$ enthusiasm).

Within aspects of neuroticism, happiness remained unrelated to volatility, $\beta_{HAP} = .13$, and was marginally ($p = .06$) negatively related to withdrawal, $\beta_{HAP} = -.13$; the volatility $\times$ withdrawal interaction remained significant, $\beta_{HAP} = -.31$, and its interpretation remained consistent with the third set of analyses: the highest levels of happiness were endorsed among people with low withdrawal, regardless of volatility, and the lowest levels of happiness were endorsed among people with high withdrawal and high volatility. Hypomania risk remained associated with high volatility, $\beta_{HYP} = .36$, but was not associated with withdrawal, $\beta_{HYP} = .10$; however, the volatility $\times$ withdrawal interaction remained significant, $\beta_{HYP} = -.33$. In contrast to the third set of analyses, which did not control for affect, this interaction showed that the highest levels of hypomania risk were endorsed among people with the unique combination of high volatility and low withdrawal, strengthening our suggestion that volatility is the aspect of neuroticism that most influences hypomania risk. Controlling for current symptoms of mania and depression, relationships among volatility, withdrawal, and hypomania risk remained consistent, $\beta_{HYP} = .20$ (volatility), $\beta_{HYP} = 0$ (withdrawal), but the interaction was no longer significant, $\beta_{HYP} = -.10$ (volatility $\times$ withdrawal).
Secondary Analyses: Relationships between Hypomanic Personality Scale Subscales and Personality Aspects

Previous research has suggested that the Hypomanic Personality Scale (HPS) may be usefully examined in terms of three subscales: social vitality, mood volatility, and excitement (Schalet et al., 2011). Conceptually, there may be some overlap between Hypomanic Personality Scale subscales and the personality aspects of extraversion and neuroticism. Specifically, the social vitality subscale of the Hypomanic Personality Scale is similar to the assertiveness aspect of extraversion, excitement subscale of the Hypomanic Personality Scale is similar to the enthusiasm aspect of extraversion, and the mood volatility subscale of the Hypomanic Personality Scale is similar to the volatility aspect of neuroticism. We tested these links by constructing a series of general linear models predicting each personality aspect from positive affect, negative affect, and all three Hypomanic Personality Scale subscales. Assertiveness (extraversion) was significantly related to social vitality (HPS), $\beta = .48$, but not mood volatility (HPS) or enthusiasm (HPS). Enthusiasm (extraversion) was related to all three Hypomanic Personality Scale subscales: social vitality, $\beta = .11$, mood volatility, $\beta = -.10$, and excitement, $\beta = .22$. Volatility (neuroticism) was related to both social vitality (HPS), $\beta = -.12$, and mood volatility (HPS), $\beta = .34$. Finally, withdrawal (neuroticism) was related to all three Hypomanic Personality Scale subscales: social vitality, $\beta = -.25$, mood volatility, $\beta = .27$, and excitement, $\beta = -.08$. Therefore, although there is some conceptual overlap
between these scales, it does not appear that the full Hypomanic Personality Scale can cleanly substitute for measuring these personality aspects.

Discussion

The present research demonstrates that the personality traits of extraversion and neuroticism are significantly linked with subjective happiness and hypomania risk proneness, two affective outcomes shaped by the dispositional tendency to experience positive affect, above and beyond the role of affect alone. More importantly, we found that aspects of extraversion and neuroticism can usefully discriminate between subjective happiness and hypomania risk, providing greater nuance than when examining personality traits at their more general level and suggesting a link to the mechanism by which these affective outcomes are experienced. Subjective happiness was linked with high enthusiasm (extraversion) and low withdrawal (neuroticism). By contrast, hypomania risk was linked with high assertiveness (extraversion) and high volatility (neuroticism). That is, the ways extraversion and neuroticism manifest in subjective happiness and hypomania risk seem to be driven by different personality aspects: The happiness-extraversion relationship is driven by enthusiasm, whereas the hypomania risk-extraversion relationship is driven by assertiveness; the happiness-neuroticism relationship is driven by withdrawal, whereas the hypomania risk-neuroticism relationship is driven by volatility.
Consistent with the idea that assertiveness, enthusiasm, volatility, and withdrawal serve as different mechanisms for happiness and hypomania risk, our results suggest that these personality aspects interact to drive different kinds of behavior. With extraversion, happiness is highest when enthusiasm is high and assertiveness is low (and lowest when enthusiasm is low, regardless of assertiveness), and with neuroticism, happiness is highest when both volatility and withdrawal are low (and lowest when volatility is high). By contrast, hypomania risk is highest when assertiveness and enthusiasm are both high, and when volatility is high and withdrawal is low. These interactions demonstrate not only that extraversion and neuroticism are not unitary concepts in predicting behavior (Jang et al., 2002), but that types of extraversion and neuroticism can combine in varying ways to predict different types of trait affective outcomes.

Critically, these studies demonstrate that a single general construct – extraversion – manifests in different ways for subjective happiness and hypomania risk. This suggests that positive affect, which is shared by both outcomes, may be experienced within different psychological contexts depending on aspects of extraversion. That is, positive affect may not be experienced the same way for all individuals: rather, positivity may be shaped or interpreted in distinct ways depending on whether one is more predisposed to assertiveness or enthusiasm. These findings change our understanding of the meaning of positive affect in the context of subjective happiness. In contrast to positive affect serving as a general approach motivation, we suggest that subjective happiness is particularly
facilitated by positivity that is shaped by an underlying orientation toward enthusiasm, denoting friendliness and sociability.

In addition to contributing toward understanding the divergent consequences of extraversion and positive affect, this work also highlights the divergent functional consequences of two types of neuroticism and negative affect. Previous research has suggested that negative affect can be characterized as relatively higher or lower in arousal (Russell, 1980): high-arousal negative affect is related to anxiety, whereas low-arousal negative affect is related to avoidance. These characterizations of negative affect map nicely onto volatility and withdrawal. Though these strategies (anxiety and avoidance) are often complementary, the present work suggests that when decoupled they can have different implications. Hypomania risk was associated with greater volatility than withdrawal; functionally, this implies affective instability, which is probably related to difficulty disengaging in response to negative information. In addition, volatility and withdrawal are linked to different neurobiological systems that may underlie these orientations: volatility to the “fight-flight-freeze system” (FFFS) and withdrawal to the “behavioral inhibition system” (BIS; Gray & McNaughton, 2000; see DeYoung, 2010). Whereas FFFS governs avoidant responses to immediate, inescapable threat, BIS governs anxiety and general vigilance for negative information.

The present work also helps to explain why a relationship between mania and neuroticism has not been consistently demonstrated in previous research. People experiencing manic episodes are often described as volatile and have difficulty inhibiting
behavior when appropriate (i.e., high volatility / low withdrawal); this combination of aspects may be masked when examining neuroticism at the trait level. The possibility that one aspect is mainly responsible for the link between neuroticism and hypomania risk may explain why neuroticism and mania have not been consistently linked in the empirical literature despite their shared associated with negative affectivity. It makes sense that a measure of neuroticism that does not account for aspects would show no reliable relationship with mania. Indeed, recent work investigating personality aspects among people with bipolar disorder found that high volatility and low withdrawal predicts bipolar disorder over unipolar depression (Quilty, Pelletier, DeYoung, & Bagby, 2013). It would be interesting to investigate the relationships among volatility, withdrawal, and bipolar disorder when people are in a manic phase compared to a depressive phase to understand the influence of current symptoms on judgments of personality.

The clinical implications of this study are limited for two reasons. First, this study explored the relationship between hypomania risk and personality using a non-clinical sample in their dispositional levels of risk for hypomania. Second, we note that only a small number of participants in the present sample qualified as a clinically significant “high-risk” group (n=84, or 8% of our sample) according to previously established cut-offs for the HPS (1.67 standard deviations above the mean, or a score of 34 in our sample; Kwapil et al., 2000). This may have made it more difficult to detect effects. As
such, it remains to be determined precisely how these results would generalize to a clinical sample, and further research is warranted.

Future work investigating the relationship between positive affective outcomes and personality may explore the possibility that discrete positive emotional states interact with personality aspects in a different way than dispositional subjective happiness or hypomania risk. Although positive emotions have long been considered to be less specific than negative emotions, recent work has suggested that different positive emotions may have specific functions and consequences (Campos, Shiota, Keltner, Gonzaga, & Goetz, 2013; Shiota, Keltner, & John, 2006). It would be interesting to explore the possibility that specific combinations of personality aspects facilitate the experience of specific positive emotional states which contribute to affective dispositions. Such work will also need to take into account the limitations of the PANAS (Watson, Clark, & Tellegen, 1988; Watson, Wiese, Vaidya, & Tellegen, 1999) as a measurement tool for the full spectrum of positive affective states, and to contextualize PA more specifically as positive activation.

A second direction for future work would be to investigate the varying functional consequences of additional personality aspects beyond extraversion and neuroticism. Openness, conscientiousness, and agreeableness also differentiate into aspects (DeYoung, Quilty, & Peterson, 2007) and may have unique consequences for other outcomes. As the present work illustrates, it can be illuminating to take a more nuanced approach to
considering personality in order to fully understand its diverse consequences for experience and behavior.

Conclusion

The present work highlights the importance of leveraging insights from personality research to differentiate trait affective orientations. Although outcomes such as subjective happiness can be described by their affective qualities, it is also critical to characterize these outcomes by the personality mechanisms that shape affective experience. Positive affect by itself is insufficient for predicting how someone will interact with the world and cope with adversity. Our work suggests that for a deeper, richer understanding of subjective happiness – and possibly any affective disposition – the effects of positive and negative affect must be considered within the context of the whole person, including both psychological strengths and vulnerabilities.
Table 1. Correlation matrix of measured variables with internal consistency, means, standard deviations, and ranges (Studies 1-3).

<table>
<thead>
<tr>
<th></th>
<th>PA</th>
<th>NA</th>
<th>SHS</th>
<th>HPS</th>
<th>E</th>
<th>EA</th>
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<th>N</th>
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<th>NW</th>
<th>ASRM</th>
<th>BDI-SF</th>
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<td>PA</td>
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<tr>
<td>NA</td>
<td>0.12</td>
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<tr>
<td>SHS</td>
<td>0.57***</td>
<td>0.42***</td>
<td>(0.88)</td>
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<tr>
<td>HPS</td>
<td>0.24***</td>
<td>0.28***</td>
<td>0.11***</td>
<td>0.34***</td>
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<tr>
<td>Extraversion</td>
<td>0.55***</td>
<td>0.28***</td>
<td>0.56***</td>
<td>0.34***</td>
<td>0.89</td>
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<tr>
<td>Assertiveness</td>
<td>0.44***</td>
<td>0.19***</td>
<td>0.34***</td>
<td>0.38***</td>
<td>0.85***</td>
<td>(0.86)</td>
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<tr>
<td>Enthusiasm</td>
<td>0.50***</td>
<td>0.29***</td>
<td>0.61***</td>
<td>0.19***</td>
<td>0.86***</td>
<td>0.46***</td>
<td>(0.87)</td>
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<tr>
<td>Neuroticism</td>
<td>-0.37***</td>
<td>0.62***</td>
<td>-0.58***</td>
<td>0.13***</td>
<td>-0.40***</td>
<td>-0.30***</td>
<td>-0.38***</td>
<td>(0.91)</td>
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<tr>
<td>Volatility</td>
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* Tables 1-4 Note: PA = positive affect and NA = negative affect (Positive and Negative Affect Schedule); ASRM = Altman Self-Rating Mania Scale; BDI = Beck Depression Inventory-Short Form; SHS = Subjective Happiness Scale; HPS = Hypomanic Personality Scale. * p < .05, ** p < .01, *** p < .001
Table 5. *T*-values for all analyses (Studies 1-3).

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</tr>
<tr>
<td></td>
<td>Volatility</td>
<td>1.66</td>
<td>4.57***</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>Withdrawal</td>
<td>-2.69**</td>
<td>2.48*</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Volatility x Withdrawal</td>
<td>-3.05**</td>
<td>-2.09*</td>
<td>-0.13</td>
</tr>
<tr>
<td></td>
<td>ASRM</td>
<td></td>
<td></td>
<td>11.67***</td>
</tr>
<tr>
<td></td>
<td>BDI</td>
<td></td>
<td></td>
<td>5.08***</td>
</tr>
<tr>
<td>Analysis 4</td>
<td>Assertiveness</td>
<td>-0.66</td>
<td>-0.12</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>Enthusiasm</td>
<td>4.29***</td>
<td>-2.13*</td>
<td>-1.6</td>
</tr>
<tr>
<td></td>
<td>Assertiveness x Enthusiasm</td>
<td>-0.43</td>
<td>3.22**</td>
<td>2.62**</td>
</tr>
<tr>
<td></td>
<td>Volatility</td>
<td>1.74</td>
<td>3.93***</td>
<td>1.97*</td>
</tr>
<tr>
<td></td>
<td>Withdrawal</td>
<td>-1.86</td>
<td>1.13</td>
<td>-0.09</td>
</tr>
<tr>
<td></td>
<td>Volatility x Withdrawal</td>
<td>-2.71**</td>
<td>-2.22*</td>
<td>-0.61</td>
</tr>
<tr>
<td></td>
<td>PA</td>
<td>11.16***</td>
<td>2.61**</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>-3.79***</td>
<td>9.75***</td>
<td>4.95</td>
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<td>ASRM</td>
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<td>10.05***</td>
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<td></td>
<td>BDI</td>
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<td></td>
<td>3.48***</td>
</tr>
</tbody>
</table>

*Table 5 Note:* PA = positive affect and NA = negative affect (Positive and Negative Affect Schedule); ASRM = Altman Self-Rating Mania Scale; BDI = Beck Depression Inventory-Short Form; SHS = Subjective Happiness Scale; HPS = Hypomanic Personality Scale. The column titled 'HPS2' represents results from a secondary set of analyses that include current symptoms of mania (ASRM) and depression (BDI), with HPS as the outcome variable.
Figure 2. Conceptual links among aspects of extraversion and neuroticism, subjective happiness, and hypomania risk. Enthusiasm (extraversion) and withdrawal (neuroticism) are most closely linked to subjective happiness; assertiveness (extraversion) and volatility (neuroticism) are most closely linked to hypomania risk.
Figure 3. Relationships among aspects of extraversion and neuroticism, subjective happiness, and hypomania risk.

*Note:* Main effects qualified by interactions are presented in light grey with dashed lines. Main effects not qualified by interactions, and significant interactions, are presented in black with solid lines. Colored outlines further link personality aspects to the disposition (happiness/orange or hypomania risk/blue) with which they are most closely associated, based on interaction analyses.
Figure 4. Interaction of assertiveness and enthusiasm predicts hypomania risk (HPS).

Figure 5. Interaction of volatility and withdrawal predicts happiness (SHS).
Figure 6. Interaction of volatility and withdrawal predicts hypomania risk (HPS).
Chapter 3: Happiness and Hypomania Risk Differ in Momentary Affective Experience

This dissertation suggests that the variety of relationships positive and negative affect can take help to differentiate happiness and hypomania risk. The study described in Chapter 2 demonstrated these differences with trait-level data, showing that happiness and hypomania risk diverge in terms of the proportion of dispositional negative affect as well as aspects of personality that are associated with positive and negative affect. However, it is unclear from this trait-level data whether positive and negative affect are experienced concurrently or alternately among people with hypomanic tendencies. This chapter examines momentary affective experiences in happiness and hypomania risk to test these competing possibilities. After briefly reviewing the literatures supporting the role of positive affect in both happiness and hypomania risk, and outlining the core features of a model that speaks to these multiple possible relationships, this chapter describes two studies of momentary affective experience and demonstrates that momentary affect differs from trait affect in happiness and hypomania risk.

Positive Affect Associated with Happiness and Hypomania Risk

Positive affect is an important component of happiness and psychological well-being (Diener, Suh, Lucas, & Smith, 1999; Ryan & Deci, 2001; Seligman, 2002), and
positivity has been linked to several short- and long-term benefits, from physical and mental health to social and cognitive functioning. People with a positive affective style are happier (Gross, Sutton, & Ketelaar, 1998) and tend to have low reactivity, high capacity for emotion regulation, and higher positive affect (Davidson, 2004). Cognitive biases may help to maintain a sunny disposition: for example, happier people demonstrate affective biases in processing information (Cunningham & Kirkland, 2014) and recalling it later (Liberman, Boehm, Lyubomirsky, & Ross, 2009). Dispositional positivity is maintained in a manner analogous to the self-fulfilling prophecy, whereby positive expectations lead to positive experiences, thereby reinforcing those expectations (Fredrickson & Joiner, 2002). On the whole, this research suggests that people with high dispositional positive affect are better prepared to cope with daily life challenges and stresses compared to people with low dispositional positive affect (Folkman & Moskowitz, 2000). Indeed, one meta-analysis found that trait positive affect is both a cause and an effect of success and health (Lyubomirsky, King, & Diener, 2005). Taken together, these findings suggest that dispositional positive affect is an essential component of happiness and well-being.

Although experiencing high positive affect often leads to beneficial outcomes, some recent work has suggested that the persistent pursuit of positivity may have some unanticipated negative consequences. Critically, positive affect has also been associated with substantial psychological and behavioral dysfunction (Gruber, Mauss, & Tamir, 2011), including mania, the core diagnostic criterion for bipolar disorder (American
Psychiatric Association, 2000). Although mania is relatively uncommon, hypomania risk is a variable that can be assessed in the general population and may be important to examine as a predictor for later onset of mania (Eckblad & Chapman, 1986; Kwapil et al., 2000). People with a history of or risk for mania are characterized by greater positive affect in response to a variety of positive and even negative events, independent of current symptom levels (Gruber, 2011). As such, positive affect in (hypo)mania has been characterized as “too much of a good thing” (e.g., Gruber, Johnson, Oveis, & Keltner, 2008) in that it reflects intense positivity that is apparently insensitive to context. Taken together, this research suggests that positive affect is an essential component of hypomania risk.

When considered together, these separate lines of research on happiness and hypomania risk present a theoretical inconsistency regarding the role of positive affect in functioning. Both happiness and hypomania risk share this common feature of positivity, yet they have drastically different consequences for well-being. To understand the possible reasons for these differences, we consider the evaluative space model, which describes the structure of affect and the multiple forms that relationships between positive and negative affect can take. We use this model to consider the possibility that the ways positive and negative affect are experienced differ between happiness and hypomania risk, shaping the subjective experience of positivity and suggesting different perspectives within which positivity is experienced.
The Evaluative Space Model

The evaluative space model suggests that the relationship between positive and negative affect may take multiple forms (Cacioppo & Berntson, 1994; Cacioppo, Gardner, & Berntson, 1997). This model posits two related, yet functionally independent motivational systems for positive and negative evaluations/affect. The existence of these systems is supported by a wealth of psychological literature suggesting that behavior is built from two fundamental kinds of feelings, motivations, or action tendencies: one corresponding to sensitivity to positive information, and the other corresponds to sensitivity to negative information. These systems are described variously as approach and avoidance (withdrawal) tendencies (Hull, 1932), reward versus threat sensitivity, appetitive and aversive motivation, promotion and prevention focuses (Higgins, 1997), extraverted and neurotic personality traits (Costa & McCrae, 1980), behavioral activation and inhibition systems (Gray, 1982), and so forth.

According to the evaluative space model, a bivariate relationship exists between positivity and negativity that frequently, in subjective experience and/or self-report, appears to be bipolar. In other words, this model proposes a distinction between subjective experience and process: affective experience is bipolar, whereas the underlying processes are bivariant (Larsen, McGraw, & Cacioppo, 2001). By delineating the processes that contribute to univalent and bivalent experiences of affect, this model helps to explain when positive and negative affect are related and when they are not.
Positive and negative affect may be directly or inversely linked, or they may also vary independently. The inverse relationship, *reciprocity*, suggests a bipolar view in which positive and negative affect covary in opposition to one another: as one increases, the other decreases. The direct relationship, *coactivity*, suggests a view in which positivity and negativity increase and decrease together, such as with the subjective experience of ambivalence. Finally, positive and negative affect may also vary independently, as *uncoupled affect*, supporting the bivariate view of these processes. A variety of combinations of positive and negative activation can lead to affective states that are primarily positive, primarily negative, or ambivalent.

A relationship characterized by reciprocity between positive and negative affect is commonly found in subjective experience. The reciprocal relationship supports a bipolar view of affect in which positive and negative affect are inversely related (Green, Goldman, & Salovey, 1993). This perspective holds that positive and negative feelings are experientially opposite: the more positivity one experiences, the less negativity, and vice versa. Like temperature, increase toward one pole necessarily signals a decrease away from the other pole. This perspective is supported by classic research on the measurement of meaning (Osgood, Suci, & Tannenbaum, 1957), which found that evaluative bipolar word pairs (e.g., *pleasant-unpleasant, good-bad*) represent a fundamental way that people organize their understanding of the world, and by dimensional models of affect (e.g., Watson & Tellegen, 1985; Russell, 1980) which
organize emotion words on a circumplex such that low activation on one dimension corresponds to moderate activation on the orthogonal dimension.

A relationship characterized by coactivity between positive and negative affect occurs when any given stimulus produces both positive and negative feelings, resulting in the experience of ambivalence (Cacioppo, Gardner, & Berntson, 1999). Ambivalent emotions are most commonly of the same hedonic valence (e.g., fear and anger), but opposing-valence emotions may also occur. For example, Schimmack (2005) found that when participants rated their emotional state on unipolar scales, they reported co-occurring feelings of pleasure and displeasure. Further, in particular situations (e.g., in after watching a bittersweet movie, while moving out of college dormitories, and when graduating from college), men and women report co-occurring feelings of happiness and sadness (Larsen, McGraw, & Cacioppo, 2001). Research on nostalgia suggests that such mixed states are often triggered by (i.e., are in response to) negative affect, potentially as a coping mechanism (Sedikides, Wildschut, Arndt, & Routledge, 2008). Ambivalent feelings typically produce discomfort that people are motivated to resolve (Festinger, 1957), and thus ambivalence is, by its very nature, a more temporary state.

The third possible relationship between positive and negative affect really describes the absence of a relationship. Uncoupled affect characterizes times at which positive and negative affect may be relatively less dependent on one another, such that variation in one type of affect has less influence on variation in another. Although a radical definition of uncoupled affect would be limited to circumstances in which one
type of affect changes while the other does not, uncoupled affect can also be used more loosely to describe the variety of ways in which reciprocity and coactivation can manifest (i.e., relationships between positivity and negativity that are not one-to-one). Indeed, most theorists emphasize that positive and negative affective dimensions can have some degree of independence. For example, positive and negative affect can co-occur at mild and moderate levels of intensity, though they do not co-occur at high levels of intensity (Diener & Iran-Nejad, 1986; Reich, Zautra, & Davis, 2003). Additional research suggest that the degree of positive relative to negative affect changes over the lifespan; negativity decreases linearly without a corresponding linear increase in positivity (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Mroczek & Kolarz, 1998). This research supports the model’s proposal that levels of positive and negative affect can change with some degree of independence.

Two specific phenomena are relevant in the case of uncoupled affect. The positivity offset describes the tendency for the positive motivational system to respond more than the negative motivational system at low levels of input, and serves an exploratory function, and the negativity bias describes the tendency for the negative motivational system to respond more intensely than the positive motivational system at high levels of input, and serves a protective function (Cacioppo, Gardner, & Berntson, 1997). Positivity offset and negativity bias provide complementary adaptive benefits of exploration in the absence of threat and alarm in the presence of threat. Most individuals experience both of these phenomena, each at different levels of input. When a novel
bivalent stimulus is distant in time or space, the positive aspects of that stimulus might outweigh the negative (positivity offset), prompting approach behavior; when that same stimulus is closer in time or space, the negative aspects of that stimulus might outweigh the positive (negativity bias), prompting avoidance behavior. For example, consider the opportunity to attend a concert. Concerts have both positive and negative features – they can be fun and social, and offer the opportunity for great memories, but they are also loud and crowded, and they require effort to get to. When a person decides to buy a ticket to a concert months in advance, the positive aspects may seem more salient. However, when the day of the concert arrives, it may seem like a hassle to fight traffic and find parking, or the person may feel tired and consider it undesirable to be in a crowded arena, and so on. These complementary processes underlie several widely-demonstrated affective forecasting errors, showing that people often are poor at predicting how they will feel in the future (e.g., Wilson & Gilbert, 2005).

Although the positivity offset and negativity bias describe general functional properties of our motivation systems, research has demonstrated that individuals can vary in their levels of positivity offset and negativity bias (Ito & Cacioppo, 2005). This research has found that such individual differences are temporally stable, internally consistent, and have convergent, predictive, and divergent validity. Assessing individual differences in positivity offset and negativity bias may give additional insight into the operation of these broad positive and negative motivation systems.
The Present Research

Chapter 2 showed that happiness and hypomania risk both involve high trait positive affect, but diverge in terms of the proportion of trait negative affect. While this research has suggested a critical role for negative emotionality in differentiating hypomania risk from happiness, the nature of the relationship between positive and negative affect in each of these cases is unclear. That is, a positive correlation between trait positive and negative affect could indicate that positive and negative affect are experienced simultaneously (coactivity), or it could indicate that affective experience alternates between positive and negative feelings (reciprocity). A negative correlation between trait positive and negative affect could indicate that affective experience alternates between positive and negative feelings (reciprocity), or it could indicate relative independence, such that one type of affect is more common and persists even during occurrences of the other type of affect (uncoupled affect).

The trait data suggest two distinct possibilities for the role of current affective experience in people with hypomania risk. One possibility is that people with hypomania risk experience coactivation of positive and negative affect. Concurrent dispositional tendencies to experience both positivity and negativity could manifest themselves in affective ambivalence, making it difficult for people with hypomanic personalities or mania proneness to disengage from harmful behaviors because they are simultaneously confronted with urges to “stop” and to “go” (i.e., a BIS/BAS conflict; Gray, 1991). The second possibility is that people with hypomania risk experience positive and negative
affect alternately, at different times. This would lead to the opposite conclusion about momentary affect compared to trait affect: in contrast to feeling mixed or ambivalent, positive and negative affect are instead highly dependent on one another, in a reciprocal fashion.⁶

Similarly, the trait data also suggest two distinct possibilities for the role of current affective experience in happy people. One possibility is that positive and negative affect are in a reciprocal relationship for happiness, just as within the general population. This possibility would suggest that, although happier people may generally feel more positive overall (i.e., higher baseline), they are just as susceptible to negativity as a less-happy person and their levels of positivity decreases just as much when things are going poorly. A second possibility is that positive and negative affect are relatively uncoupled for happiness. In other words, happier people may experience positivity that persists even when negativity is higher than usual.⁷

The second possibility proposed for both happiness and hypomania risk would suggest that measuring positive and negative affect at a dispositional level masks the way positive and negative emotions are actually experienced, creating an illusion of ambivalence (as demonstrated in Chapter 2). In other words, relationships with positivity

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⁶ A third possible relationship proposed by the evaluative space model, uncoupled affect, is unlikely given that hypomania risk is associated with both high positive and high negative affect; this combination implies that positive and negative affect change together in some way.

⁷ A third possible relationship proposed by the evaluative space model, coactivity, is unlikely given that happiness is associated with high positive and low negative affect; coactivity implies that high levels of one co-occur with high levels of the other.
and negativity may appear different at different time scales. We designed two studies to test these possibilities by exploring the momentary experience of affect.

Further, the evaluative space model posits that there may be individual differences in positivity offset and negativity bias. People with a stronger positivity offset respond with greater positivity to neutral information, and people with a stronger negativity bias respond with greater negativity to negative information. Positivity offset has significant conceptual overlap with happiness: for example, happier people have also been shown to evaluate neutral stimuli more favorably (Isen & Shalker, 1982), and to be approach-oriented in the absence of threatening information (Fredrickson, 1998). It is reasonable to consider the possibility that happiness may involve an increase in positivity offset. Moreover, happiness has been shown to involve increased sensitivity to positive information without a corresponding decrease in sensitivity to negative information. For example, one study found that the amygdala – a brain area that processes motivationally relevant stimuli (Cunningham, Van Bavel, & Johnsen, 2008) – was more responsive to positive information for happier compared to less happy people, but equally responsive to negative information for happier compared to less happy people (Cunningham & Kirkland, 2014). Therefore, we predicted that happiness would not involve a weaker negativity bias: happier people, we suspect, are just as sensitive to negative information as positive, which helps them respond adaptively to threats. Moreover, given that hypomania risk involves increases in positive responding (e.g., Gruber, 2011; Gruber et al., 2008), we predicted that hypomania risk would also involve a higher positivity offset.
Hypotheses

Chapter 2 showed that happiness and hypomania risk diverge in terms of the proportion of dispositional negative affect. We expected that these proportions would replicate in the momentary data at a mean level, such that happiness is associated with higher positivity and lower negativity, whereas hypomania risk is associated with higher positivity and higher negativity.

We sought to test the nature of the associations among happiness, high momentary positive affect, and low momentary negative affect. One possibility is that positive and negative affect are in a reciprocal relationship for happiness: high positive necessarily implies low negative, and high negative necessarily implies low positive. This relationship has been demonstrated in the general population, so this would imply a main effect of affect but no interaction with happiness. A second possibility is that positive and negative affect are relatively uncoupled for happiness. In other words, happier people may experience positivity that persists even when negativity is higher than usual. This possibility implies an interaction between negativity and happiness such that the experience of positivity among the people with the highest happiness is greater than those with low happiness when feeling negative.

We also sought to test the nature of the associations among hypomania risk, high momentary positive affect, and high momentary negative affect. One possibility is that positive and negative affect are coactive for hypomania risk: positive affect increases as negative affect increases. In other words, hypomania risk involves some consistent
degree of affective ambivalence. This possibility suggests that there should be little to no main effect when predicting positivity from negativity, and an interaction between negativity and hypomania risk such that increasing levels of negativity are associated with increasing levels of positivity, but only among people with high hypomania risk. A second possibility is that positive and negative affect are in a reciprocal relationship for hypomania risk: positive affect increases as negative affect decreases, resulting in alternating experiences of positive and negative. This possibility suggests there should be both a main effect and an interaction between negativity and hypomania risk such that the increasing levels of negativity are associated with decreasing levels of positivity, and this relationship is stronger among people with higher risk. This would imply that the experience of positivity among the people with the highest hypomania risk depends on current negativity.

Finally, we sought to test individual differences in negativity biases and positivity offsets in happiness and hypomania risk. Consistent with prior work in our lab (e.g., Cunningham & Kirkland, 2014), we suggest that happiness involves a stronger positivity offset and not a weaker negativity bias. In other words, we believe that happy people are just as sensitive to negative information when it is relevant, but also have a default tendency to be more positive and approach-oriented in the absence of negative information. By contrast, hypomania risk involves decreased sensitivity to negative information, and therefore we predicted that hypomania risk would involve a weaker negativity bias.
Studies 4 and 5: Method

Design

The present studies used an experience sampling method to record people’s feelings over time during their daily lives. Experience sampling is an expensive and labor-intensive method that allows researchers to learn about what people are doing, thinking, and feeling at moments in their lives (e.g., Barrett & Barrett, 2001; Csikszentmihalyi & Larsen, 1987; Hektner, Schmidt, & Csikszentmihalyi, 2007). A major strength of this method is its ability to track the experience of affect as it is occurring. Our studies recruited two samples of college students to carry personal data assistants (PDAs) for two weeks. Each time the PDA alerted participants, they were asked to pause what they were doing and report on their current affective state.

Data Collection and Aggregation

We collected data in two studies. There were no substantive differences between the studies in terms of the variables presented here.8 Our decision to collect data in multiple studies was based on the recent emphasis on replication of studies in psychology (Carpenter, 2012), but we chose to analyze both studies together following the recommendations of Schimmack (2012), who suggests that analyzing multiple

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8 Both studies were designed to address additional research questions beyond the scope of this paper. There are no substantive differences between the two studies in terms of the materials presented here. Sample sizes were based on time constraints and available funds for paying participants.
replications of a study within a single statistical model increases the total power across studies and contributes to the credibility of findings.

Participants

Our first study (Study 4) included 88 adults at Ohio State University who participated for payment. Eleven people did not complete any experience sampling measures and were dropped from the study before analysis, leaving a final sample of 77. This sample was 47% male, with an average age of 21.4 years (SD = 5.17, range = 18-58). Participants’ racial identities were: 74.3% White, 18.9% Asian, 4% Black, 5.4% Hispanic, 1.3% Native American, and 1.3% Other.9

Our second study (Study 5) included 128 adults at Ohio State University who participated for payment. Fifteen people did not complete any experience sampling measures and were dropped from the study before analysis, leaving a final sample of 113. This sample was 31% male, with an average age of 20.9 years (SD = 2.93, range = 18-33). Participants’ racial identities were: 68.7% White, 25% Asian, 8.9% Black, 2.7% Hispanic, and 1.8% Other.

Across both studies, our total sample size for analysis was 190 participants. This research was approved by The Ohio State University Institutional Review Board and included written informed consent for all participants.

9 Participants were given the option to select multiple racial categories; thus, the total exceeds 100%.
Experience Sampling Procedure

Participants completed a set of pretest measures and were provided with Palm M500 personal data assistants (PDAs) during an orientation meeting. During the meeting they were informed about the general purpose of the study, received both oral and written instructions on how to use the PDA, received a packet of information explaining the questions and study structure in greater detail, and provided informed consent. They were also informed about confidentiality as well as how their participation would be compensated. On the PDAs, a customized program controlled the assessment schedule, questionnaire presentation, and data saving. This program was a modified version of Experience Sampling Program (http://www.experience-sampling.org/), an open-source software package.

Participants carried the PDAs with them during the experience-sampling period of 14 consecutive days. Each day, four signals were distributed throughout a 12-hour time window, from 10:00am to 10:00pm. Participants were given the option during orientation to personalize the specific start times, but the length of the time window remained constant. Following recommendations of Hektner et al. (2009), we ensured that signals were randomly distributed during this time window under the condition that two consecutive signals were at least 30 minutes apart. If participants did not respond or stopped responding during assessment, the program closed after 15 minutes and recorded only the collected data. These data are referred to as “momentary” hereafter and represent
a hierarchical structure, with moments (Level 1; \( n = 56 \)) nested within persons (Level 2; \( n = 113 \)).

We emailed participants seven days into their participation to check in and make sure everything was going well. At the end of the 14-day period, participants came back into the lab to return their PDAs, complete a short set of posttest measures (not reported here), and collect payment.

Participants were reimbursed for their time as follows. In Study 4, participants were given the option to be reimbursed with cash or with class credit. Participants selected their preferred option at the beginning of the study. Cash-reimbursement participants were paid $35 initially, and as an additional incentive, if they completed more than 85% of signals, they received an additional payment of $15. Credit-reimbursement participants were given comparable compensation in the form of credit toward a research participation requirement in introductory psychology using the same initial-plus-bonus structure. In Study 5, all participants were paid, and we restructured the payment system to incentivize completion. All participants were paid $10 initially, and if they completed more than 85% of signals, they received an extra payment of $30.

People who came to the orientation but did not participate at all after initial contact were dropped from the study before data analysis (11 people (12.5%) in Study 4 and 15 people (11.7%) in Study 5). The remaining participants responded to and completed 79.4% (Study 4) and 78% (Study 5) of signals. These represent a fairly typical response rate for studies in which participants are signaled several times per day (Connor
Christensen, Barrett, Bliss-Moreau, Lebo, & Kaschub, 2003). Fifty-five participants (71%) in Study 4 and 53 participants (47%) in Study 5 completed more than 85% of trials and were notified within 48 hours that they were eligible for the extra payment.

**Measures**

*Dispositional Measures.* Participants completed measures of happiness and hypomania risk during a pretest session before receiving their PDAs. Other measures not central to the present study were also obtained but were not analyzed in this research. Happiness was measured with the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999), a four-item scale measuring global subjective happiness. The first two items ask respondents to characterize themselves using absolute ratings and ratings relative to peers, while the second two items offer brief descriptions of happy and unhappy people and ask respondents how well each characterization describes them. Internal consistency was $\alpha = .84$ (Study 4) and $\alpha = .92$ (Study 5). Hypomania risk was measured with the Hypomanic Personality Scale (HPS; Eckblad & Chapman, 1986), which consists of 48 true-false self-report items capturing episodic shifts in emotion, behavior, and energy. The HPS has excellent predictive validity for the onset of manic episodes (Kwapil et al., 2000), and prior work has demonstrated that high HPS scores are associated with intense positivity across contexts (Gruber, Johnson, Oveis, & Keltner, 2008). Internal consistency was $\alpha = .82$ (Study 4) and $\alpha = .85$ (Study 5).

*Momentary Measures.* When prompted, participants responded to two questions about their current affective state: “How positive are you feeling now?” (positive affect)
and “How negative are you feeling now?” (negative affect) with a slider corresponding to a coded rating from 1 (not at all positive/negative) to 100 (very positive/negative). In Study 4, as a measure of arousal, participants were also asked: “Regardless of how positive or negative you are feeling, how calm or energized do you feel right now?” with a slider corresponding to a coded rating from 1 (calm/sleepy) to 100 (energetic/intense). Other measures not central to the present study were also obtained but were not analyzed in this research.

Table 6 presents correlations and descriptive statistics for these measures across both studies, and Table 7 and Table 8 report the individual correlations and descriptive statistics for each study.

**Analysis Strategy**

*Relationships between Average Affect, Happiness, and Hypomania Risk*

Our first set of analyses was conducted to confirm that the proportions of positive and negative affect in happiness and hypomania risk were the same when averaging across momentary ratings compared to overall ratings at a trait level (demonstrated in Chapter 2). We used regression analyses to examine the relationships among happiness and hypomania risk with averaged momentary positive and negative affect. We expected to find that happiness would be associated with higher positive affect and lower negative affect, whereas hypomania risk would be associated with higher positive affect and higher negative affect.
Relationships between Momentary Affect, Happiness, and Hypomania Risk

Our second set of analyses was conducted to test whether relationships between positive and negative affect were different for both happiness and hypomania risk when examined at the momentary level compared to average levels. Because our data were nested as trials within subjects, these analyses used multilevel modeling (also known as hierarchical linear modeling; Raudenbush, 1993) to examine whether the relationship between momentary positive and negative affect varied with individual differences in happiness and hypomania risk. One strength of this design is that it enables comparison of each person’s momentary affect to his or her baseline state affect (i.e., the average of all of his or her momentary trials). In other words, for each individual, we can calculate whether a particular trial represents a “better than usual” or “worse than usual” moment. This allows us to standardize across participants and understand variability in positive affect in terms of the degree of change from each person’s average, rather than as an absolute value, which could be biased by individual differences in self-report. Critically, we can also test for interactions between momentary and trait variables to see whether the momentary relationship between positive and negative affect depends on individual differences in happiness and hypomania risk.

In multilevel modeling, because time-series data violate the assumption of residual independence at Level 1, the Level 1 regressions must account for serial dependence in the data. To account for this tendency for scores to cluster within individuals, each momentary predictor variable was recoded into two separate, centered
variables denoting average scores (within-participant averages centered at the between-participants average), and momentary scores (momentary raw score centered at the within-participant average). Thus, each momentary predictor variable, e.g., momentary negative affect, was represented by two variables: centered average momentary negative affect (Level 2) and centered momentary negative affect (Level 1). To enable direct comparison with these centered variables, happiness (SHS) and hypomania risk (HPS) (Level 2 variables) were also centered at the between-participants average. All multilevel analyses include the centered versions of these variables when modeled as predictors, and the uncentered (raw) variables when modeled as outcomes.

Multilevel models used R (R Core Team, 2012) and lme4 (Bates, Maechler, Bolker, & Walker, 2014a, 2014b) to perform a linear mixed effects analysis of the relationships between positive affect (PA), negative affect (NA) happiness (SHS), and hypomania risk (HPS). Our first model set positive affect as our outcome variable. As fixed effects, we entered two terms for negative affect (centered-average and centered-momentary) and allowed these to interact with centered-happiness and centered-hypomania risk in the model. As random effects, we had an intercept for subjects, as well as by-subject random slopes for the effects of happiness and hypomania risk. Our second model was identical to our first model, except that we switched positive affect and negative affect: we set negative affect as our outcome variable and positive affect (centered-average and centered-momentary) as fixed effects. Visual inspection of residual plots did not reveal any obvious deviations from homoscedasticity or normality. P-values
were obtained with *lmerTest* (Kuznetsova, Brockhoff, & Christensen, 2014). Equations for both models are provided below:

\[
PA = (NA_{center} + NA_{average}) \times (SHS_{center} + HPS_{center}) + (1 + SHS_{center} + HPS_{center} | subject)
\]

\[
NA = (PA_{center} + PA_{average}) \times (SHS_{center} + HPS_{center}) + (1 + SHS_{center} + HPS_{center} | subject)
\]

**Positivity Offset and Negativity Bias in Happiness and Hypomania Risk**

Our third set of analyses was conducted to assess momentary positivity offset and negativity bias in happiness and hypomania risk. We used data from Study 4, which included a measure of arousal, to assess positivity offset and negativity bias. To calculate the overall positivity offset and negativity bias, two regression analyses were conducted on the momentary data using the equation

\[
Y = \beta_0 + \beta_1 x + r
\]

where \(Y\) was unipolar positive affect or negative affect, \(\beta_0\) was the intercept, \(\beta_1\) was arousal, which can be used as a measure of motivational input, and \(r\) was the random error term. The positivity offset is represented as the intercept for positivity (\(\beta_0\)) and the negativity bias is represented as the slope for negativity (\(\beta_1\)). To appropriately compare slopes when measuring the negativity bias, we used Cohen, Cohen, West, & Aiken’s (2003) formula to compare the relative magnitude of slopes by converting them to a z-score:

\[
z = \frac{b_1 - b_2}{\sqrt{SE_1^2 + SE_2^2}}
\]}
To calculate the change in positivity offset and negativity bias as a function of happiness and hypomania risk, we first conducted two regression analyses on trait data for each participant using the equation above. Following the logic of Ito & Cacioppo (2005), the intercept value for the positive affect equation represents the strength of the positivity offset, and the slope for the negative affect equation represents the strength of the negativity bias. In this way, we obtained estimates of the positivity offset and negativity bias for each individual. Next, we conducted two regression analyses predicting each of the positivity offset and negativity bias parameters from happiness (SHS) and hypomania risk (HPS):

\[\text{Positivity offset} = \text{SHS} + \text{HPS}\]
\[\text{Negativity bias} = \text{SHS} + \text{HPS}\]

Studies 4 and 5: Results

**Relationships between Average Affect, Happiness, and Hypomania Risk**

Chapter 2 found that happiness is associated with high trait positive affect and low trait negative affect, whereas hypomania risk is associated with high trait positive affect and high trait negative affect. We expected that these trait patterns would replicate in our data using an analogous measure of trait affect: momentary affect, averaged across trials. Because averaged momentary data gives an overall sense of people’s general levels of affect, rather than a specific window into ongoing affective experience, we predicted that we would find the same patterns, with happiness involving high positive affect and
low negative affect, and hypomania risk involving high positive affect and high negative affect. These patterns, examined at this general or trait-like level, would show a relationship of reciprocity between positive and negative affect for happiness, and a relationship of coactivation of positive and negative affect for hypomania risk.

Our first set of regressions predicted (1) happiness from averaged momentary positive affect and averaged momentary negative affect and (2) hypomania risk from averaged momentary positive affect and averaged momentary negative affect. We predicted that, at a momentary level, happiness would be associated with higher positive affect and lower negative affect, whereas hypomania risk would be associated with higher positive affect and higher negative affect. Consistent with this prediction, regression analyses revealed that happiness was linked with high momentary positive affect, $t(186) = 2.93$, $\beta = .03$, $p < .001$. However, happiness was unrelated to momentary negative affect, $t(186) = -1.33$, $\beta = -0.01$, $p = .19$. Consistent with our prediction, hypomania risk was linked with high momentary positive affect, $t(186) = 2.21$, $\beta = .02$, $p = .03$, and high momentary negative affect, $t(186) = 2.69$, $\beta = .03$, $p < .01$. These analyses conceptually replicate, in part, the trait-level relationships observed in Chapter 2. The lack of a relationship between happiness and average momentary negative affect was unpredicted, and offers potential support for the view that happiness involves uncoupled affect, rather than demonstrating a reciprocal relationship between positive and negative affect. This view is confirmed in our second set of analyses, which examine momentary data.
Relationships between Momentary Affect, Happiness, and Hypomania Risk

We tested the nature of the associations among happiness, high positive affect, and low negative affect in momentary experience. One possibility is that, as in the trait data (Chapter 2), momentary positive and negative affect are reciprocally related in happiness: as positive affect increases, negative affect decreases. If this were the case, we would expect to find an interaction between happiness and negative affect in predicting PA such that as happiness increases, the negative relationship between positive and negative affect becomes stronger. A second possibility, suggested by the averaged data in our first set of analyses, is that positive and negative affect are relatively uncoupled in happiness. In other words, happier people may experience positive affect that persists even when negative affect is higher than usual. If this were the case, we would expect to find an interaction between happiness and negative affect in predicting positive affect such that as happiness increases, the negative relationship between positive and negative affect becomes weaker.

We also tested the nature of the associations among hypomania risk, high positive affect, and high negative affect in momentary experience. One possibility is that, as in the trait data, momentary positive and negative affect are coactive in hypomania risk: positive affect increases as negative affect decreases. If this were the case, we would expect to find an interaction between hypomania risk and negative affect in predicting positive affect such that as hypomania risk increases, the relationship between positive and negative affect changes from inverse (negative correlation) to direct (positive
correlation). Another possibility is that, in contrast to the trait data, momentary positive and negative affect are reciprocally related in hypomania risk: as positive affect increases, negative affect decreases. If this were the case, we would expect to find an interaction between hypomania risk and negative affect in predicting positive affect such that as hypomania risk increases, the inverse relationship (negative correlation) between positive and negative affect becomes stronger. This would imply that the experience of positive affect among the people with the highest hypomania risk depends on current negative affect.

To test these hypotheses, we constructed two multilevel models described in the “Analysis Strategy” section above. The intercept for the first model (criterion variable: positive affect) was estimated at 61.51, indicating the average level of positivity when holding all predictors constant; the intercept for the second model (criterion variable: negative affect) was estimated at 32.14, indicating the average level of negativity when holding all predictors constant. Coefficients (standardized $\beta$) reported below can be interpreted as the amount of change in positive affect (or negative affect), relative to the intercept, as a function of a one-unit change in the predictor.

Examining relationships with happiness, we found that happiness significantly predicted momentary positive affect when controlling for negative affect, $t(8339) = 2.68, \beta = 1.29, p < .01$, but did not significantly predict momentary negative affect when controlling for positive affect, $t(8339) = -1.37, \beta = -.83, p = .17$. However, there was a significant interaction between happiness and momentary positive affect in predicting
momentary negative affect, \( t(8339) = 3.24, p = .001 \). As illustrated in Figure 7, this interaction suggests that when feeling more positive than usual, happiness was not strongly related to level of negativity; everyone, regardless of dispositional happiness, reported equally low negative feelings. However, when feeling less positive than usual, happier people remained less negative than less happy people. In other words, happiness involves a weaker relationship between positive and negative affect: happier people feel less negative than less-happy people when positivity is low. These findings support the view that positive and negative affect may be relatively uncoupled for higher happiness.

Examining relationships with hypomania risk, we found that hypomania risk significantly predicted momentary positive affect when controlling for negative affect, \( t(8339) = 2.13, \beta = 1.10, p < .05 \), and also significantly predicted momentary negative affect when controlling for positive affect, \( t(8339) = 2.68, \beta = 1.47, p < .01 \). These findings are consistent with the preliminary analyses. Critically, when predicting momentary positive affect, there was a marginally significant interaction between hypomania risk and momentary negative affect, \( t(8339) = -1.81, p = .07 \). As illustrated in Figure 8, this interaction revealed that when feeling more negative than usual, all participants felt less positive, but when feeling less negative than usual, higher-hypomanic participants felt much more positive than those with low hypomanic tendencies. In other words, the link between hypomania risk and positivity is strongest when people with hypomania risk are feeling less negative than usual. These findings support a reciprocal relationship between positive and negative affect wherein people
with hypomania risk feel high negativity and low positivity much of the time, but occasions of low negativity imply much higher positivity. Positivity in hypomania risk seems to depend on the absence of negativity.

We must add a word of caution that these relationships seem to be most strongly supported by data from Study 5; when analyzing the studies separately, some of the patterns presented here are stronger in Study 5 and weaker in Study 4 (see Appendix for these supplementary analyses). This may be due to low power to detect effects in Study 4,\(^{10}\) which would support our decision to collate these datasets for analysis, but we cannot rule out the possibility that other substantive differences in sampling (or, indeed, in true effects) contributed to differences in results between Studies 4 and 5. Therefore, we caution the reader that these results constitute preliminary evidence for these relationships, which may warrant further research to clarify.

**Positivity Offset and Negativity Bias in Happiness and Hypomania Risk**

Prior research has shown that happiness involves a default orientation toward positive information without a corresponding decrease in sensitivity to negative information (e.g., Cunningham & Kirkland, 2014). The evaluative space model conceptualizes these two ways of processing information as positivity offset and

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\(^{10}\) Using the p-curve tool (http://www.p-curve.com), we calculated that the effects of interest reported in Study 4 give the study an approximate power of 36%, and the effects of interest reported in Study 5 give the study an approximate power of 9%. According to these calculations, both studies were underpowered and highly unlikely to obtain a significant effect (Simonsohn, Nelson, & Simmons, 2014). Given this limitation, it is possible that failure to replicate all Study 5 effects in Study 4 is due to low power rather than a null effect.
negativity bias, respectively. To test this possibility in momentary experience, we examined individual differences in positivity offsets and negativity biases in happiness and hypomania risk. We predicted that happiness would involve a stronger positivity offset and not a weaker negativity bias, and hypomania risk would involve a stronger positivity offset.

To calculate average levels of positivity offset and negativity bias, we constructed two regression models described in the “Analysis Strategy” section above. For positivity offset, we examined the difference between the intercepts in each model. Consistent with an overall positivity offset, the equation predicting positive affect was associated with a higher intercept ($M = 47.77$) than the equation predicting negative affect ($M = 40.32$), $t(77) = 6.79$, $p < .0001$, average positivity offset = 7.45. For negativity bias, we compared the relative magnitude of slopes by converting them into a $z$-score (Cohen et al., 2003). There was, to our surprise, no evidence of a overall negativity bias, with the slope for negative affect ($M = -0.19$) significantly less steep than the slope for positive affect ($M = 0.28$), $z = 4$, $p < .0001$, average negativity bias = -.09. This indicates that, in this sample, the relationship between arousal and positive affect was stronger than the relationship between arousal and negative affect; participants continued to be more tuned toward positive affect over negative affect even at higher levels of arousal. Moreover, the relationship between arousal and negative affect was negative in these data, indicating the opposite of a negativity bias: if anything, participants displayed a positivity bias.
Critically, we predicted a higher positivity offset, and not a weaker negativity bias, for high happiness. To calculate the change in positivity offset and negativity bias as a function of happiness and hypomania risk, we conducted two regression analyses predicting each of the positivity offset and negativity bias parameters from happiness and hypomania risk (detailed in the “Analysis Strategy” section above). Consistent with our hypothesis, happiness was associated with a higher positivity offset, $t(77) = 3.08, p < .01$, but not with a weaker negativity bias, $t(77) = .17, p = .87$. Intriguingly, hypomania risk was not significantly associated with a change in positivity offset, $t(77) = .28, p = .78$, nor with a change in negativity bias, $t(77) = .52, p = .60$.

Discussion

The present work examined everyday affective experience to determine the nature of the relationships of happiness and hypomania with positive and negative affect. Whereas hypomania risk was related to positivity in times of low negativity, happiness related to positivity in times of high negativity. These findings suggest that, although people with higher hypomania risk usually feel more negative on average than their low-hypomania risk counterparts, their levels of positivity do not differ from low-risk individuals when they are feeling more negative than usual: everyone feels equally low positivity; a bad day is a bad day. But at times when they are feeling less negative than usual, their positivity is much higher. By contrast, people with higher happiness feel just as little negativity as others when positivity is higher than usual: a good day is a good
day. But at times when they are feeling less positive than usual, they experience a kind of buffer, in that they feel less negative than their low-happiness counterparts. These findings are supported in the combined dataset with data from both Studies 4 and 5.

However, these results were only partially supported when examining data from each study separately (see Appendix). Both studies found that hypomania risk was related to positivity in times of low negativity, but Study 4 found that happiness was related to positivity regardless of level of negativity, whereas Study 5 and the combined dataset found that happiness was related to positivity most strongly when negativity was higher than usual. The present work does not provide conclusive proof, then, that happiness specifically involves persistent decreases in negativity when positivity is absent, compared to an alternate possibility (presented by Study 4 alone) that happiness involves overall higher levels of positivity. Additional research will be needed to disentangle these two possibilities and to understand whether these divergent findings are due to statistical error, low power, sampling, or some other factor. However, we believe that presenting these findings transparently (a) is informative as to the messy nature of real-world data, and (b) can guide and direct future work. The current state of psychological science is a bit messy: we have in the last four years wrestled with a surge of issues surrounding questionable statistical practices and reporting biases (e.g., Crocker, 2011; Simmons, Nelson, & Simonsohn, 2011), and prominent scientists have begun to call for promoting truth over publishability (Nosek, Spies, & Motyl, 2012). As our science emerges from this turmoil, it is of the utmost importance to present results straightforwardly and let the
self-correcting nature of science ultimately decide the truth-value of claims through the iterative process of direct and conceptual replications.

One major hypothesis of this work was that positive affect would manifest differently in happiness and hypomania risk, and this hypothesis was supported. These data provide consistent support for the hypothesis that there is a reciprocal relationship between positive and negative affect for hypomania risk: hypomania risk involves more frequent negativity, and alternating experiences of positive and negative affect, rather than simultaneous experiences of both. People with hypomania risk can experience high levels of positivity, but only when feeling less negative than usual. This dysregulated positivity may create a greater than usual drive for exploration, engagement, and so forth. Previous research has suggested that people with bipolar spectrum disorders experience dysregulation of the behavioral activation system (BAS) (Alloy & Abramson, 2010). This work suggests that the BAS is hypersensitive, overreacting to relevant cues and producing an abundance of goal-directed behaviors. When goals are not achieved or are failed, BAS becomes excessively deactivated, resulting in decreased energy, loss of interest, sadness, and other symptoms of depression. These states are consonant with experiences of mania and depression, respectively. These symptoms are also tantalizingly similar to the emotional states involved in promotion focus when people achieve or fail at their goals (Higgins, 1997). Perhaps people with hypomania risk are overly promotion-focused as well. This possibility remains to be confirmed by research.
These data also provide preliminary support for the hypothesis that happiness involves some degree of resilience from negativity. Data from Study 5 and the combined dataset suggests that happier people may sometimes simultaneously experience positive and negative affect, though this coactivation results from an uncoupling of positive and negative affect rather than an experience of conflict or ambivalence. Happier people experience more stable positivity, which has many benefits. When occasional negative life events happen, those events do not negatively affect happier people as much as less happy people, suggesting a stable baseline of affect toward which happier people consistently gravitate. Happiness involves still seeking the bright side to some extent even when “the going gets rough.” This approach may encourage more adaptive responses to the environment, such as exploration, as well as more opportunity for emotion regulation, such as reappraising the negative situation.

We also examined individual differences in positivity offsets and negativity biases in happiness and hypomania risk, and found that happiness involves a higher positivity offset without a weaker negativity bias. This implies that happier people have higher baseline sensitivity to positive information, but that they respond appropriately to negative information when relevant. These data are complementary with previous research (e.g., Cunningham & Kirkland, 2014; see Kirkland Turowski, Man, & Cunningham, 2014), and build on this work by showing that these processing differences replicate in actual momentary affective experience. We had also predicted that hypomania risk would involve a stronger positivity offset, but this hypothesis was not
supported. Curiously, our sample did not show any overall evidence of a negativity bias. If anything, our sample showed a positivity bias, being less sensitive to negative information with increased arousal. This raises the interesting possibility that the kinds of arousal-inducing experiences that occur in daily life are meaningfully different from the evaluative processes that occur when passively viewing arousing stimuli in the laboratory (i.e., the circumstances in which a negativity bias is typically found). Further research will be needed to investigate this intriguing phenomenon.

In summary, the relationship between positive and negative affect in happiness and hypomania may depend on the time scale at which affect is measured. In contrast to the relationships suggested by the trait data, which appear to show coactivity for hypomania risk and reciprocity for happiness, these data provide preliminary evidence to suggest that at the level of momentary experience hypomania involves reciprocity and happiness involves uncoupled affect. Future research will be needed to more clearly explore these relationships and delineate the boundary conditions under which these effects do and do not hold.
Table 6. Correlation matrix and descriptive statistics of measured variables (Studies 4-5).

<table>
<thead>
<tr>
<th></th>
<th>SHS</th>
<th>HPS</th>
<th>pos</th>
<th>neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPS</td>
<td>0.07</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pos</td>
<td>.19***</td>
<td>.02*</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>neg</td>
<td>-.18***</td>
<td>.05***</td>
<td>-.69***</td>
<td>--</td>
</tr>
<tr>
<td>Mean</td>
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<td>17.80</td>
<td>61.27</td>
<td>32.20</td>
</tr>
<tr>
<td>SD</td>
<td>1.13</td>
<td>7.35</td>
<td>21.79</td>
<td>23.04</td>
</tr>
<tr>
<td>Range</td>
<td>1.25-7</td>
<td>3-44</td>
<td>0-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>

Table 7. Correlation matrix and descriptive statistics of measured variables (Study 4).

<table>
<thead>
<tr>
<th></th>
<th>SHS</th>
<th>HPS</th>
<th>pos</th>
<th>neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPS</td>
<td>-.04</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pos</td>
<td>.19***</td>
<td>-.01</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Neg</td>
<td>-.15***</td>
<td>.04*</td>
<td>-.70***</td>
<td>--</td>
</tr>
<tr>
<td>Mean</td>
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<td>60.33</td>
<td>31.57</td>
</tr>
<tr>
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<td>6.68</td>
<td>21.35</td>
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</tr>
<tr>
<td>Range</td>
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<td>3-31</td>
<td>0-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>

Table 8. Correlation matrix and descriptive statistics of measured variables (Study 5).

<table>
<thead>
<tr>
<th></th>
<th>SHS</th>
<th>HPS</th>
<th>pos</th>
<th>neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPS</td>
<td>.12***</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pos</td>
<td>.19***</td>
<td>.03*</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>neg</td>
<td>-.20***</td>
<td>.05***</td>
<td>-.68***</td>
<td>--</td>
</tr>
<tr>
<td>Mean</td>
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</tr>
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<td>SD</td>
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<td>4-44</td>
<td>16-100</td>
<td>1-83</td>
</tr>
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</table>

*Tables 6-8 Note: SHS = Subjective Happiness Scale, HPS = Hypomanic Personality Scale, pos = positive affect, neg = negative affect, measured with momentary PDA measures completed up to four times per day. * p < .05, ** p < .01, *** p < .001*
Figure 7. Interaction of momentary positive affect (posc) and happiness (SHS.s) predicts momentary negative affect (neg).
Figure 8. Interaction of momentary negative affect (negc) and hypomania risk (HPS.s) predicts momentary positive affect (pos).
Chapter 4: General Discussion

This dissertation describes five studies directly comparing affective experience between happiness and hypomania risk, two outcomes that are both linked with positive affect. This research shows that positive affect is linked differentially to happiness and hypomania risk depending on the presence or absence of negative affect and variables associated with negative affect. Chapter 2 describes three studies that examined personality correlates, finding that aspects of extraversion and neuroticism differentially predict happiness and hypomania risk, two outcomes typically associated with positive affect. Both happiness and hypomania were associated with high positive affect and extraversion, yet aspects of extraversion mapped differentially onto happiness and hypomania: happiness was associated with enthusiasm (sociability), hypomania risk with assertiveness (drive). Further, happiness was linked more strongly to low withdrawal in neuroticism, whereas hypomania risk was more strongly linked to high volatility in neuroticism. Chapter 3 describes two studies that examined daily affective experience, finding that the relationships with positivity are different when examined at the state level compared to the trait level. Specifically, hypomania risk was associated with higher positive affect only in the absence of negative affect, whereas happiness was associated with lower negative affect even in the absence of positive affect. In other words,
hypomania risk was associated with greater dependence between positive and negative affect, whereas happiness was associated with greater independence between positive and negative affect. These patterns for happiness were supported more strongly in one study than in the other, but held in a dataset combing these two studies, suggesting the need for future research exploring this hypothesis with a larger sample size. This suggestion is consistent with the current state of psychological science, which has focused increasingly on high-powered replications and transparent reporting. Finally, Chapter 3 also examined positivity offset and negativity bias in happiness and hypomania risk, finding that happiness was associated with a higher baseline positivity offset but no change in negativity bias. Taken together, these studies support multiple relationships among positive and negative affect suggested by the evaluative space model (as described in Chapter 1).

These studies show that positive affect is linked to negative affect differently for happiness and hypomania risk: people experience positive and negative affect in different ways, at different times, and in different ratios. Happiness involves overall high positive and low negative affect, a sociable form of extraversion, and decreased withdrawal. When happier people are feeling less positive than usual, they experience less negativity than less happy people, suggesting the resilience of their baseline positivity and a decoupling of positive and negative affect (though, this suggestion remains to be confirmed by an independent replication). Happiness also involves a positivity offset: higher positivity at low levels of arousal, facilitating exploration and approach behavior.
Yet, happiness is not associated with changes in negativity bias, reflecting the same
degree of negativity at high levels of arousal compared to lower happiness, suggesting an
appropriate response to threat. By contrast, hypomania risk involves overall high positive
and high negative affect, an assertive form of extraversion, and increased volatility.
When people with hypomania risk are feeling less negative than usual, they are much
more positive than low-risk individuals, suggesting greater dependency between positive
and negative affect. Hypomania risk was not associated with changes in positivity offset
or negativity bias relative to baseline, a finding that ran counter to our predictions.

These data also provide preliminary evidence to suggest that positive and negative
affect are linked differently in actual experience than on the trait level. Results described
in Chapter 2 indicate that happiness and hypomania both experience high trait positive
affect, though they differ in the specific form or expression of it (i.e., aspect of
extraversion), and that happiness involves low trait negative affect whereas hypomania
involves high trait negative affect. These patterns imply an inverse or reciprocal
relationship between positive and negative affect for happiness and a direct or coactive
relationship between positive and negative affect for hypomania risk. However, results
described in Chapter 3 indicate that state positivity is experienced at different times in
relation to state negativity in happiness and hypomania risk. Whereas positivity may be
most evident in happier people in a high-negative context (i.e., “seeing the bright side”),
positivity is most evident in people with hypomania risk people in a low-negative context
(i.e., positivity is “all or none”). In other words, the results for momentary affect suggest
a reciprocal relationship between positive and negative affect for hypomania risk and a possible uncoupling of positive and negative affect for happiness.

Because the relationship between positivity and negativity in happiness and hypomania may differ depending on the time scale being examined, this work implies that polling individuals’ general levels of affect cannot necessarily be used to understand or predict affective experience in the moment. Indeed, recent work has highlighted the importance of change over time in understanding emotional experience (Kirkland & Cunningham, 2012), suggesting that moment-by-moment emotional states are constructed in part by our predictions of whether or not our current level of (mis)fortune will continue on its current trajectory. The present research supports that body of literature, suggesting that it is important to consider affective phenomena at multiple levels of resolution.

Critically, these data challenge the idea that hypomania risk is an extreme version of happiness (Gruber, Mauss, & Tamir, 2011). The “extremity” perspective suggests that positivity takes a bipolar view of affect, suggesting that too-low levels of positivity are associated with depression, too-high levels with mania, and well-being is a sweet spot somewhere in between (Fredrickson & Losada, 2005; Oishi, Diener, Choi, Kim-Prieto, & Choi, 2007). The research presented in this dissertation supports an alternate perspective, that happiness and hypomania risk involve substantively different affective processes. Hypomania risk is not “too much happiness,” but is characterized by affective instability. Happiness is not “best in moderation,” but is characterized by affective stability.
These data have substantial implications for understanding both happiness and hypomania risk, as well as methodological implications for using the appropriate comparison group.

Understanding Happiness

This research speaks to the idea that positivity may not be experienced in the same way for everyone. A swell of recent research on the downsides or costs of happiness has used happiness and positive affect fairly interchangeably, a heuristic that is unwarranted – and maybe even dangerous – in light of the present research. For example, some work suggests that hypomania may be “too much happiness” (Gruber, Mauss, & Tamir, 2011, p. 229) and valuing happiness to an extreme has been associated with symptoms of mental illness (Ford, Mauss, & Gruber, 2015; Ford, Shallcross, Mauss, Floerke, & Gruber, 2014). However, other work has shown positive correlates of valuing positive emotion: for example, a sample of 9,874 participants from 47 countries found that cultures that value positive emotions tend have more people who experience such emotions and are satisfied with life (Bastian, Kuppens, De Roover, & Diener, 2014). As such, this research may reflect a general lack of theoretical clarity regarding the definition of happiness, including an inadequate distinction between happiness and positive affect and possible conflation of happiness with metacognitive processes. It is not happiness itself that seems to be problematic in these studies, but rather the kinds of thoughts people
have regarding the concept of happiness.\textsuperscript{11} The present research speaks to the need to be specific when discussing happiness because it does not necessarily mean the same thing for everyone, and clearly positive affect in and of itself is not sufficient for happiness. We would urge future work to consider these distinctions.

Recently, my colleagues and I suggested that there might be multiple routes to or multiple definitions of happiness across individuals (Kirkland Turowski, Man, & Cunningham, 2014). The conceptual categories that people use to anchor and define their positive experiences vary widely. For example, research in our lab has demonstrated that when people are given the opportunity to write about their definition of happiness or what makes them happy, some write about enjoyment of social relationships; others write about more concrete pleasures; others write about more abstracted ideas of completing goals or gaining truth and understanding; and still others describe happiness as the absence of negative experience and the fulfillment of obligations. This suggests that happiness is not a single and unidimensional construct, but is instead a rich and complex set of partially overlapping ideas.

These multiple definitions suggest that positive affect can manifest and be interpreted in several ways, leading to different subjective senses of happiness. For example, some forms of positive affect derive from gaining rewards and are associated

\textsuperscript{11} The “valuing happiness” studies use a measure of valuing happiness that reflects a neurotic, hyper-self monitoring approach to evaluating one’s happiness, which appears to confound happiness with negative personality traits. As such, this work may speak more to the extent to which inflexible beliefs, critical self-judgments, and negative self-talk relate to symptoms of mental illness than to any link between happiness and dysfunction.
with a motivational system that is preferentially sensitive to gains, whereas other forms of positive affect derive from avoiding punishments and are associated with a motivational system that is preferentially sensitive to losses (Higgins, 1997; 1998). Regulatory focus theory suggests that the promotion system orients the individual toward exploration and opportunity; the presence of positive information (and the experience of elation) is the primary concern for chronically promotion-focused individuals. By contrast, the prevention system orients the individual toward concerns of safety and security, and the absence or avoidance of negative information (and the experience of calm) is the primary concern for chronically prevention-focused individuals. It is therefore possible for promotion focus and prevention focus to both achieve happiness through different routes. These forms of happiness may be very different from one another. Another form of happiness may come from savoring hedonic sensory experiences such as music or food. Thus, although the term “happiness” is constant across individuals, it may reflect a variety of subjective experiences. Relatedly, some work has found cross-cultural differences in ideal affect, or how people ideally want to feel. This research has found that Western cultures place a higher value on higher-arousal, intense positive emotions, such as excitement, whereas Eastern cultures place a higher value on lower-arousal positive emotions, such as contentment and serenity (Tsai, 2007). Perhaps individual definitions of happiness should be given greater consideration in future research.

Supporting the idea of multiple mechanisms for happiness, an abundance of recent work has focused on interventions designed to increase well-being, such as
expressing gratitude (Seligman, Steen, Park, & Peterson, 2005), acts of kindness (Dunn, Aknin, & Norton, 2008), meditating on positive feelings toward others (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008), savoring positive events (Bryant & Veroff, 2007), and optimistic thinking (King, 2001). These can increase well-being through multiple mechanisms, including positive emotions, positive thoughts, positive behaviors, and need satisfaction (Layous & Lyubomirsky, 2014). The finding that positive affect is not the only route through which positive behaviors can increase well-being speaks to the idea that happiness can be achieved in multiple ways. Importantly, many of these interventions are explicitly social or other-oriented, speaking to the primacy of our interactions with others in determining happiness.

A comprehensive model of happiness will also need to account for the dynamic interplay between positive and negative affect, and the ways people prioritize each affective state. Negative affect can be a valuable signal about one’s standing in the environment, and negative emotions are adaptive and can motivate people to prepare for and respond to challenging situations (e.g., Darwin, 1872; Janis & Leventhal, 1968; Svanum & Zody, 2001). Positive and negative emotions serve different, yet complementary, functional purposes: Negative emotions promote survival in the moment of threat by sparking specific, life-preserving actions to avoidable threats, whereas positive emotions promote survival over the long run by accumulating resources that can be drawn on when facing later, inevitable threats (Cohn et al., 2009; Fredrickson, 1998). The value of negative information is seen in the widely-documented negativity bias, in
which negative information receives greater weight than positive information (e.g., Kahneman & Tversky, 1979; Rozin & Royzman, 2001). Yet, both affective states are important and relevant to different types of stimulation; positivity offset reflects the extent to which people engage with a non-threatening environment. Happier people may be particularly tuned to balance these concerns in a way that maximizes both survival and opportunity-seeking/resource-gathering. Consistent with this idea, research presented in Chapter 3 suggests that happier people demonstrate a higher positivity offset, but not a weaker negativity bias, when interacting with their environment. Other work has shown one biological basis for this behavior: the amygdala, a brain area that is sensitive to motivationally relevant information (Cunningham, Van Bavel, & Johnsen, 2008; Cunningham & Brosch, 2012), is equally responsive to positive and negative information for happier people (Cunningham & Kirkland, 2014), reflecting a balanced approach to evaluating positive and negative information. This may be because happier people display greater amygdala flexibility – responding to negative information when vigilance is necessary, and responding to positive information when there are no negatives to attend and opportunities abound.

Building on this work, in two unpublished studies, we used eye tracking to investigate how differences in self-reported happiness are linked to visual perception. Participants viewed a series of displays composed mostly of negative and/or neutral images, but which sometimes also include a single positive image. We found that happier people noticed and attended to positive stimuli more compared to less happy people,
suggesting that happiness may be associated with a bias toward positivity beginning at very early levels of processing. However, in displays without any positive information, happier and less-happy people were equally sensitive to negative information. Therefore, happier people may have motivational biases allowing for greater sensitivity to positivity, but these biases are not blinders – rather, they allow happier people to have the “best of both worlds” in a sense: focusing on negative information when relevant, and positive information when possible.

Future work may focus on cognitive flexibility as a key variable that facilitates the ability to optimally move between affective states and allow for a variety of affective interpretations of a situation. Cognitive flexibility refers to the ability to change thoughts or interpretations selectively in response to environmental stimuli with the goal of perceiving, processing, and responding to situations in different ways (Scott, 1962). Given an unpredictable and ever-changing world, demanding or imposing too much structure is not adaptive. Rather, optimal interaction with one’s environment requires the ability to detect and respond appropriately to change, bringing one’s expectations in line with the current state of the world and reducing discrepancies. To the extent that one is cognitively flexible, this will be easier to do. Whereas one’s goal is more immediate and clear-cut with negative emotions (e.g., deal directly with a threat), there are a greater variety of potential behavior options for positive emotions, and depending on the situation, some options may be more appropriate than others within this large potential repertoire (Kirkland Turowski, Man, & Cunningham, 2014). The key to happiness is
probably being strategically flexible – “seeing the bright side” of ambiguous situations within the constraints of what is contextually appropriate, including sensitivity to negative information when it is relevant. Cognitive flexibility can therefore be thought of as a continuum with an optimal level for adaptive functioning. Relatedly, recent work has suggested that resilience – the ability to adapt to changing environments – may be a crucial component of happiness (Cohn et al., 2009). It would be exciting to see future work build on these ideas to come to a more comprehensive understanding of well-being.

Understanding Hypomania Risk

The present work also contributes to a large body of research investigating the causes and consequences of (hypo)mania. For example, research has linked mania and hypomania to impulsivity, or the tendency to act on the “spur of the moment” (Swann et al., 2001) with reduced consideration of future consequences (Gruber, Cunningham, Kirkland, & Hay, 2012). People with a history of mania are engaged with goal pursuit to an extreme, experiencing robust increases in confidence during positive moods (Johnson, 2005). Anticipation and goal-directed behavior are also associated with unique neural substrates. Activation of dopamine in the core of the nucleus accumbens increases motivated responses associated with anticipatory positive affect (Berridge & Robinson, 2003), resulting in reward-seeing and goal-driven behavior. This increased activation is specific to the anticipation of positive but not negative outcomes (Knutson, Adams, Fong, & Hommer, 2001). The behavioral activation system, which may be hypersensitive in
bipolar spectrum disorders (Alloy & Abramson, 2010), features dopaminergic pathways to and from the nucleus accumbens (Kalivas & Nakamura, 1999). Our finding that hypomania risk involves a more assertive, driven form of extraversion is consistent with this account. People with hypomania risk also experience affective instability and difficulty with emotion regulation, an observation that is consistent with the association with volatility and the linear dependency between positive and negative affect found in the present work. Critically, our findings also show that positive affect in hypomania is experienced differently from positive affect in happiness – not just that hypomania involves extreme positivity, but rather that happiness and hypomania differ in the proportions and types of positive and negative affect found in personality and experience.

Using the Appropriate Comparison Group

These studies are groundbreaking in that they compared two dispositions with substantial implications for well-being that have not been compared before, even though they share a similar affective core. Prior research examining happiness and hypomania risk separately has compared each to the low ends of their own spectrums (assuming a bipolar view of the constructs) rather than comparing each to a complementary construct that shares a core defining feature. In moving toward a more comprehensive understanding of both happiness and hypomania risk, it is crucial to understand the underlying characteristics of the construct, particularly those that differentiate it from related constructs with opposite implications for well-being.
Future research focused on understanding affective phenomena or individual differences more deeply might do well to consider adding additional comparison groups beyond individuals who score low on a scale for that construct (or are diagnosed/undiagnosed with a condition). As the present research demonstrates, many constructs emerge from the complex interplay of multiple variables rather than being two poles on a bipolar continuum. Measurement of a construct should be simple, but our understanding of its elements need not be. Just as some of the basic physical phenomena are more complex than they appear from simple observation, many affective phenomena are better understood when examined without making assumptions that come from subjective experience (Cunningham & Kirkland, 2012). Indeed, the entire positive psychology movement emerged from a rebellion against oversimplifying constructs relevant to well-being (Seligman & Csikszentmihalyi, 2000). For decades, scholars assumed that happiness was the opposite of depression, that flourishing simply meant not languishing. However, the last twenty years of research have suggested that happiness and depression are distinct in many ways. Similarly, to better understand any individual difference, it may sometimes be critical to compare those individuals with others who share key similarities in addition to those who are opposites on that dimension.
Conclusion

The most basic way we understand the world is in terms of positive and negative information. Positive and negative affect can orient us appropriately within our environment, shape thought, and guide behavior. These affect systems can take a variety of relationships with one another. This dissertation shows that the relationship between positive and negative affect varies between happiness and hypomania risk, and that the nature of this relationship depends on whether affect is being measured at the state or the trait level. Happiness and hypomania risk do not rely on the experience of positivity, per se, but rather the way that positivity is experienced relative to negativity.
References


Appendix: Secondary Analyses in Chapter 3

Multilevel Analyses: Study 4

We modeled the dataset for Study 4 separately using the two multilevel models described in the “Analysis Strategy” section (Chapter 3). The intercept for the first model (criterion variable: positive affect) was estimated at 60.31, indicating the average level of positivity when holding all predictors constant; the intercept for the second model (criterion variable: negative affect) was estimated at 30.70, indicating the average level of negativity when holding all predictors constant. Coefficients (standardized $\beta$) reported below can be interpreted as the amount of change in positive affect (or negative affect), relative to the intercept, as a function of a one-unit change in the predictor.

Unfortunately, Study 4 demonstrated a less consistent pattern of relationships among happiness, hypomania risk, and momentary affect relative to Study 5.

With regard to hypomania risk, the Hypomanic Personality Scale (HPS) did not significantly predict momentary positive affect when controlling for negative affect, $t(3422) = .53, \beta = .38, p = .60$, and also did not significantly predict momentary negative affect when controlling for positive affect, $t(3422) = .91, \beta = .73, p = .37$. However, one interaction was significant: momentary positive affect and hypomania risk (HPS) interacted to predict momentary negative affect, $t(3422) = 2.22, \beta = .03, p < .05$. 

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Consistent with the combined dataset presented in Chapter 3, this interaction revealed that when feeling more negative than usual, all participants felt less positive, but when feeling less negative than usual, people with higher hypomania risk felt much more positive than those with low risk.

With regard to happiness, the Subjective Happiness Scale (SHS) did significantly predict momentary positive affect when controlling for negative affect, $t(3422) = 3.08, \beta = 2.32, p < .001$, but did not significantly predict momentary negative affect when controlling for positive affect, $t(3422) = .40, \beta = .38, p = .69$. Neither interaction was significant.

**Multilevel Analyses: Study 5**

We modeled the dataset for Study 5 separately using the two multilevel models described in the “Analysis Strategy” section (Chapter 3). The intercept for the first model (criterion variable: positive affect) was estimated at 62.2, indicating the average level of positivity when holding all predictors constant. The intercept for the second model (criterion variable: negative affect) was estimated at 32.77, indicating the average level of negativity when holding all predictors constant. Coefficients (standardized $\beta$) reported below can be interpreted as the amount of change in positive affect (or negative affect), relative to the intercept, as a function of a one-unit change in the predictor.

Examining relationships with hypomania risk, we found that the Hypomaniac Personality Scale (HPS) significantly predicted momentary positive affect when controlling for negative affect, $t(4917) = 2.26, \beta = 1.60, p < .05$, and also significantly
predicted momentary negative affect when controlling for positive affect, \( t(4917) = 2.63, \beta = 1.95, p < .01 \). Critically, when predicting momentary positive affect, there was a significant interaction between hypomania risk (HPS) and momentary negative affect, \( t(4917) = -2.01, p < .05 \). Consistent with the combined dataset presented in Chapter 3, this interaction revealed that when feeling more negative than usual, all participants felt less positive, but when feeling less negative than usual, people with higher hypomania risk felt much more positive than those with low risk. In other words, the link between hypomania risk and positivity is strongest when people with hypomania risk are feeling less negative than usual. These findings support a reciprocal relationship between positive and negative affect wherein people with hypomania risk feel high negativity and low positivity much of the time, but occasions of low negativity imply much higher positivity. Positivity in hypomania risk seems to depend on the absence of negativity.

Examining relationships with happiness, we found that the Subjective Happiness Scale (SHS) did not significantly predict momentary positive affect when controlling for negative affect, \( t(4917) = .51, \beta = .40, p = .61 \), nor did it predict momentary negative affect when controlling for positive affect, \( t(4917) = -1.73, \beta = -1.41, p = .09 \). However, there was a significant interaction between happiness (SHS) and momentary negative affect in predicting momentary positive affect, \( t(4917) = 2.19, p < .05 \), and there was also a significant interaction between happiness (SHS) and momentary positive affect in predicting momentary negative affect, \( t(4917) = 4.43, p < .001 \). The interaction predicting negative affect is consistent with the findings in the combined dataset (Chapter 3),
suggesting that when feeling more positive than usual, happiness was not strongly related to level of negativity; everyone, regardless of dispositional happiness, reported equally low negative feelings. However, when feeling less positive than usual, happier people remained less negative than less happy people. In other words, happiness involves a weaker relationship between positive and negative affect: happier people feel less negative than less-happy people when positivity is low. The interaction predicting positive affect suggests that when feeling less negative than usual, happiness was not strongly related to level of positivity: everyone, regardless of dispositional happiness, reported equally positive feelings. However, when feeling more negative than usual, happier people remained more positive than less happy people. In other words, the link between happiness and positivity is strongest when happier people are feeling more negative than usual. These findings support the view that positive and negative affect may be relatively uncoupled for higher happiness, and also raise the interesting possibility that happiness involves both a lower overall negativity when feeling less positive than usual, and some degree of positivity that persists even when feeling more negative than usual.

**Discussion of Differences between Study 4 and Study 5**

In both Study 4 and Study 5, hypomania risk interacted with momentary positive affect to predict momentary negative affect, indicating that hypomania risk was most closely related to positivity in times of low negativity. However, in Study 4, the main effects of hypomania risk were not significant, whereas in Study 5 they were. In both
studies, happiness was related to momentary positive affect, but in Study 4 this effect existed only as a main effect (not an interaction, as in Study 5), indicating that happiness was related to positivity regardless of level of negativity. Happiness was also not significantly related to momentary negative affect in Study 4, but was related to negative affect (with main effect and an interaction) in Study 5.

One interpretation of these findings is that the interactions of happiness with affect, not being significantly different from zero in Study 4, likely do not exist as a true effect. This is consistent with the traditional approach to null-hypothesis significance testing. Another interpretation of these findings is that, because the effects are significant in Study 5, some true effect may exist, but its estimate is imprecise in the Study 4 dataset – perhaps there is too much noise in the data, or the sample size is inadequate to detect a small effect size \((n = 77\) in Study 4 and \(n = 113\) in Study 5).

Moreover, we found some fundamental differences between the study samples in terms of how much positivity they felt. We re-ran the multilevel models described in Chapter 3 including study as a covariate, and found both main effects and interactions for the study term. People in Study 5 tended to be somewhat less positive, overall, than those in Study 4, \(t(8339) = 1.92, p = .057\). This appears to be influenced primarily by people low in subjective happiness: a significant interaction revealed that low-happiness people’s momentary positivity in Study 4 was lower than low-happiness people in Study 5, \(t(8339) = -1.95, p = .056\). The distribution of happiness scores also varied between studies: it followed more of a bell curve in Study 4 (Figure 9) and was multimodal in
Study 5 (Figure 10). Similarly, the relationship between positivity and negativity varied as a function of study: a significant interaction between study and momentary negativity in predicting momentary positivity indicated that in Study 5, positive and negative affect were less strongly related than in Study 4, \( t(8339) = 3.54, p < .001 \). It is possible that variability in individual samples might contribute to divergent patterns between samples.

Although there are differences between studies, analyzing the studies together gives some compelling preliminary evidence in support of our hypothesis that positive affect is experienced differently between happiness and hypomania risk. These findings are also informative as to how pre-existing differences in sample characteristics can influence results in non-experimental designs, highlighting the usefulness of cataloging individual differences between samples when conducting multiple studies of the same phenomenon in cases when using random assignment to conditions is infeasible. This also provides an illustrative example for the need for larger sample sizes in psychological science (Schimmack, 2012), particularly when attempting to replicate prior studies.
Figure 9. Frequency distribution of happiness (SHS) scores (Study 4).

Figure 10. Frequency distribution of happiness (SHS) scores (Study 5).