Physical health, positive and negative affect, and personality: A longitudinal analysis

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ABSTRACT

This study used structural equation modeling to examine longitudinal relations among physical health, personality and mood in a sample of 360 college students. Research focused on the longitudinal associations among physical health and mood and their systematic relations with the Big Five personality dimensions of Extraversion and Neuroticism. Longitudinal analyses over successive 1-month intervals revealed lagged reciprocal effects between physical health and negative affect. After controlling for the effect of negative affect, physical health influenced subsequent positive affect, but positive affect did not influence subsequent physical health. Implications of these findings for subsequent research on health, personality, and emotions are discussed.

1. Introduction

In a great deal of research, scholars have tried to better understand the relationship between affect, personality and physical health. Negative affect (NA) is associated with a number of physical and mental health outcomes (Chida & Hamer, 2008; Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Kubzansky & Kawachi, 2000), and has been of interest to scholars for quite some time. More recently, scholars have also started to examine the role of positive affect (PA), with some initial studies suggesting that PA may also be an important factor for understanding physical and mental health (Pressman & Cohen, 2005).

Associations between NA, PA and self-reported physical health have been demonstrated in the literature, but the vast majority of these studies have used cross-sectional designs (Lyubomirsky, King, & Diener, 2005; Suls & Bunde, 2005). As such, important conceptual questions remain unanswered. First, the causal direction underlying the association between affect and physical health has yet to be resolved. Second, many studies examining the effect of affect on health fail to compare the effects of PA and NA simultaneously, which leaves questions regarding which construct explains most of the variance in physical health. Third, Neuroticism has well-documented links to self-reported health (Watson & Pennebaker, 1989), but it is plausible that another major dimension of personality, such as Extraversion contributes to self-reported physical health above and beyond NA and PA. In the current paper, we devel-

op and empirically test a longitudinal model that addresses these gaps in the literature by systematically examining the links between PA, NA, personality and physical health.

1.1. Positive affect, negative affect and physical health

PA and NA represent the broadest conceptualization of overall mood (Watson, Clark, & Tellegen, 1988). PA reflects an individual's level of pleasurable engagement with the environment, and is characterized by feelings of enthusiasm, high energy, and attentiveness. NA reflects an individual's experience of distress, dissatisfaction, or unpleasant arousal, and is characterized by guilt, fear, anger, and nervousness. PA and NA represent individuals' levels of approach or withdrawal, and as such can be conceptualized as positive activation (PA) and negative activation (NA) (Watson, Wiese, Vaidya, & Tellegen, 1999).

In a series of seven studies examining the relation between affect and physical symptom reporting, Watson and Pennebaker (1989) found a consistent association between both state and trait NA and somatic health complaints. Similarly, using a longitudinal design in which common physical symptoms (e.g., respiratory problems) and affect were measured daily, Brown and Moskowitz (1997) found unpleasant affect related to concurrent as well as subsequent common physical symptoms. Finally, Knapp et al. (1992) used a laboratory procedure and found that the experience of NA resulted in increases in systolic blood pressure and decreases in mitogenic lymphocyte reactivity. Qualitative and meta-analytic reviews of NA and health bolster these earlier findings, showing that NA is related to cardiovascular disease (Kubzansky & Kawachi, 2000; Suls & Bunde, 2005), decreased immune functioning,

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(Kiecolt-Glaser et al., 2002), and physiological responses to stress (Chida & Hamer, 2008).

In contrast to the consistent relationship between NA and physical health, measures of PA exhibit weaker and inconsistent associations with physical symptom reporting (Cohen & Pressman, 2006). On one hand, meta-analytic research suggests that positive affect relates to physical health and immunity at $r = .38$ (Lyubomirsky et al., 2005). On the other hand, across three different samples, Watson and Pennebaker (1989) obtained a mean correlation of only $-.15$ between trait PA and common physical symptoms. Similarly, Watson and Clark (1992) found somatic complaints to correlate between $-.15$ and $-.21$ with general PA. By comparison, correlations between common physical symptoms and NA were much stronger and ranged from .24 to .46.

A limitation of these studies and most of the studies examining PA, NA, and physical health is that researchers often look at *just* PA or NA, not both simultaneously. This is problematic, as PA and NA tend to be negatively correlated. There are some exceptions, however. In a cross-sectional study that explicitly examined the comparative utility of PA and NA in predicting physical health, Dua (1993) found NA, but not PA, to significantly predict physical health. In a second study, however, Dua (1994) found both dimensions of affect to predict physical health significantly, but NA proved to be the better predictor in terms of proportion of explained variation in the criterion. Following this trend, NA, but not PA, is associated with chronic stress (Steptoe, O'Donnell, Marmot, & Wardle, 2008). In the area of immunology, researchers have found that negative psychological states tend to be stronger predictors than positive psychological states (Cohen & Herbert, 1996). These findings support the overall notion that "bad is stronger than good" (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001).

In a comprehensive review of the literature, Pressman and Cohen (2005) suggested reasons why PA relates to health less consistently than NA. First, there is less agreement among researchers regarding the nature of PA. Researchers debate if PA was related to health because PA was the absence of NA or because it is a substantively different emotional state (Keyes, 2003). Second, there are inconsistencies in the literature regarding the conceptualization and operationalization of PA. For example, the Levy, Slade, Kunkel, and Kasl (2002) study is often cited as strong evidence for the relationship between PA and health, but PA was not actually measured, Satisfaction with Aging was used. Similarly, reports of subjective well-being, satisfaction with life, and positive psychological traits, such as optimism, are often used interchangeably with PA. Furthermore, there may be heterogeneities in mechanisms across samples, supported by findings that PA may be related to health among older individuals, but that PA may actually be *harmful* to institutionalized individuals and individuals coping with a serious illness (Pressman & Cohen, 2005).

Although the empirical link between NA and physical health is clear, there is no current consensus among researchers regarding the mechanisms that might explain the association. One explanation, the *psychosomatic hypothesis* (Watson & Pennebaker, 1989), suggests that chronically elevated levels of NA trigger a variety of health problems through multiple pathways, including cortisol profiles, inflammatory processes, and sleep disturbances (Steptoe, Dockray, & Wardle, 2009), which in turn are manifested as higher scores on physical symptom measures. A second plausible interpretation, however, is that causality operates in the reverse direction with physical health problems resulting in higher levels of subsequent NA, called the *disability hypothesis* (Watson & Pennebaker, 1989). The underlying logic of this model is that health problems tend to generate substantial stress and physical discomfort, which result in elevated levels of psychological distress and NA. Researchers have also proposed mechanisms by which PA

leads to improved physical health. Pressman and Cohen (2005) propose that PA may directly lead to improved health through improved health practices, social ties, endogenous opioids, and hypothalamic–pituitary-adrenal axis activation or may indirectly lead to improved health by serving as a stress buffer and helping individuals to cultivate important social, psychological, and physical resources (Fredrickson, 1998). Alternatively, individuals who are not in good health may not report the energy that characterizes PA.

1.2. Positive affect, negative affect, and personality

Personality is one of the most robust predictors of PA and NA (DeNeve & Cooper, 1998; Diener & Lucas, 1999). In earlier research, Costa and McCrae (1980) noted that NA correlates significantly with characteristics associated with Neuroticism, and PA correlates with characteristics associated with Extraversion. Moreover, NA is largely unrelated to Extraversion, and PA is generally unrelated to Neuroticism (e.g., Larsen & Ketelaar, 1991). Tellegen (1985) argued that Extraversion and Neuroticism reflect basic dimensions of emotional temperament that relate to an inherent susceptibility to positive and negative emotional experiences (cf., Rothbart, 1991). In this view, traits related to Extraversion foster a predisposition towards the experience of positive mood, whereas traits related to Neuroticism relate to a susceptibility to negative mood experiences. For example, Lucas, Le, and Dyrenforth (2008) found a relationship between extraversion and PA, even after controlling for social activities. Indeed, meta-analytic investigations show that Extraversion relates to PA at .44 and Neuroticism relates to NA at .54 (Steel, Schmidt, & Shultz, 2008), and there is support for NA mediating the relationship between Neuroticism and related outcomes and for PA mediating the relationship between Extraversion and related outcomes (Rusting, 1998).

The present investigation used a longitudinal design to empirically investigate the directionality of self-reported physical health and affect. In contrast to cross-sectional analyses based on ordinary least-squares regression, estimation of a longitudinal model permitted the assessment of hypothesized reciprocal relations between personality, affect and physical health complaints across time, as well as a comparison of the relative strength of the lagged effects in each direction (Dwyer, 1983). We measured personality at time one, and measured NA, PA, and physical health complaints at times one, two, and three.

2. Method

2.1. Participants and procedure

A total of 360 undergraduate students enrolled in two sections of an introductory psychology course participated in return for extra course credit. Three consecutive assessments were separated by a period of 30 days. The first measurement occurred during the beginning of the semester, the second during midterms, and the third during finals week. We chose times during the semester when students would be coping with a number of stressors, which we thought would help increase the variability in physical health reports. To justify completion of the same measures, participants were told that they were involved in a study of stability and change in physical health and mood. Sixty-nine percent of the sample was female. The majority of participants was 18 or 19 years old (75.4%) and White, non-Hispanic (81.3%). The modal reported family income was above $60,000 (44.3%), with another 20.1% reporting their family income between $45,000–$60,000.