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Personality dynamics turn positive and negative mood into creativity

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Abstract

Introduction: Research on the link between affect and creativity rests on the assumption that creativity unfolds as a stimulus-driven response to affective states. We challenge this assumption and examine whether personality dynamics moderate the relationship of positive and negative mood with creativity.

Theoretical Model: According to our model, personality dynamics that generate and maintain positive affect and down-regulate negative affect energize creativity. Based on this model, we expect high creativity in response to negative mood if people engage in self-motivation and achieve a reduction in negative mood. We further derive that individual differences in action versus state orientation moderate the within-person relationship between mood and creativity.

Method: We conducted an experience-sampling study and examined the relationship between mood and creativity in everyday work-life. Two-hundred-and-ten participants indicated their action-state orientation and reported their mood three times a day over five consecutive workdays. At noon of each day, we assessed self-motivation and in the evening the extent to which participants had generated novel and useful ideas during the day.

Results: We observed high creativity when negative mood declined and self-motivation was high. Action-state orientation moderated the within-person relationships of positive and negative mood with creativity.

Conclusion: Personality dynamics determine whether positive and negative mood result in creativity.

Keywords: Action-State Orientation; Affect; Creativity; Mood; Motivation; PSI Theory

According to Buddhist teachings, there is no such thing as a permanent self. A person can instead be understood as the temporary grouping of five aggregates—body, sensation, perception, mental activity and awareness (Varela et al., 1991). Classic Buddhist scriptures use the analogy of a chariot to explain this view and argue that a chariot is neither identical with any of its constituent parts such as its wheels, pole, and axel, nor does it exist as a structural entity apart from these parts (Thanissaro, 1998). Psychological theories concur with the Buddhist notion in so far as they use the concept of the self to refer to a dynamical system rather than to a structural entity (Allport, 1961; Ryan & Brown, 2003). They define this system in terms of the functions its components—namely cognitive, affective, and physiological processes—achieve together (e.g., Baumeister et al., 1998; Kuhl et al., 2015).

One critical function of the dynamical system we call self for human development and adaptation in complex and dynamic environments is creativity. Creativity refers to the development of new and potentially useful ideas that are based on a person's unique knowledge and experience and enable the person to respond to and to shape the environment (Amabile & Pratt, 2016; Oldham & Cummings, 1996). Core components of the self that influence whether people show creativity are positive and negative affect (Russell, 2003). In particular positive moods and emotions have been linked to high creativity, while some studies suggest that negative moods and emotions can also result in creativity (e.g., Amabile et al., 2005; Bledow et al., 2013; De Dreu et al., 2008). The implicit assumption underlying many studies on the link between affect and creativity is that creativity occurs as a stimulus-driven response to affective experiences and the affective states they elicit.

An important factor that has been overlooked by research on the affect-creativity link are the dynamics of personality through which a person responds to and regulate affective states.

Positive and negative affect are subject to personality dynamics that maintain, amplify or change affective states over time (Gross & John, 2003; Koole, 2009). The effect of affect on creativity that has been observed in the literature may therefore not operate in a stimulus-driven and mechanistic manner, as many past studies on the affect-creativity link suggest. Instead, this effect may be moderated by personality dynamics such that affective states are only the starting points of the processes that unfold within a person and determine whether positive and negative affect result in creativity. Our dynamics of affect and creativity model, termed DYNAVITY model, attempts to specify these personality dynamics. According to our model, stability-oriented dynamics that generate and maintain positive affect and change-oriented dynamics that down-regulate negative affect are two basic forces within a person that energize creativity and need to be taken into account to further the understanding of affect-creativity link.

Our manuscript offers three contributions to the literature. First, we provide a theoretical model on the affect-creativity link that moves beyond mechanistic assumptions and specifies personality dynamics underlying this link. The model can thereby help to explain inconclusive findings and serve as an integrative framework for future research on creativity. Second, we contribute to the literature on motivation and creativity by showing that motivation a person generates autonomously enables creativity in response to negative moods. We thereby qualify past research on the influence of affective shifts on creativity and show that creativity requires a more specific response to the experience of negative affect than a shift to positive affect (Bledow et al., 2013; Bledow et al., 2011; Yang et al., 2016). Third, we advance the literature on individual differences and creativity by unpacking the role of action-state orientation for how positive and negative moods influence creativity (Koole et al., 2005). Individual differences in whether people remain focused on affective experiences (i.e. state orientation) or counter-

regulate affect to facilitate goal-striving (i.e. action orientation) hold important implications for when they access their creative potential.

Theoretical Model

Our model departs from the assumption that individuals actively generate and change their affective state and thus rejects the notion that external stimuli have a simple, deterministic influence on creativity through the affective states they elicit. The mixed pattern of findings and conflicting theoretical arguments on the relationship between negative affect and creativity indeed suggest the existence of moderating factors that influence whether people respond with creativity to the experience of negative affect (Baas et al., 2008; George & Zhou, 2002, 2007). For positive affect, by contrast, the accumulated evidence points to a positive effect on creativity, which renders the explanation that external stimuli invoking positive affect directly and consistently result in creativity plausible (Amabile et al., 2005; De Dreu et al., 2008). However, positive affect facilitates behavior in general and can also stimulate uncreative responses, such as conformity to social influence or consumptive behavior (George & Zhou, 2002; Harmon-Jones et al., 2010). Moreover, research using experimental affect manipulations usually does not examine whether the induced affective state persists over time while participants complete a creativity task. As experimentally induced positive and negative affect dissipate quickly (Bledow et al., 2022), it remains unclear whether participant's initial affective reaction or the personality dynamics that unfold subsequently are responsible for creativity. The creativity-promoting effect of positive affect that has been observed in many studies may even be independent of participants' affective state while completing the creativity task (cf. Isen, 1999), provided that the initial activation of positive affect is associated with some personal significance. For example, giving a gift as an experimental induction of positive affect seems to promote creativity

on a subsequent task when a personalized bag of sweets is given, whereas a bag of sweets from the supermarket shelf does not appear to promote creativity (A. Isen, personal communication, 2003). The dynamics underlying personal significance can be described in terms of the activation of the self as a continuously operating, implicit system that is distilled from the vast number of personally relevant episodes and connects experiences with intrinsic needs (Kuhl, Quirin, & Koole, 2021).

In contrast to the view that creativity unfolds as a stimulus-driven response to the experience of positive or negative affect, our theoretical model assumes that affective experiences are the starting point of personality dynamics that energize creativity by activating the self. The goal of our model is to specify these personality dynamics. We use the term personality dynamics to refer to processes that unfold over time within a person and cut across the boundaries between cognition, affect, and behavior (Fajkowska et al., 2023). Personality dynamics can encompass deliberately controlled as well as autonomously operating processes that energize behavior (Koole, 2009; Quirin et al., 2023). They differ between people as relatively stable, latent tendencies and can vary within people over time and across situations (Jayawickreme et al., 2019; Judge et al., 2014).

The basic proposition of our DYNAVITY model is that the personality dynamics underlying the link between positive affect and creativity are stability-oriented and energize creativity by generating and maintaining positive affect; the personality dynamics that turn negative affect into creativity are change-oriented and energize creativity by down-regulating negative affect. These personality dynamics energize creativity to ensure the integrity and continuity of the self by means of assimilation and accommodation. Assimilation refers to the use of available cognitive schemata to integrate new perceptions and to influence the context

(Piaget and Inhelder, 1969); accommodation refers to the modification of and the generation of new cognitive schemata, for instance, when a person generates new ideas to reach a goal after an initial attempt to reach the goal has failed (Block, 1982). As creativity involves the use of available cognitive schemata to generate new cognitive schemata, it is based on the interplay between assimilation and accommodation.

Regarding the personality dynamics underlying the link between positive affect and creativity, research suggests that positive affect reduces behavioral inhibition and signals that available cognitive schemata can be used to engage in goal-directed behavior (Carver & White, 1994). However, the application of available cognitive schemata to approach goals can also result in behavior that lacks novelty and originality (Gable & Harmon-Jones, 2008). A critical factor for whether positive affect stimulates creativity rather than other forms of behavior may reside in whether personality dynamics generate and maintain positive affect and give rise to an enduring state of high activation of the self. While momentary positive affect, such as the affective reaction evoked by attractive stimuli, facilitates behavioral responses in general, positive affect that is maintained within a person over time presumably has a specific, creativity enabling effect (Amabile et al., 2005). Enduring positive affect allows for the spread of activation in the self's associative memory networks that integrate a person's knowledge and experience (Kuhl, 2001). When these memory networks are broadly accessible due to enduring positive affect, a person can process information in a broad and flexible manner (Fredrickson & Branigan, 2005), perform remote associations (Kühnel et al., 2022), and generate new ideas to reach goals (Baas et al., 2008). Personality dynamics that generate and maintain specific experiences associated with positive affect such as desired future states or positive affective events and belief can also stimulate creativity (e.g., Baer et al., 2021; Tierney & Farmer, 2011).

This line of reasoning is consistent with a large body of research that has linked enduring states of positive mood as well as experiences associated with positive affect to creativity (De Dreu et al., 2008; Isen, 1999; Kühnel et al., 2022).

While our theoretical model holds that positive affect results in creativity when personality dynamics generate and maintain positive affect over time, we make complementary argument for the link between negative affect and creativity. Negative affect initially inhibits the application of cognitive schemata to strive toward goals, narrowly focuses attention on problems and risks, and induces analytical thinking (Schwarz & Bless, 1991). Although negative affect can thereby temporarily inhibit creativity, negative affect also induces the readiness to generate new cognitive schemata because readily available responses are insufficient. To enable creativity, however, the inhibitory influence of negative affect on the person's cognitive schemata needs to be overcome so that available cognitive schemata can be used to generate new cognitive schema. Kuhl's (2000) theory of personality holds that this can occur when personality dynamics down-regulate negative affect and activate the associative memory networks of the self (Koole et al., 2019). By down-regulating negative affect, the door opens for creativity instead of other forms of accommodating to negative affect, such as defensiveness or conformity to social influence (Bledow et al., 2022). We therefore expect that the experience and subsequent down-regulation of negative affect through personality dynamics can result in a phase, in which the self is highly activated and creativity is broadly amplified (Bledow et al., 2013; George & Zhou, 2007).

In the following, we translate these basic theoretical propositions into a set of empirically testable hypotheses. Given that the relationship between positive affect and creativity has been established in the literature, we first focus on the link between negative affect and creativity before taking individual differences in personality dynamics into account. As we empirically

examine a person's overall affective state rather than affective reactions to specific events, we use the terms positive and negative mood when developing our hypotheses.

Hypotheses Development

Negative Mood, Self-Motivation, and Creativity

A core hypothesis we derive from our theoretical propositions is that negative mood results in a phase of high creativity if a person autonomously generates motivation to counter-regulate negative affect. The onset of these dynamics is characterized by some perturbation by negative mood arising from experiences that are incongruent with a person's goals, such as persisting difficulties in solving a problem (Higgins, 1987). Negative mood can lead to a phase during which attention is narrowly focused on perceptions that do not match a person's goals (Forgas, 2013; Kuhl & Baumann, 2000). Although persisting negative mood can interfere with creativity because it reduces the availability of positive affect, narrows the focus of attention, and inhibits the application of cognitive schemata to strive towards goals (George & Zhou, 2007; To et al., 2012), it can become the starting point of a phase of high creativity (Bledow et al., 2013; Curhan et al., 2021).

Whether creativity unfolds in response to negative mood depends on a person's ability to autonomously generate motivation and to initiate a decline in negative mood. We use the concept of self-motivation to refer to motivation a person generates to strive toward goals that are personally relevant (Kuhl & Fuhrmann, 1998). Self-motivation entails that a person activates the self and counter-regulates negative affect to generate adaptive responses (Quirin et al., 2011; Skimina et al., 2023). Self-motivation is an integrated form of motivation, in which people have a full sense that their behavior is an integral part of who they are that emanates from their sense of self (Ryan & Deci, 2000). Presumably, when negative mood is experienced, self-motivation

can instigate a decline in negative affect and eventually dissipate negative mood. By responding with self-motivation, a person dampens the focus on adverse experiences, takes ownership over the situation, and initiates progress towards goals. Self-motivation can be contrasted with self-protective and passive responses to negative affect, such as disengaging from a situation.

We expect high creativity in response to an episode of negative mood when people self-motivate and thus mobilize personal resources to move out of their negative affective state. While negative affect instills the readiness to generate novel responses, self-motivation initiates the search for novel responses by drawing from a person's knowledge and experience (Rotenberg, 2009). A peak in creativity will often not appear immediately when negative mood is experienced, but only after a period of latency or incubation after a reduction in negative mood has been achieved (Sio & Ormerod, 2009; To et al., 2012). When the activation of the self has dissolved negative mood, the associative memory networks that integrate a person's knowledge and experience become more and more accessible so that the person can perform remote associations and generate creative ideas as an adaptive response to the situation (Bledow et al., 2013; Kuhl, 2000). According to this reasoning, the critical creativity energizing factor hereby is not the initial state of negative mood but the personality dynamics of down-regulating negative affect that activate the self's associative memory and results in a phase in which creativity is broadly amplified. However, if a decline in negative mood is achieved without self-motivation, low creativity can be expected because a person fails to activate the self. This can be the case, for example, when a person ignores or defensively withdraws from a situation that evokes negative affect. Low creativity can also be expected when negative mood persists and inhibits remote associations and access to a person's integrated knowledge base (Baumann & Kuhl, 2002; Staw et al., 1981).

Hypothesis 1. Self-motivation moderates the relationship between negative mood and creativity such that a decline in negative mood is positively related to creativity if self-motivation is high.

The Moderating Role of Individual Differences in Action-State Orientation

To further specify the personality dynamics that turn positive and negative mood into creativity, we next take individual differences in the dynamics of action versus state orientation into account (Koole et al., 2005; Kuhl, 1994). A state orientation refers to the tendency to persistently focus on affective experiences, while an action orientation refers to the tendency to shift the focus away from affective experiences to gain action control (Diefendorff et al., 2000; Koole & Jostmann, 2004; Schlüter et al., 2018). Individuals differ in how strongly they lean toward action or state orientation on two dimensions called disengagement and initiative that concern the regulation of negative and positive affect, respectively (Baumann et al., 2007).

We first examine how the disengagement dimension of action-state orientation influences the link between negative mood and creativity. Action-oriented individuals (i.e. scoring high in disengagement) readily down-regulate negative affect and disengage from processing negative experiences such as failures and threats to focus on goal striving (Kazen et al., 2003; Kuhl, 1981). By contrast, the more individuals lean toward state orientation (i.e. scoring low in disengagement), the higher is the likelihood that they display persisting negative thoughts and emotions after negative experiences (Baumann & Kuhl, 2002; Gieselmann, Ophey, Jong-Meyer, & Pietrowsky, 2012). Our theoretical proposition that personality dynamics that initiate a decline in negative affect energize creativity suggests that action-oriented individuals more likely display creativity in response to an episode of negative mood than state-oriented individuals. Action-oriented individuals can efficiently counter-regulate negative affect, terminate the narrow focus

of attention on negative experiences, and activate the self's associative memory to initiate a creative response (Koole & Jostmann, 2004). By contrast, state-oriented individuals will more often remain focused on negative experiences and find it difficult to activate the self and generate creative responses (Bledow et al., 2022). We therefore predict that action-state orientation moderates the relationship between negative mood and creativity such that the relationship will be positive for action-oriented individuals.

Hypothesis 2. Action-state orientation (disengagement dimension) moderates the relationship between negative mood and creativity such that action-oriented individuals display a positive relationship between negative mood and creativity.

The initiative dimension of action-state orientation concerns individual differences in the regulation of positive affect to initiate intended actions. We argue that fluctuations in positive mood have a stronger effect on the creativity of state-oriented individuals (i.e., scoring low in initiative), who remain focuses on affective experiences than on the creativity of action-oriented individuals (i.e., scoring high in initiative), who readily shift to behavioral execution. When positive mood is low, a state orientation manifests in hesitation to enact intentions and can undermine creativity because self-access is inhibited and attention persistently focuses on experiences that inhibit positive affect (Diefendorff et al., 2000; Kazen et al., 2008; Wanberg et al., 2010). State-oriented individuals will then find it difficult to engage in the broad and flexible cognitive processes necessary for creativity. By contrast, when positive mood is high, we expect high creativity of state-oriented individuals. Actively focusing on and amplifiying experiences that give rise to positive mood such as positive feeback, personal acceptance, and imagined future states will activate the self and energize creativity (Baer et al., 2021; Chatterjee et al., 2013; Goschke & Kuhl, 1993).

In contrast to a state orientation, we expect that an action orientation reduces the influence of fluctuations in positive mood on a person's creativity. Action-oriented individuals can counter-regulate low positive mood by self-generating positive affect and thereby remain actionable (Jostmann & Gieselmann, 2014). They should therefore be capable of displaying creativity even when positive mood is reduced, for example when they are confronted with a difficult or boring task, for which no solution seems to be in reach. However, the creativity of action-oriented individuals may benefit less from high positive mood. Action-oriented individuals tend to shift attention away from affective experiences in favor of initiating actions. As creativity takes time and phases of incubation, focusing on action control rather than positive experiences that activate the self can undermine creativity (Rosing et al., 2018; Shin & Grant, 2021). In sum, we thus expect that the initiative dimension of action-state orientation moderates the relationship between positive mood and creativity.

Hypothesis 3. Action-state orientation (initiative dimension) moderates the positive relationship between positive mood and creativity such that the relationship is stronger for state-oriented individuals.

Method

We tested our theoretical model with an experience sampling study in a work setting. After responding to a general questionnaire that assessed demographic characteristics and the two dimensions of action-state orientation, participants reported their level of positive and negative mood in the morning, at noon, and in the late afternoon before they left their work over the course of one work week. At noon, participants indicated their level of self-motivation and in the late afternoon the extent to which they had generated new and useful ideas during the work day.

Participants

We recruited full-time employees from different organizations and professions in Belgium for an experience sampling study through e-mail invitations and social networks of graduate students (response rate: 65%). Of the 263 employees who participated, 210 responded to the general questionnaire and the daily questionnaires and could be included in the analyses. Participants' age ranged from 21 to 63 years (M = 37), 55 percent were women, 75 percent held a university degree, and 27 percent worked in a leadership position. Seventeen percent worked in organizations with less than 10 employees, 25 percent in organizations with less than 50 employees, 33 percent in organizations with 50 – 250 employees, and 25 percent in organizations with more than 250 employees.

Procedures

After answering a survey, which included the scales on action-state orientation and demographic questions, participants took part in an experience sampling study. Participants responded to three short surveys each day during a period of one work week after receiving e-mail invitations. We restricted the study period to one working week as participants had to answer three surveys on each day. Participants answered surveys in the morning when they started to work (*T1*), at noon before lunch (*T2*), and in the late afternoon before they left their work place (*T3*). In the morning (*T1*), at noon (*T2*), and in the late afternoon (*T3*) of each workday participants indicated their positive and negative affect. At T2 participants reported the extent to which they displayed self-motivation and at T3 they assessed the extent to which they had generated novel and useful work-related ideas during the day.

Measures

Positive and negative mood. Positive and negative mood were measured with the PANAS inventory, one of the most widely used scales to measure mood or emotion (Watson et al., 1988). Participants indicated how well seven negative (e.g., upset, hostile, scared) and seven positive (e.g., excited, strong, interested) adjectives described their affect state in a specific time interval (1 = *not at all*, 5 = *extremely*). In the morning, participants indicated how they felt this morning; at noon, they indicated how they had felt in the time interval between morning and noon; in the late afternoon, they referred to the time interval between noon and late afternoon (α ranging from .88 to .90).

Self-motivation. At noon (*T2*), we measured whether participants displayed self-motivation on a given day with six items of the Volitional Components Inventory (Kuhl & Fuhrmann, 1998). Example items are 'Today, I can focus on the positive aspects of my work' and 'Today, I can identify myself with what I'm doing'. Participants reported on a 5-point scale how well each item described their state on a given day (α = .82, *M* = 3.74, *SD* = .52).

Creativity. Participants assessed with five items at the end of each day (*T3*) to what extent they had been creative during the workday (Ohly & Fritz, 2010; Tierney et al., 2006). Example items are: 'I generated novel, but operable work-related ideas', 'I served as a good role model for creativity', and 'I demonstrated originality in my work' (α = .90, *M* = 2.87, *SD* = .76). Past research has established the validity of self-report measures of daily creativity and the convergence of findings between self-report measures of creativity, other ratings of creativity and creativity tests (e.g., Amabile et al., 2005; Bledow et al., 2013; Tadmor et al., 2012).

Action-State orientation. Action-state orientation was measured with twelve items for initiative (α = .70) and twelve items for disengagement (α = .71) (Kuhl, 1994). These scales operationalize action-state orientation at an experiential level and confront respondents with a set

of concrete events and ask them which of two response options applies to them. An example item for initiative is: “When I am getting ready to tackle a difficult problem: a) It feels like I am facing a big mountain that I don´t think I can climb (state orientation). b) I look for a way that the problem can be approached in a suitable manner (action orientation). An example for disengagement is: “If I’ve worked for weeks on one project and then everything goes completely wrong with the project: a) It takes me a long time to adjust myself to it (state orientation). b) It bothers me for a while, but then I don’t think about it anymore (action orientation). Response options reflecting a state orientation are coded with 0, while response options reflecting an action orientation are coded with 1 such that higher scores indicate a stronger action orientation.

Analytical Approach

We analyzed the data using hierarchical linear modeling (HLM 7.0) with repeated observations nested within persons (Raudenbush et al., 2011). For the test of Hypothesis 1 that involves change in negative mood as a predictor, we used growth-curve modeling. We estimated the intercept and slopes of how mood changed across the three daily measurement occasions and used these parameters and self-motivation as a moderator to predict creativity of a given day. To corroborate these analyses, we used a second approach and examined the moderating effect of self-motivation on the relationship between point estimates of negative mood at different measurement occasions and creativity. Hypotheses 2 and 3 involve person-level moderation of within-person relationships. Before testing these hypotheses, we centered repeatedly measured predictors around the mean of each person (Hofmann & Gavin, 1998). Resulting values thus reflect within-person deviations around the mean of a person (e.g., whether a person displayed higher or lower positive affect on a given workday as compared to other workdays).

Results

Descriptive statistics and intercorrelations of all study variables are displayed in Table 1. Table 2 presents results of growth-curve modeling, while Table 3 presents regression analyses with interactions between negative mood and self-motivation. Table 4 presents regression analyses including the person-level predictors disengagement and initiative and person-mean centered day-level predictors.

We first estimated parameters on change in mood (i.e. intercepts and slopes) that could subsequently be used as predictors of growth-curve modelling. To do so, we regressed the three daily measures of positive and negative mood on time in two separate models (time was coded '0' for *T1*, '1' for *T2* and '2' for *T3*). The intercepts and slopes of time in predicting positive and negative mood varied significantly across days ($p < .001$). Participants thus reported varying starting levels of positive and negative mood (intercepts) and different patterns of change during a day (slopes). The intercepts refer to the starting value of positive and negative mood in the morning of a day; the linear slopes refer to the overall rates of change in positive and negative mood across the three daily measurement occasions. The more positive the slope, the stronger was the increase in positive or negative mood; the more negative the slope, the stronger was the decrease in positive or negative mood over the course of the day. The quadratic slopes capture differences in the rates of change between the morning time interval (*T1* to *T2*) compared to the afternoon time interval (*T2* to *T3*).

Models 1-3 in Table 2 examine the relationship between positive and negative mood with creativity and provide the test of Hypothesis 1. Model 1 shows that the intercept and the linear slope of positive mood were positively related to creativity, while the intercept and slope of negative mood were not significant. Creativity was higher on days with high positive mood in the morning as compared to days with low positive mood in the morning. An increase from low

to high positive mood over the course of the day predicted creativity over and above the starting level of positive mood in the morning. According to Hypothesis 1, self-motivation moderates the relationship between change in negative mood and creativity. In Model 2 in Table 1, self-motivation was added as a moderator of the relationship between the intercept and slope of negative mood with creativity. Self-motivation was positively related to creativity ($p < .001$, $\Delta R^2 = .03$) and moderated the relationship between change in negative mood and creativity ($p < .01$, $\Delta R^2 = .02$). When self-motivation was high, change from high to low negative mood during a day was related to creativity. As Figure 1 shows for high self-motivation, creativity was higher the more a day was characterized by a negative rather than by a positive rate of change in negative mood, that is by a decline in negative mood. In Model 3, the quadratic slope for change in negative mood was significantly negative ($p = .02$, $\Delta R^2 = .01$). Creativity was higher, the more negative mood declined in the afternoon interval relative to the morning interval.

To corroborate the previous analyses, Table 3 provides a detailed account of the relationship between negative mood at different measurement occasions and creativity and the moderating role of self-motivation using multiple regression. Model 2 shows that self-motivation moderated the relationship between negative mood at T1 and creativity ($p = .03$, $\Delta R^2 = .01$). Figure 2 illustrates this moderation. Simple slope analyses showed that negative mood at *T1* was negatively related to creativity when self-motivation during the day was low (1 *SD* below the mean); negative mood at *T1* was positively related to creativity when self-motivation during the day was high (1 *SD* above the mean; $p < .05$). Model 3 in Table 3 presents the full model including negative mood at all measurement occasions. The four-way interaction term between self-motivation and negative affect at *T1*, *T2*, and *T3* was significant ($p = .02$, $\Delta R^2 = .02$). A graphical inspection of the four-way interaction showed that creativity was highest when self-

motivation was high and negative mood declined either in the morning time frame (between T1 and T2) or in the afternoon time frame (between T2 and T3). Creativity was lower when self-motivation was low, when no negative mood was reported throughout a day, or when negative mood persisted until T3. In sum, these analyses corroborate results of growth-curve modeling and support the prediction that participants displayed high creativity when negative mood was experienced and subsequently declined while self-motivation was high.

To test Hypotheses 2 and 3, we turn to Table 4 that includes the disengagement and initiative dimensions of action-state orientation as person-level moderators of within-person relationships. Hypothesis 2 predicted that action-state orientation (disengagement dimension) moderates the relationship between negative mood and subsequent creativity. We tested this hypothesis with the T2 measurement of negative mood because it captured participants' affective state during the working hours between morning and noon and was measured prior to and independent of the dependent variable creativity at T3 (more detailed analyses are provided below). In support of Hypothesis 2, action-state orientation moderated the lagged within-person relationship between negative mood at T2 with creativity at T3 in Model 2 ($p = .046$, $\Delta R^2 = .01$). Simple slope analysis (see Figure 3) showed that negative mood in the morning time frame was positively related to creativity for action-oriented participants ($p < .01$). For state-oriented participants, the relationship between negative mood in the morning time frame and creativity was not significant.

To test Hypothesis 3, we examined whether action-state orientation (initiative dimension) moderated relationship between positive mood and creativity (Model 3 in Table 4). As with the previous hypothesis, we used the T2 measurement of mood because it captured participants' affective state during the working hours between morning and noon and was measured before the

dependent variable creativity. Action-state orientation moderated the relationship between positive mood at T2 and creativity ($p = .004$, $\Delta R^2 = .01$). Figure 4 shows that the within-person relationship between positive mood and creativity was stronger for state-oriented participants. Simple slope analysis confirmed that the relationship was significantly positive for state-oriented participants and insignificant for action-oriented participants. The creativity of state-oriented participants was thus more strongly influenced by whether they were in a positive mood during the work day.

Additional Analyses

We performed additional analyses to examine in more detail how action-state orientation (disengagement dimension) influenced the relationship between negative mood and creativity. We first ran another test of Hypotheses 2 that included the T1 and the T2 measurement of negative mood. There was a significant three-way interaction between action-state orientation and negative mood at T1 and T2 (Model 4 in Table 4; $p = .016$, $\Delta R^2 = .01$). A descriptive inspection of this interaction showed that action-oriented participants displayed higher creativity when negative mood was present at T1 and T2 than only at T1 or T2.

As action-state orientation and self-motivation moderate the relationship between negative mood and creativity, we next explored whether the effect of these moderators was interdependent. To do so, we added the interaction between action-state orientation and self-motivation with negative mood in Model 5 (to reduce complexity, we included the T3 measurement of negative mood only as a control variable). Action-state orientation moderated the effect of self-motivation on the relationship between negative mood and creativity ($p < .01$, $\Delta R^2 = .02$), which suggests that the effect of both moderators is interdependent. A descriptive inspection of this effect showed that for state-oriented participants, the within-person relationship

between negative mood and creativity was positive only when self-motivation was high. For action-oriented participants, the consistent factor influencing the creativity was whether negative mood was experienced in the morning time interval. These exploratory results suggest that self-motivation was a more important factor for creativity in response to negative mood for state-oriented participants. Action-oriented participants appear to respond with creativity to negative mood even when self-motivation is low.

Discussion

An experience-sampling study supported the idea that personality dynamics moderate the relationship between mood and creativity. The within-person relationship between negative mood and creativity was moderated by self-motivation. When participants responded with self-motivation to negative mood and overcame a state of negative mood, high creativity could be observed. High creativity in response to negative mood was more consistently displayed by action-oriented participants who can disengage from focusing on negative experiences. Positive mood had an overall positive relationship with creativity and this relationship was moderated by action-state orientation. State-oriented participants, who remain focused on affective experiences, displayed particularly high creativity when in a positive mood and particularly low creativity when positive mood was low.

In line with past research, our study showed that both positive and negative mood can become starting points of creativity. Instead of conceptualizing creativity as a stimulus-driven response to affective states, however, we showed that creativity depends on personality dynamics that unfold in response to affective states. Consistent with our theoretical propositions, the personality dynamics that turn positive affect into creativity were stability-oriented insofar as the state-oriented tendency to remain focused on affective experiences amplified creativity when

positive mood was high. The personality dynamics that turned negative affect into creativity were change-oriented in so far as the constructive down-regulation of negative affect paved the way for high creativity. Arguably, the personality dynamics that achieve creativity by generating and maintaining positive affect are the more salient driver of creativity. The personality dynamics that unfold in response to negative affect may be less salient due to a period of latency between the experience of negative affect and subsequent creativity. However, these personality dynamics likely play an equally important function for human adaptation and development.

Regarding this function, the findings of our study resonate with the principle "Assimilate if you can; accommodate if you must!" (Block, 1982; p. 286). When positive affect is high, a person generates new cognitive schemata based on available cognitive schemata to engage with and to assimilate the context. Cognitive schemata tend to 'feed' themselves and incorporate compatible outside elements to achieve continuity (Piaget, 1977). The function of creativity is then primarily assimilative in so far as cognitive schemata are creatively used to move toward goals and to integrate the context. By contrast, when a person engages in creativity by down-regulating negative affect, creativity presumably has an additional, accommodative function (Kuhl et al., 2021). Creativity is then a means to respond to and to accommodate to the experience of negative affect. Creativity can serve this accommodative function in a variety of ways and the target of change may vary. For example, a person may generate new ideas directed at changing elements of the context that conflict with goals and are a source of negative affect (Zhou & George, 2001). The focus of change can also be internal, for example, when a person generates a new strategy on how to reach a goal after repeated attempts have failed or when a person searches for creative solutions to adapt to the context (Bledow et al., 2022). An important

avenue for future research is to unpack how different personality dynamics that unfold after the experience of negative affect relate to various forms of creative self-expression.

With respect to individual differences in how people regulate positive and negative affect, our study suggests that an action orientation is a mixed blessing for creativity. The tendency of action-oriented individuals to terminate processing of affective experiences and to self-generate positive affect to gain action control enables them to be creative even when positive affect is reduced or negative affect is experienced. However, an action orientation holds the risk that people insufficiently focus on affective experiences and use positive affect to quickly move from intention to action rather than taking the time needed for creativity. Our study showed that action-oriented participants responded with creativity to negative mood, however, they displayed very low levels of negative mood. Presumably, action-oriented individuals often filter out negative experiences before negative affect is sufficiently strong to evoke a creative response (Bledow et al., 2022; Herrmann et al., 2014). Moreover, as compared to state-oriented participants, the creativity of action-oriented participants benefited less from positive mood. The action-oriented tendency to terminate processing of affective experiences to focus on behavioral execution may thus limit the extent to which people make use of the creative potential of positive affective experiences (Shin & Grant, 2021).

Limitations and Future Research

A strength of our empirical study is that it embraced the complexity of simultaneously looking at positive and negative affect as well as the personality dynamics that link affect to creativity in a real-world setting. The study directly measured changes in mood and temporarily separated assumed causes and consequences. However, due to its non-experimental design, it cannot rule out alternative causal explanations. Indeed, reciprocal causal effects, for instance,

affective reactions to arising new ideas, are to be expected. Future studies are needed to isolate and examine these processes in more detail and under more controlled conditions. Moreover, the variables we studied empirically provide only a glimpse of the personality dynamics that presumably turn affective experiences into creativity and the pattern of findings we report requires extension and conceptual replication.

A second limitation concerns the study's reliance on self-report. The focal outcome variable was the extent to which employees perceived that they engaged in creativity on a given day. Past research suggests that self-report measures of creativity are valid and correlate with observer ratings of creativity (e.g., Ivcevic et al., 2007; Moneta et al., 2010). Moreover, observer ratings of creativity and creativity tests measure a narrower construct. Such measures capture observable expressions of creativity only, while self-reports are based on more information about the degree to which a person has generated new ideas in a given time-frame (Shalley et al., 2009). Self-report measures may, however, prevent strong inferences about individual differences in creativity. People differ in their standards regarding what constitutes high creativity, and some people may tend to see their creativity in a more positive light than others.

Third, our study abstracted from the specific events that influenced positive and negative affect as well as the content of creative ideas. This is a limitation insofar that we did not examine the specific problems and goals creativity served. Future research is needed that examines how the personality dynamics we examined influence the pursuit of specific goals and whether different ideas emerge depending on the involved personality dynamics. For example, change-oriented personality dynamics that unfold after negative affect may be particularly important for the emergence of radically new ideas that strongly depart from the status-quo and require the reconfiguration of cognitive schemata (Madjar et al., 2011). By contrast, stability-oriented

personality dynamics that maintain positive affect and further develop existing structures may be more prone to yield incremental ideas that build on existing structures and integrate what is encountered in the social context.

Conclusion

Creativity is a key factor for human adaptation and development in complex and dynamic environments that can unfold in response to the experience of positive and negative affect. This study contributes to the literature by theoretically specifying and empirically demonstrating personality dynamics that turn positive and negative mood into creativity. Personality dynamics that instigate a reduction in negative affect and personality dynamics that generate and maintain positive affect energize creativity.

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Table 1

Means, standard deviations, and correlations between study variables

Variable	*M*	*SD*	*ICC* [a]	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Creativity (T3)	2.87	.76	.62									
2. Self-Motivation (T2)	3.74	.52	.50	.25**								
3. Negative Mood (T1)	1.19	.42	.44	-.07*	-.13**							
4. Negative Mood (T2)	1.18	.39	.49	-.03	-.27**	.59**						
5. Negative Mood (T3)	1.17	.38	.51	-.05	-.20**	.58**	.67**					
6. Positive Mood (T1)	3.34	.77	.40	.26**	.36**	-.21	-.15**	-.14**				
7. Positive Mood (T2)	3.49	.71	.43	.34**	.47**	-.14**	-.20**	-.16**	.64**			
8. Positive Mood (T3)	3.44	.72	.45	.34**	.34**	-.05	-.14**	-.24**	.53**	.66**		
9. Disengagement	0.51	.25	-	.14*	.13	-.16*	-.15*	-.15*	.16*	.13	.14*	
10. Initiative	0.73	.23	-	.03	.20**	-.21**	-.19**	-.22**	.25**	.24**	.28**	.22**

Note. N = 757 for repeatedly measured variables. [a] Indicates the amount of between-person variance. Repeatedly measured variables were aggregated to the person level (N = 210) to compute correlations with disengagement and initiative. Higher (lower) values in disengagement and initiative indicate an action (state) orientation.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Growth-curve modelling approach with creativity as the dependent variable

	Model 1	*Model 2*	*Model 3*
Intercept	2.88 (0.04) ***	2.88 (0.04) ***	2.88 (0.04) ***
Positive Mood (Intercept)	0.39 (0.05) ***	0.33 (0.05) ***	0.33 (0.05) ***
Change in Positive Mood (Linear Slope)	0.50 (0.10) ***	0.42 (0.10) ***	0.43 (0.09) ***
Negative Mood (Intercept)	-0.04 (0.09)	-0.12 (0.11)	-0.03 (0.10)
Change in Negative Mood (Linear Slope)	-0.90 (0.47)	-1.11 (0.49)*	-0.61 (0.28)*
Self-Motivation		0.44 (0.17)*	0.20 (0.05) ***
Self-Motivation× Negative Mood (Intercept)		-0.24 (0.14)	-0.04 (0.13)
Self-Motivation× Change in Negative Mood (Linear Slope)		-2.45 (0.80)**	-0.45 (0.13) ***
Change in Negative Mood (Quadratic Slope)			-1.64 (0.71) *
-2 × Log Likelihood	1324.023	1295.710	1290.829
Δ-2 × Log Likelihood (*df*)	81.015 (4) ***	24.834 (3) ***	4.880 (1) *
Level 1 Intercept Variance (*SE*)	.1947 (.0117)	.1849 (.0111)	.1830 (.0110)
Level 2 Intercept Variance (*SE*)	.2950 (.0343)	.2984 (.0343)	.3000 (.0344)
Pseudo R^2 (Level 1 Variance)	.05	.11	.12

* $p < .05$. ** $p < .05$. *** $p < .001$. Note. Creativity is the outcome variable of all models. Values are unstandardized parameter estimates for regression weights (standard errors in parenthesis). Nullmodel: Level 1 Intercept Variance (*SE*): .2079 (.0124), Level 2 Intercept Variance (*SE*): .3579 (.0406)

Table 3

Within-person relationships between mood, self-motivation and creativity

	Model 1	*Model 2*	*Model 3*
Intercept	2.86 (0.04)**	2.86 (0.04)**	2.86 (0.05)**
P@T1 (Positive Mood at Time 1)	-0.01 (0.04)	0.00 (0.04)	0.00 (0.04)
N@T1 (Negative Mood at Time 1)	0.02 (0.06)	0.01 (0.06)	-0.06 (0.09)
P@T2	0.12 (0.05)**	0.06 (0.05)	0.07 (0.05)
N@T2	0.13 (0.08)	0.19 (0.08)*	0.48 (0.15)**
P@T3	0.20 (0.04)**	0.21 (0.04)**	0.20 (0.04)**
N@T3	-0.15 (0.07)*	-0.11 (0.07)	-0.17 (0.11)
Self-Motivation		0.15 (0.05)**	0.13 (0.05)**
Self-Motivation × N@T1		0.20 (0.09)*	0.68 (0.22)**
Self-Motivation × N@T2			0.00 (0.15)
Self-Motivation × N@T3			0.42 (0.23)
N@T1 × N@T2			-0.26 (0.14)
N@T1 × N@T3			0.18 (0.12)
N@T2 × N@T3			-0.53 (0.21)*
Self-Motivation × N@T1 × N@T2			-0.26 (0.24)
Self-Motivation × N@T1 × N@T3			-0.68 (0.36)
Self-Motivation × N@T2 × N@T3			-0.85 (0.34)*
N@T1 × N@T2 × N@T3			0.23 (0.14)
Self-Motivation × N@T1 × N@T2 × N@T3			0.62 (0.27)*
Pseudo R^2	.12	.16	.20

* $p < .05$. ** $p < .01$. Note. Creativity is the outcome variable of all models. '@' is used to indicate if a predictor was measured in the morning (*T1*), at noon (*T2*), or in the late afternoon (*T3*). Values are unstandardized parameter estimates for regression weights (standard errors in parentheses).

Table 4

Moderating effects of person-level predictors on within-person relationships between mood and creativity

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Intercept	2.86 (0.05)**	2.86 (0.05)**	2.86 (0.04)**	2.87 (0.05)**	2.86 (0.05)**
P@T1 (Positive Mood at T1)	0.00 (0.05)	0.00 (0.04)	0.00 (0.05)	0.01 (0.05)	0.03 (0.04)
N@T1 (Negative Mood at T1)	0.06 (0.07)	0.06 (0.07)	0.06 (0.07)	0.09 (0.06)	0.13 (0.07)*
P@T2	0.06 (0.05)	0.06 (0.05)	0.06 (0.05)	0.06 (0.05)	-0.01 (0.05)
N@T2	0.12 (0.10)	0.19 (0.10)	0.18 (0.10)	0.17 (0.11)	0.16 (0.09)
P@T3	0.18 (0.05)**	0.18 (0.05)*	0.18 (0.05)*	0.18 (0.05)**	0.19 (0.04)**
N@T3	-0.21 (0.10)*	-0.22 (0.10)*	-0.20 (0.09)*	-0.24 (0.09)**	-0.23 (0.08)**
Disengagement		0.40 (0.16)*	0.42 (0.16)*	0.38 (0.17)*	0.39 (0.19)*
Disengagement × N@T2		0.51 (0.25)*	0.47 (0.25)	0.38 (0.29)	0.39 (0.30)
Initiative			-0.19 (0.19)	-0.13 (0.19)	-0.11 (0.21)
Initiative × P@T2			-0.54 (0.19)**	-0.56 (0.18)**	-0.57 (0.18)**
Disengagement × N@T1				0.11 (0.15)	0.05 (0.19)
N@T1 × N@T2				-0.04 (0.17)	0.02 (0.17)
Disengagement × N@T1 × N@T2				1.29 (0.48)**	1.55 (0.53)**
Self-Motivation					0.17 (0.06)**
Disengagement × Self-Motivation					-0.10 (0.22)
Self-motivation × N@T1					0.05 (0.27)
Self-motivation × N@T2					-0.15 (0.27)
Self-motivation × N@T1 × N@T2					1.04 (0.60)
Disengagement × Self-Motivation × N@T1					-1.49 (1.05)
Disengagement × Self-Motivation × N@T2					0.27 (1.01)
Disengagement × Self-Motivation × N@T1 × N@T2					5.78 (2.14)**
Pseudo R^2	.12	.13	.14	.15	.20

* $p < .05$. ** $p < .01$. Note. Values are unstandardized parameter estimates for regression weights (standard errors in parentheses). Creativity is the outcome variable

Figure 1

Self-motivation moderates the relationship between change in negative mood over the course of a day and creativity

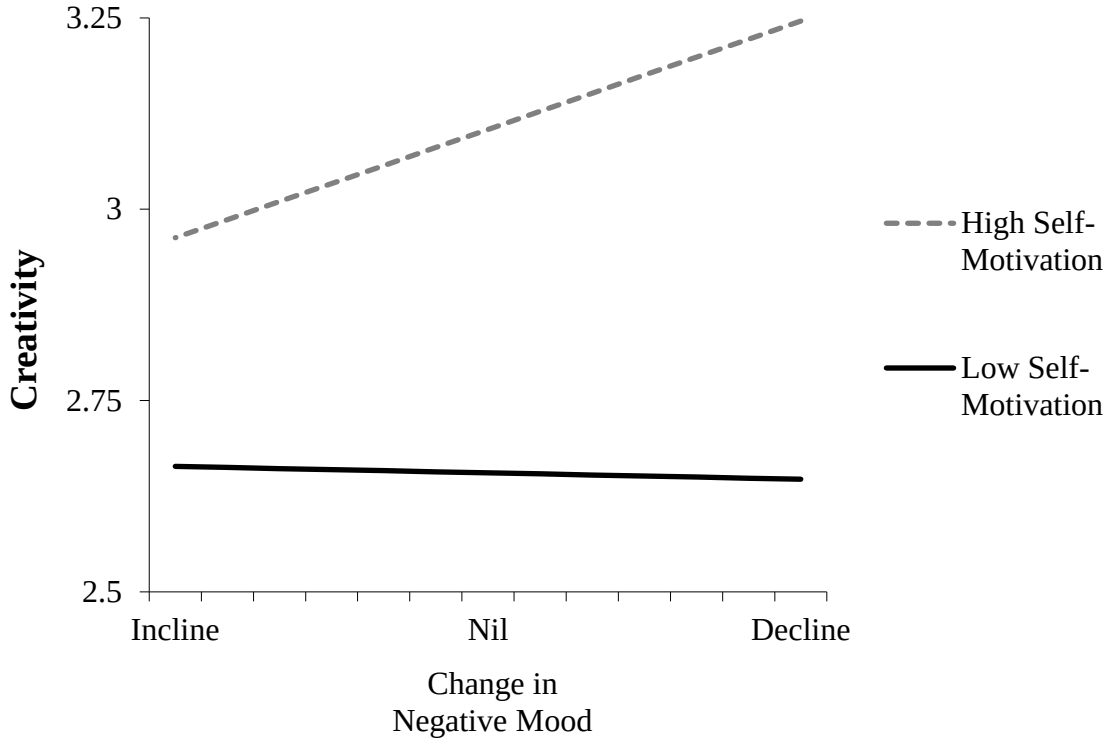

Figure 2

Self-motivation moderates the relationship between negative mood and creativity

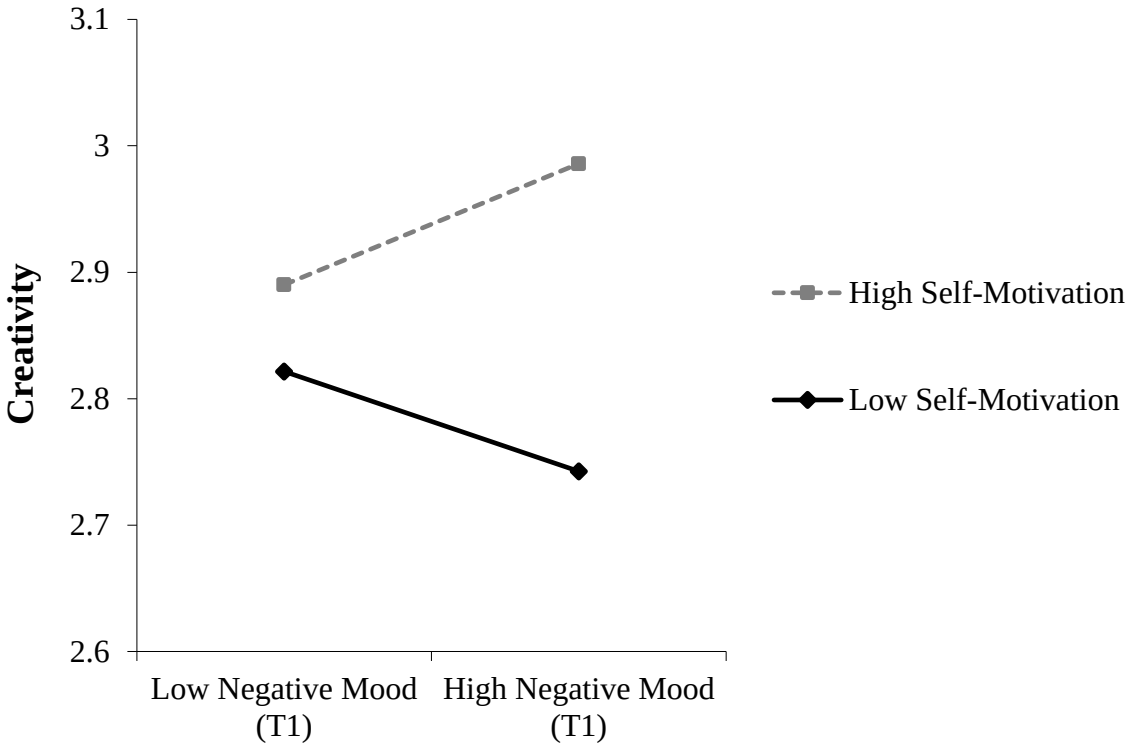

Figure 3

Action-State Orientation (disengagement dimension) moderates the relationship between negative mood and creativity

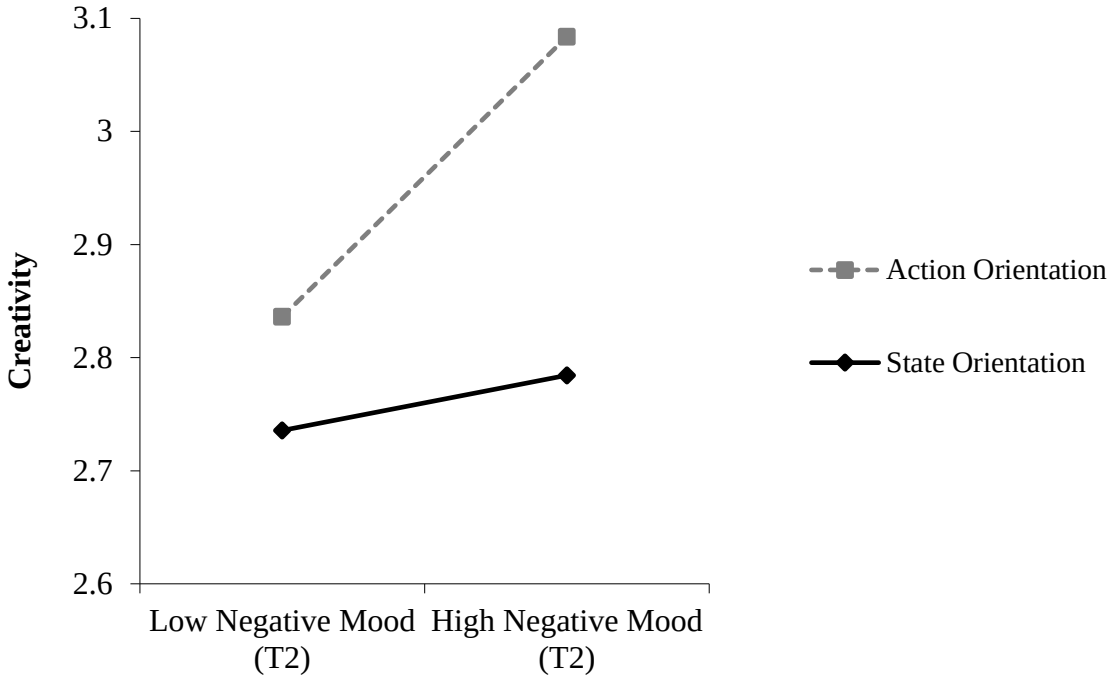

Figure 4

Action-State Orientation (initiative dimension) moderates the relationship between positive mood and creativity