

# The Crossover of Positive and Negative Emotions: The Role of State Empathy

Mina Westman, Efrat Shadach, and Giora Keinan

Tel Aviv University

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*Our aims were (a) to provide empirical support for the crossover process and compare positive and negative crossover intensity, and (b) to establish the role of state empathy in the crossover process. Participants were 62 army trainees participating in a training course in the Israeli Defense Forces (IDF). We manipulated crossover by presenting a distressed or a happy target person creating negative (distressed target person) and positive (happy target person) conditions. Participants' affect was assessed using self-report questionnaires and cognitive tasks. Results support the operation of positive and negative crossover from a target person to the trainees. Findings indicate a relative dominance of positive over negative crossover. The hypothesis that emotions cross over as a result of empathy was partially supported. We found that the condition (positive-happy or negative-distressed target person) had a stronger impact among respondents characterized by high state empathy only for positive emotions.*

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**Keywords:** crossover, positive and negative emotions, state empathy

Crossover has been traditionally defined as the process through which psychological stress or strain experienced by one individual affects the level of stress or strain of another individual in the same social environment (Bolger, DeLongis, Kessler, & Schilling, 1989). Most crossover studies conducted in the past decade have shown that strain caused by a broad range of negative experiences, including anxiety (Westman, Etzion & Horovitz, 2004), depression (Katz, Beach, & Joiner, 1999; Vinokur, Price, & Caplan, 1996; Westman & Vinokur, 1998), perceived ill health (Westman, Keinan, Roziner, & Binyamini, 2008), and job burnout (Bakker, Demerouti, &

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Mina Westman, Faculty of Management, Tel Aviv University, Tel Aviv, Israel; Efrat Shadach and Giora Keinan, Department of Psychology, Tel Aviv University.

All authors contributed equally.

Correspondence concerning this article should be addressed to Mina Westman, Faculty of Management, Tel Aviv University, Haim Levanon St., Tel Aviv, Israel 69978. E-mail: [westman@post.tau.ac.il](mailto:westman@post.tau.ac.il)

Schaufeli, 2005; Bakker & Schaufeli, 2000; Westman & Etzion, 1995) may cross over from one partner to another.

A related stream of research focuses on emotional contagion, a process whereby an individual's emotional state is effectively "caught" by another person. This phenomenon is thought to occur at an unconscious level, whereby people automatically and unintentionally mimic the facial expression, posture, voice intonation, or movements of those with whom they interact, causing emotional assimilation to occur (Hatfield, Cacioppo, & Rapson, 1994). Research has shown that, in conversations, people "automatically" mimic the facial expressions, voices, postures, and behaviors of others (Bernieri, Reznick, & Rosenthal, 1988), and that people's conscious experience may be shaped by such facial feedback (e.g., Laird, 1984). The most important difference between crossover and emotional contagion is that crossover has been framed as a conscious process in which an empathic attitude of partners (or other closely related people) facilitates the transference of emotions. Contagion is conceptualized as an unconscious process of imitation that results in similar emotions in two individuals.

Initially, crossover research focused on the work–family interface, examining the crossover of stress and strain between spouses and cohabiting partners (for review, see Bakker, Westman, & van Emmerik, 2009). Westman (2001) suggested extending the scope of crossover research to include work settings, thus extending the traditional unit of analysis of the couple to include individuals in work teams. Westman and Etzion (1999) found crossover of job-induced strain from school principals to teachers and vice versa. Similarly, evidence for crossover of burnout was found among various team members such as nurses (Bakker, Demerouti, et al., 2005), general practitioners (Bakker, Schaufeli, Sixma, & Bosveld, 2001), teachers (Bakker & Schaufeli, 2000), army officers (Bakker, Westman, & Schaufeli, 2007), call-center employees (Westman, Bakker, Roziner, & Sonnentag, 2011), and constabulary officers (Bakker, van Emmerik, & Euwema, 2006).

In the current field experiment, we focused on crossover from a target person to multiple respondents in a group.

## CROSSOVER OF POSITIVE EMOTIONS

In her review of crossover of stressors and strain, Westman (2001) suggested extending the traditional definition of crossover to include crossover of positive feelings. According to Westman, just as stressful job demands have a negative impact on one's partner's well-being, positive feelings following positive job events may also cross over to one's partner and have a positive effect on his or her well-being. This proposition to investigate the

crossover of positive emotions is also in line with the growing interest in positive psychology (e.g., Seligman & Csikszentmihalyi, 2000).

The suggestion to extend crossover research to positive crossover is also consistent with Fredrickson's (2001) broaden-and-build theory, which postulates that positive emotions broaden individuals' thought-action repertoires, prompting them to pursue a wider range of thoughts and actions than they typically use. In the interpersonal context, the broaden-and-build theory predicts that positive emotions broaden people's sense of self to include others, and enhance individuals' identification with others, thus producing greater feelings of self-other overlap and "oneness" (Vaugh & Fredrickson, 2006). Such feeling may lead to positive crossover.

Several studies have demonstrated positive crossover (e.g., Bakker, 2005; Bakker, LeBlanc, & Schaufeli, 2005; Demerouti, Bakker, & Schaufeli, 2005; Westman, Etzion, & Chen, 2009). Demerouti et al. (2005) found a direct crossover of life satisfaction between partners. In particular, men's life satisfaction crossed over to their partner's life satisfaction. Bakker, LeBlanc, et al. (2005) provided evidence for crossover of engagement (vigor and dedication) among partners. The relationships were about equally strong for both partners. In their study of dual-earner couples, Bakker and Demerouti (2009) found evidence of crossover of work engagement. The crossover of work engagement was stronger when husbands were high (vs. low) in perspective-taking. Similar results were obtained by Bakker, Shimazu, Demerouti, Shimada, and Kawamaki (2011) in a Japanese sample. Westman et al. (2009), studying business travelers and their spouses, found that travelers' vigor crossed over to their spouses. These studies, all cross-sectional in nature and based on self-report measures, offer preliminary support for crossover of positive experiences.

One aim of the present research was to compare the crossover of negative and positive emotions, and explore which process prevails over the other—the crossover of negative emotions, such as stress and conflict, or the crossover of positive emotions, such as happiness and joy. This question has never been examined before, to the best of our knowledge, despite its important theoretical and practical implications. Although crossover literature sheds little light on this issue, two recent reviews comparing the effects of negative and positive events and processes can be used to develop specific hypotheses.

In a comprehensive review of the impact of positivity and negativity, Baumeister, Bratslavsky, Finkenauer, and Vohs (2001) concluded that negative events have stronger, longer-lasting consequences than positive events. Specifically, interpersonal relationships are more strongly affected by negative communications and actions than by their positive counterparts. Rozin and Royzman (2001) reached a similar conclusion based on their literature review on interactions between "good" and "bad" factors. They found that

“good” and “bad” factors compete directly against each other in a single situation, as a result of a “negativity bias,” which is a general bias to give greater weight to negative entities.

The sound conclusions of both reviews offer a foundation for the hypothesis that negative emotions cross over more readily than positive emotions. However, not all phenomena are subject to the negativity bias. [Baumeister et al. \(2001\)](#) pointed to several exceptions to the general principle that negative events prevail over positive ones, such as “the Pollyanna hypothesis,” a bias in thought toward more positive ideas and conclusions or memory, and recall bias, which is a tendency to remember pleasant events more strongly than nonpleasant events. Furthermore, it has been suggested that positive emotions produce a feeling of “oneness” with others, diminishing actor–observer perspective differences and blurring the line between self and others ([Aron, Aron, Tudor, & Nelson, 1991](#); [Waugh & Fredrickson, 2006](#)). We suggest that when the line between self and other becomes blurred, crossover is more likely to take place. Therefore, the crossover process may be yet another exception to the negative bias model. If positive emotions enhance interpersonal oneness, they may be more susceptible to crossover than negative emotions. Following this rationale, the crossover of positive emotions was hypothesized to be more dominant than the crossover of negative emotions.

## THE ROLE OF STATE EMPATHY IN THE CROSSOVER PROCESS

[Westman and Vinokur \(1998\)](#) suggested three main nonmutually exhaustive underlying processes of crossover: direct crossover via empathy, indirect crossover via interaction style (e.g., undermining), and spurious crossover effect due to common stressors. The suggested path of direct crossover via empathy supports sharing of both positive and negative emotions. Thus, if the crossover process operates via empathy, one would expect to find crossover of not only negative experiences but also positive experiences.

It is generally assumed that the emotions expressed by one partner elicit an empathic reaction in the other partner. [Starcevic and Piontek \(1997\)](#) define empathy as interpersonal communication that is predominantly emotional in nature and involves the ability to be affected by the other’s affective state, as well as to be able to read in oneself what that affect has been. Social learning theorists (e.g., [Bandura, 1969](#); [Stotland, 1969](#)) support this view and have explained the transmission of emotions as a conscious processing of information. They suggest that individuals imagine how they would feel in the other’s situation and thus come to experience and share the other’s feelings. Acting together, the cognitive and emotional aspects of empathy produce

what was described by Lazarus (1991) as “sharing another’s feelings by placing oneself psychologically in that person’s circumstances” (p. 287). Empathy thus involves a sharing of another person’s emotional state. Consequently, strain in one partner produces an empathic reaction in the other that increases the other partner’s strain, producing crossover. Eckenrode and Gore (1981) proposed the involvement of empathy in the crossover process, suggesting that the effect of one’s stress on the spouse’s distress might be the result of empathy. Westman and Vinokur (1998) also argued that stressors and strain are transmitted from one partner to another directly as a result of empathetic reactions. The empathy explanation can also be applied to positive emotions: The empathy of one partner toward the other may result in the former sharing the latter’s happiness and satisfaction.

Scholars distinguish between trait and state empathy (Davis, 1994; Nezlek, Feist, Wilson, & Plesko, 2001). Trait empathy is defined as a type of cross-situational ability or potential to experience the emotions of others. State empathy is defined as the extent to which people experience emotions of others at specific points in time.

The distinction between state and trait empathy has been discussed with regard to both the emotional and cognitive aspects of empathy, namely, empathic concern and perspective-taking (Davis, 1994). Trait empathy relates to personality constructs, such as emotional arousability (Mehrabian, 1995), trait anxiety (Eysenck, 1990), and altruism (Batson, Ahmad, Lishner, & Tsang, 2002). State empathy has been studied mainly for its involvement in social processes, such as helping others in need (e.g., Batson & Coke, 1981) and attribution (e.g., Jones & Nisbett, 1972). As state empathy has been studied mainly with social processes and attribution, we focus on state empathy in the current research.

The main aims of this study are (a) to experimentally support the crossover process and compare the intensity of positive and negative crossover, and (b) to explore the role of state empathy in the crossover process, an issue which has rarely been systematically investigated to date. In the present study, the role of state empathy was examined under the assumption that individuals high in state empathy are more susceptible to both negative and positive crossover effects. Based on the literature review, the following two hypotheses emerged:

1. Negative and positive emotions cross over from a target individual to members of a group. Positive emotions cross over more readily than negative emotions.
2. The crossover process is moderated by state empathy. Crossover of both negative and positive emotions will be stronger to individuals who are characterized by a higher degree of state empathy compared with individuals characterized by low levels of state empathy.

## METHOD

### Participants

Participants were 62 female army trainees in the Israeli Defense Forces (IDF), participating in a 10-week in-service human resources course for noncommissioned officers (NCOs), typically females, designed to prepare them for interviewing soldiers, mostly males, on personal and family problems related to their military service. The NCOs' work involves interviewing soldiers, making home visits, and identifying and finding solutions to soldiers' personal problems by obtaining approval for special service conditions. These trained NCOs are responsible for ensuring that the soldiers are given conditions and benefits that will enable them to perform effectively, taking their personal circumstances into consideration. Such service benefits include financial aid, social assistance, family leave, and change of placement. After completing their training, the trainees also counsel the officers in their respective units regarding decision making that involves the soldiers in the unit. All participants were high school graduates, ranging in age from 18 to 19 years.

### Procedure

We started our experiment after obtaining approval from the university ethics committee. We experimentally manipulated crossover by presenting a distressed or a happy target person to participants, creating two affective conditions (negative and positive). Participants' affect following exposure to the target was assessed using self-report questionnaires and two cognitive tasks: a creativity task and a recall task. Crossover was suggested by a match between the affective condition and the participants' affect, as follows: (a) more positive and less negative emotions reported by participants in the positive condition, and more negative and less positive emotions reported by participants in the negative condition; (b) high levels of creativity and recall in the positive condition, and low levels of creativity and recall in the negative condition, based on Fredrickson's (2001) broaden-and-build theory, which postulates that positive emotions broaden individuals' thought-action repertoires; and (c) recall of more positive contents in the positive condition and more negative contents in the negative condition.

Participants were randomly assigned to one of two equally sized groups. Each group was seated in a separate classroom, accompanied by one of the course trainers and a research assistant, both blind to the research hypotheses.

The trainer explained that the group would meet a soldier who had volunteered to tell them about his personal background and his military service. In effect, the volunteer soldier was an actor carefully trained by the researchers to portray one of two characters: a happy soldier, expressing positive emotions, or a distressed soldier, expressing negative emotions. The actor then entered the room and portrayed a distressed or happy character in a monologue that lasted for approximately 8 min.

The research assistant then asked the participants (a) to complete a self-report questionnaire assessing their current emotional state, (b) to perform a simple test of creative thinking, and (c) to perform a short task requiring the selection and recall of emotion words. These tasks were presented in counterbalanced order. Finally, participants were asked to indicate their perception of the target's emotions, which served as a manipulation-check measure. Upon completion of the experiment, participants were debriefed.

## Materials and Measures

### *Stories*

Two male actors were recruited for the study and were given specific scripts for each of the two characters (happy, distressed), and instructed to portray the relevant emotions. Scripts were carefully developed by the researchers, based on information given to them by the course's senior staff concerning the nature of the soldiers usually interviewed throughout the course. The two characters described in the scripts were identical in terms of their demographic characteristics, family background, and military service, but differed in their affect. The distressed character had recently suffered a stress-inducing event (mother's illness that caused painful personal and familial consequences), and the actor was instructed to openly express stress, anxiety, and despair. The happy character had recently experienced a pleasant event (an improvement in his financial situation), and the actor was instructed to openly express optimism, joy, and satisfaction with his current circumstances. Three judges, blind to the research hypotheses, rated each character script using a questionnaire designed and validated for the present study's purpose on the following emotions: anxiety, stress, worry, sadness, optimism, comfort, satisfaction, and happiness. The internal consistencies between judges were high for the negative and positive scripts (.98).

### *State Empathy*

Participants used a 5-point scale (Batson, Lishner, Cook, & Sawyer, 2005) to rate their experience of empathy, identification, closeness, and emotional involvement toward the soldier who told them his story. These four items formed the State Empathy Scale and yielded a Cronbach's alpha internal consistency coefficient of .94.

### *Self-Reported Affect*

Participants' affect was assessed by a questionnaire designed and validated for the present study's purposes. The 8-item questionnaire comprised four items describing negative emotions (*stress, worry, anxiety, and sadness*) and four describing positive emotions (*optimism, happiness, satisfaction, comfort*). Participants were asked to rate the extent to which they currently experienced each emotion on a 5-point scale. Cronbach's alpha was .83 for negative emotions and .84 for positive emotions.

### *Creativity*

The creativity task was adapted from the *Torrance Tests of Creative Thinking* (Torrance & Ball, 1984), a widely used instrument (Shalley, Zhou, & Oldham, 2004). Participants were asked to list as many uses as they could think of for an ordinary object (a cardboard box). A trained scorer assessed respondents' answers for fluency (the number of responses), originality (the uniqueness of each response), and flexibility (the diversity of responses).

### *Choice and Recall of Emotion Words*

Participants were presented with a list of 21 emotion words that were positive (e.g., *happy*), negative (e.g., *sad*), or neutral (e.g., *diary*), taken from previously rated lists of emotion and neutral words (Rusting, 1999). Participants were asked to review all the words carefully and then compose a sentence using three words from the list (e.g., "The stories I write in my *diary* are sometimes *happy* and sometimes *sad*"). The word list was then removed from view, and participants were asked to recall as many words as they were able. Participants were rated for (a) the number of negative, positive, and neutral words selected to compose the sentence; (b) the number of negative, positive, and neutral words recalled; and (c) the total number of words recalled.

## RESULTS

### Manipulation Check

A MANOVA, using the affective condition (negative, positive) as the independent variable and the manipulation check measures as the dependent variables, showed that the manipulation was highly effective: Participants in the negative condition perceived the target as expressing more negative and less positive emotions, whereas participants in the positive condition perceived the target as expressing more positive and less negative emotions,  $F(1, 60) = 92.80, p < .001$ , for perceived negative emotions, and  $F(1, 60) = 283.35, p < .001$ , for perceived positive emotions. Mean ratings of the actors' positive and negative affect in the two experimental groups are presented in Table 1.

### Negative and Positive Crossover

To test for crossover of negative and positive emotions, a MANOVA was conducted using the affective condition (negative or positive story of the soldier) as the independent variable and the affective indicators (emotions' self-report, performance) as dependent variables. The affective condition had a significant multivariate effect on participants' affect,  $F(8, 62) = 22.62, p < .01$ . The univariate results showed that the effect was significant for participants' reported negative affect,  $F(1, 61) = 67.48, p < .01$ , positive affect,  $F(1, 61) = 159.38, p < .01$ , creative flexibility,  $F(1, 61) = 5.57, p < .05$ , and recall of positive words,  $F(1, 61) = 4.82, p < .05$ , and was marginally significant for creative fluency,  $F(1, 61) = 3.76, p = .06$ . Results were not significant for general recall, recall of negative words, or creative originality.

Means and standard deviations of variables are presented in Table 2: Reported negative affect, reported positive affect, creative flexibility, creative fluency, and recall of positive words are presented separately for each of the two (negative or positive) affective conditions. Consistent with the our

**Table 1.** Perceived Target's (Soldier's) Affect in Positive and Negative Affective Conditions

Perceived affect	Affective condition			
	Positive ( $n = 30$ )		Negative ( $n = 32$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Target's perceived positive affect	11.17	2.31	6.20	3.75
Target's perceived negative affect	2.31	1.82	13.56	2.09

*Note.* Observed power was 1.00 for both perceived positive affect and perceived negative affect.

**Table 2.** Participants' Performance and Self-Reported Affect in Negative and Positive Affective Conditions

Measure	Affective condition			
	Negative ( <i>n</i> = 30)		Positive ( <i>n</i> = 32)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Negative affect report	9.73	3.09	3.63	2.76
Positive affect report	4.85	2.67	12.20	1.83
Creative flexibility	4.87	1.61	6.24	2.79
Creative fluency	6.03	2.55	7.76	4.22
Recall of positive words	3.24	1.17	3.87	1.07

*Note.* Observed power was 1.00 for both negative affect and positive affect, .64 for creative flexibility, .48 for creative fluency, and .58 for recall of positive words.

hypotheses, participants in the negative condition reported higher levels of negative affect and lower levels of positive affect, were less creative in terms of fluency and flexibility, and recalled less positive emotion words compared with participants in the positive condition.

Additional support for crossover was obtained by correlating participants' reported affect with their perceptions of the target's affect as rated in the manipulation-check measure (e.g., the correlation between participants' report of their own happiness after the presentation with their perception of the target's happiness). All correlations were significant and are presented in Table 3. Participants' own affect closely matched the affect they attributed to the target, strongly supporting negative and positive crossover.

**Table 3.** Correlations Between Participants' Self-Reported Affect and Perceived Target's Affect

Self-reported affect	Perceived target's affect				
	Optimism	Happiness	Comfort	Satisfaction	Positive emotions–Total
Optimism	.67**				
Happiness		.88**			
Comfort			.64**		
Satisfaction				.58**	
Positive emotions–Total					.85**
	Stress	Worry	Anxiety	Sadness	Negative emotions–Total
Stress	.45**				
Worry		.65**			
Anxiety			.62**		
Sadness				.27*	
Negative emotions–Total					.67**

\* *p* < .05. \*\* *p* < .01.

**Table 4.** Regression of Positive Emotion on Condition and State Empathy

	<i>B</i>	<i>SEB</i>	$\beta$	<i>Sig</i>
Stage 1				
Empathy	-.013	.30	-.03	.97
Condition	7.29	.60	.85**	.00
Stage 2				
Empathy	-.65	.39	-.15	.10
Condition	7.32	.57	.85**	.00
Empathy $\times$ Condition	1.40	.85	.22*	.020

\*  $p < 0.05$ . \*\*  $p < 0.01$ .

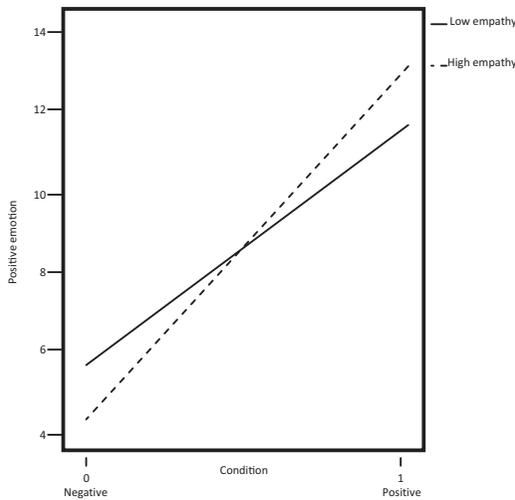
To compare between the effect of the target's positive and negative emotions on the participants, two correlations were compared using Fisher's test: the correlation between the target's perceived positive affect and the participant's reported positive affect ( $r = .85$ ), and the correlation between the target's perceived negative affect and the participant's reported negative affect ( $r = .67$ ). The difference between the correlations was significant ( $Z = 3.35$ ,  $p < .001$ ): The correlation between participants' reported affect and targets' perceived affect was stronger when positive rather than negative emotions were considered.

### Crossover and State Empathy

To assess the role of state empathy in the crossover process, we performed two hierarchical regressions (one for positive emotion and one for negative emotion), entering condition and empathy in the first stage, and condition, empathy, and the interaction between condition and empathy at the second stage as predictors of emotion (Table 4). The interaction between empathy ( $Z$  scores) and condition was significant only for the positive emotion,  $F$  change = 5.75,  $p < .01$ ,  $\Delta r^2 = 0.025$ ,  $p < .05$ . Results presented in Figure 1 show that the target (happy target vs. distressed target) had a stronger impact on participants characterized by high state empathy than on low state empathy participants. Thus, positive crossover was stronger for high state empathy respondents than for low state empathy respondents. We found no significant interaction for negative emotions. This pattern of results partially supports the role of state empathy as a moderator of crossover effects.

## DISCUSSION

This field experiment had three main aims: to obtain experimental support for the crossover process, to compare the intensity of positive and



**Figure 1.** Interaction between condition and state empathy on positive emotion.

negative crossover, and to establish the role of state empathy in the crossover process. One might argue that the process we demonstrated is actually mood induction or emotional contagion. This is, of course, a claim we cannot prove wrong. However, as the rationale of the study is based on crossover theory and the design follows former crossover studies, we believe we did demonstrate positive and negative crossover.

Results support the operation of positive and negative crossover from a target person to respondents in a group. Consistent with the crossover hypotheses, participants in the negative condition (exposure to a distressed target) reported higher levels of negative affect and lower levels of positive affect, and performed more poorly in most cognitive tasks, compared with participants in the positive condition.

That participants' own affect closely matched the affect they attributed to the target further supports the crossover effect. Thus, both negative and positive crossover effects were supported with both self-report and performance measures. Results of the present research offer empirical evidence for positive crossover, replicating and expanding recent findings from cross-sectional studies demonstrating crossover of positive emotions such as life satisfaction and work engagement (Bakker et al., 2006; Demerouti et al., 2005; Westman et al., 2009).

Participants' performance on creativity tests in the positive condition was superior to participants' performance in the negative conditions. To elaborate, participants' creativity was elevated in the positive condition and diminished in the negative condition. This finding supports a large number of studies that have used various creativity measures in a variety of settings (for

a review, see [Shalley et al., 2004](#)). These results also corroborate the findings of [Amabile, Barsade, Muller, and Staw \(2005\)](#) and [Fredrickson and Losada \(2005\)](#), who demonstrated that positive affect relates positively to creativity in organizations. We did not detect a significant impact of mood on general recall levels, although participants in the negative condition showed superior recall of more negatively valenced stimuli, and participants in the positive condition showed superior recall of positively valenced stimuli, offering further support of positive and negative crossover. These differential effects are consistent with existing findings on the mood-congruent recall model concerning the relation between emotion and cognition, which suggests that negative moods prime unpleasant memories (for a review, see [Singer & Salovey, 1988](#)).

Furthermore, we compared the impact of crossover of negative and positive emotions, an issue that, to the best of our knowledge, has not been addressed in previous crossover studies. As hypothesized, our findings indicate a relative dominance of positive over negative crossover. Participants' reported affect and perceived target's affect were more closely matched following exposure to the happy target than following exposure to the distressed target. These results challenge the view put forward in two recent reviews by [Baumeister et al. \(2001\)](#) and [Rozin and Royzman \(2001\)](#), who concluded that negative events are stronger than positive ones. Our findings support other lines of research and show the reverse pattern, indicating that positive events may, in some cases, have a stronger impact than negative events. Such a reverse pattern has been found in some psychological phenomena, including language and memory biases that show a preference for positive events (e.g., [Taylor, 1991](#)), optimistic anticipation of future events ([Weinstein, 1980](#)), and an elimination of the negativity bias in both the cognition and emotion (e.g., [Wood & Kisley, 2006](#)). Our results are also in line with those of [Hammer, Cullen, Neal, Sinclair, and Shafiro \(2005\)](#), who found that positive spillover, compared with negative spillover, had a stronger effect in reducing spouse's depression over time.

Findings of the present study are especially interesting in the context of [Fredrickson's \(1998, 2001\)](#) work on positive emotions and their relation to interpersonal relationships. Fredrickson's broaden-and-build theory postulates that positive emotions broaden individuals' thought-action repertoires, prompting them to pursue a wider range of thoughts and actions than they typically use. These broadened thought-action repertoires create a variety of resources. In the interpersonal context, the broaden-and-build theory predicts that positive emotions broaden people's sense of self to include others, thus producing greater feelings of self-other overlap and "oneness" ([Waugh & Fredrickson, 2006](#)). Applying these concepts to the present research, participants in the positive condition may have felt a greater sense of oneness with the target, allowing them to be more receptive to the positive emotions

expressed by the target. In the broader context of crossover research, this interpretation may explain why crossover of positive emotions may prevail over the crossover of negative emotions. It therefore seems important to include crossover of positive emotions in crossover models and to account for the potency of positive crossover compared with the crossover of negative emotions.

The hypothesis that emotions cross over as a result of the empathic reaction was partially supported. We found that high, compared with low, state empathy participants reported more positive affect. This pattern of results partially supports the role of state empathy as a moderator in the crossover process. This finding is in line with the findings that the impact of positive crossover was stronger than that of negative crossover. Specifically, the impact of state empathy as a moderator was also stronger concerning positive emotions.

### **Limitations and Contributions of the Present Research**

Limitations of the present research must be noted as well. First, there are several factors that limit the generalizability of results. All participants were female high-school graduates between the ages of 18 to 19 years. In addition, participants were recruited from a human resources training course to which they volunteered. Therefore, participants presumably shared some inclination toward interpersonal sensitivity, and can be speculated to be higher than average in empathy. To improve generalizability of results, future research should attempt to test the present study's hypotheses with additional samples.

The most precise method to assess crossover in the present study would have been to examine and compare participants' affect before and after exposure to the target. This was impossible to achieve as the participants were unaware at the beginning of the interview that this was an experiment. Future studies should have baseline measures as well in order to increase validity of results. Furthermore, power was low for some of the analyses.

Despite these limitations, the results of the present research contribute significantly to the crossover literature. First, the present research is the first in the crossover field to employ an experimental design using performance measures within a field setting, and to provide empirical, behavioral evidence for crossover. The finding that crossover influences not only emotions but also cognitive performance contributes to the validity of the crossover model and helps overcome biases typically associated with self-report questionnaires. The field of crossover would thus benefit from future research incorporating behavioral and performance measures.

Second, the experimental design was implemented in a field setting, presenting as minimal a challenge as possible to ecological validity. To the best of our knowledge, only one experiment investigated crossover. In a series of laboratory experiments, Bakker et al. (2007) found that teachers who were exposed to an article in which a colleague expresses burnout demonstrated a higher level of burnout compared with the control condition. Furthermore, soldiers who were exposed to a videotape of a burnt out or engaged colleague demonstrated crossover of burnout moderated by the similarity with the stimulus person. There are a couple of differences between Bakker et al.'s study and the current one. First, their study is a laboratory experiment focusing on burnout, whereas the current study is a field experiment focusing on negative and positive crossover and demonstrating behavioral outcomes. Second, the current study investigated and found a moderating effect of state empathy.

The present research thus aids in filling an existing gap in crossover literature, adding empirical support to the crossover model and establishing causality of crossover-related processes. Furthermore, the present research is the first to present experimental evidence for the crossover of positive emotions. Several recent studies have demonstrated positive crossover, but have done so using cross-sectional designs (Bakker, 2005; Bakker et al., 2006; Demerouti et al., 2005). Furthermore, the present research is the first to show that the crossover of positive emotions is stronger than the crossover of negative emotions, a comparison that has never been reported. The present results thus add to theoretical thinking and extend the current boundaries of crossover models in a manner that resonates with the growing interest in the field of positive psychology. Results indicating positive crossover also carry many practical implications for organizational psychology, for example, concerning the importance of interventions aimed at enhancing positive team atmosphere and work engagement, or those aimed at breaking negative work-related cycles.

Third, the present research is the first to provide experimental evidence for the moderating effect of state empathy in the crossover process, elucidating the underlying mechanisms of the crossover model. An interesting issue of this study, which has rarely been investigated, is crossover from a target person to a group. Most crossover studies focused on spouses and team members. This is a case of crossover between interviewees and interviewers. Further research should investigate this issue in different contexts and groups to seek evidence that supports a comprehensive theoretical crossover model.

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