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The optimism-pessimism ratio as predictor of employee creativity: the promise of duality

Predictor of
employee
creativity

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Abstract

Purpose – The purpose of this paper is to study if the employees' optimism-pessimism ratio predicts their creativity.

Design/methodology/approach – In total, 134 employees reported their optimism and pessimism, and the respective supervisors described the employees' creativity.

Findings – The relationship between the optimism-pessimism ratio and creativity is curvilinear (inverted U-shaped); beyond a certain level of the optimism-pessimism ratio, the positive relationship between the ratio and creativity weakens, suggesting that the possible positive effects of (high) optimism may be weakened by a very low level of pessimism.

Research limitations/implications – Being cross-sectional, the study examines neither the causal links between the optimism-pessimism ratio and creativity nor other plausible causal links. The study was carried out at a single moment and did not capture the dynamics that occur over the course of time involving changes in optimism/pessimism and creativity. Future studies may adopt longitudinal or quasi-experimental designs.

Practical implications – Managers and organizations must consider that, even though positivity promotes creativity, some level of negativity may help positivity to produce creativity.

Originality/value – This study suggests that scholars who want to study the antecedents of creativity (and innovation) must be cautious in focusing only on the positive or the negative sides of individuals' characteristics, and rather they must explore the interplay between both poles. Individuals may experience both positive and negative states/traits (Smith *et al.*, 2016), and this both/and approach may impel them to think divergently, to challenge the status quo and to propose “out the box” and useful ideas.

Keywords Creativity, Pessimism, Optimism, Curvilinear relationship, Optimism-pessimism ratio

Paper type Research paper

Introduction

Workplace creativity (i.e. “products, services, business models, work methods, or management processes that are novel and useful”; Zhou and Hoever, 2014, p. 335) is “the starting point and the root” of organizational innovation (Yeh-Yun Lin and Liu, 2012, p. 56). Considering that both creativity and innovation are important determinants of successful organizational



performance and longer-term survival (Anderson *et al.*, 2014; Kyvik *et al.*, 2012; Simmons and Sower, 2012; Tung, 2016), studying the antecedents of workplace creativity is an important research endeavor. Creativity may unfold at the organizational, team, and individual levels (Anderson *et al.*, 2014), and this paper focuses on antecedents of individual creativity (i.e. it adopts an actor-centered approach). Specifically, we test how the ratio between employees' optimism and pessimism predicts their creativity.

Optimism represents a tendency to believe that good things, as opposed to bad ones, will occur, while pessimism represents a tendency to believe that bad things will occur (Carver *et al.*, 2010; Luthans *et al.*, 2015). Consequently, optimists tend to see desired outcomes as attainable and to persevere in their goal-directed activities, while pessimists are more likely to become passive and give up on achieving their goals (Carver *et al.*, 2010). A possible consequence of this difference is that, as we discuss later in the paper, optimists tend to be more creative (Rego *et al.*, 2012a; Seligman, 2011), while pessimists tend to be less creative.

This reasoning is based mainly on the assumption that optimism and pessimism represent opposite poles of the same construct. However, as we discuss later, optimism and pessimism may be considered as being two different constructs (Burke *et al.*, 2000; Herzberg *et al.*, 2006; Lopes *et al.*, 2011; Robinson-Whelen *et al.*, 1997) and individuals may be characterized by idiosyncratic levels of optimism and pessimism. Moreover, there is some evidence suggesting that pessimism is not always an obstacle to creativity, as it is sometimes assumed to be (Charyton *et al.*, 2009; Park, 2016); and in certain circumstances, optimism may be detrimental to performance and creativity (Charyton *et al.*, 2009; Ickson *et al.*, 2014). It is sometimes said that the optimist sees opportunities in every problem and the pessimist sees problems in every opportunity (Hmieleski and Baron, 2009). However, seeing opportunities in every problem is not necessarily conducive to creative (i.e. new and useful; Oldham and Cummings, 1996) ideas if, for example, the individual does not face the problem realistically and does not prepare to proactively reduce the likelihood of undesired outcomes (Shepperd *et al.*, 2006; Sweeny *et al.*, 2006). Moreover, pessimistically seeing the problem in every opportunity does not necessarily preclude being creative if the individual is also optimistic enough to continue striving and to cope actively with the problems encountered, thereby being more creative.

It is thus important to study how the interplay between optimism and pessimism predicts creativity. In this paper, borrowing from the literature about the positivity ratio (Fredrickson, 2009; Rego *et al.*, 2012a; Shrira *et al.*, 2016), we introduce the construct of the optimism-pessimism ratio (the ratio between optimism and pessimism) and test the degree to which this ratio predicts employee creativity beyond the predictive value of optimism. Although the literature on the topic of positivity ratio has been characterized by controversy (Brown *et al.*, 2013, 2014; Fredrickson, 2013; Nickerson, 2014), Cross and Pressman (2017) suggested that it is warranted that research continues to explore possible consequences of such a ratio (see also Fredrickson, 2013). Our aim with the current study is to present additional empirical evidence suggesting that the logic behind the positivity ratio (including its possible curvilinear relationship with variables of interest for individual functioning; Fredrickson, 2009) may also apply to the interplay between optimism and pessimism and have consequences over employee creativity. We conceptually defend that the relationship between the optimism/pessimism ratio and creativity is curvilinear and that some level of pessimism, combined with optimism, may be necessary to produce higher levels of creativity, which, by definition, refers to the production of novel and useful ideas (Oldham and Cummings, 1996; Zhou and George, 2003). Borrowing from the dynamic process (Hoff *et al.*, 2012) and the preparedness approaches (Sweeny *et al.*, 2006; Sweeny and Shepperd, 2007), we suggest that optimism helps individuals to produce novel ideas, while some level of pessimism may be necessary to afford realism/utility to that novelty.

The paper makes three main contributions. First, several authors (e.g. Carver *et al.*, 2010; Dawkins *et al.*, 2013; Luthans *et al.*, 2015, p. 120) have suggested continuing to assess the dimensionality of the construct, and we provide evidence corroborating the two-dimensional approach. Second, the interplay between optimism and pessimism has been understudied as a predictor of individual creativity (see Hoff *et al.*, 2012; Zhou and Hoever, 2014). For example, Hoff *et al.*'s (2012) literature review about how personality predicts creativity is silent with regard to both optimism and pessimism. A recent literature review of psychological capital, a construct that includes optimism (the other components being hope, resilience, and self-efficacy), makes no mention of the interplay between optimism and pessimism (Luthans and Youssef-Morgan, 2017). Studying such an interplay between variables, instead of merely focusing on the bright, i.e. positive and optimistic side of the individual's characteristics, is thus a relevant theoretical endeavor.

Third, we extend the construct of positivity ratio to the optimism-pessimism domain, and contribute to the discussion on the relevance of this ratio for an indicator of "human flourishing" (Fredrickson, 2013; Seligman, 2011): creativity. As Fredrickson (2013, p. 820) pointed out, the "full value of positivity ratios remains in its infancy" (see also Cross and Pressman, 2017). With this study, we also contribute to the literature by reinforcing the idea of a curvilinear relationship between the positive ratio and creativity. We do not claim the existence of any specific, ideal, or universal "tipping point" (Brown *et al.*, 2014). Rather, in consonance with the notion of a "too much of a good thing effect" (Pierce and Aguinis, 2013), we argue that too much positivity may limit an employee's capacity to be creative.

The paper is structured as follows. We start by discussing optimism and pessimism as different constructs. After that, we first discuss why optimism tends to contribute to creativity, while pessimism tends to inhibit it, and then discuss the somewhat counterintuitive idea that a certain level of pessimism may be necessary. Then, we present the method and the findings. In the last section, we discuss the findings, suggest avenues for future research, and conclude along with pointing out implications for theory and practice.

Optimism and pessimism: unipolar or bipolar?

Optimism and pessimism have been studied both as bipolar opposites (e.g. Hmieleski and Baron, 2009; Rauch *et al.*, 2007; Scheier *et al.*, 1994; Vautier *et al.*, 2003) and as separate constructs (Chang *et al.*, 1994, 1997; Herzberg *et al.*, 2006; Kubzansky *et al.*, 2004; Lopes *et al.*, 2011; Robinson-Whelen *et al.*, 1997). Theoretical and empirical evidence is not conclusive about what position (bipolar vs dual unipolar nature of the construct) reflects reality better (Kam and Meyer, 2012; Robinson-Whelen *et al.*, 1997). Luthans *et al.* (2015, p. 120) argued that the way optimism and pessimism have been studied does not allow researchers to arrive at a final answer regarding their independence. They also suggested that researchers continue to assess the dimensionality of the construct. Dawkins *et al.* (2013) recommended that researchers examine optimism and pessimism as different constructs and how they relate to outcomes of interest. Carver *et al.* (2010) also called for more research efforts to examine the dimensionality of optimism-pessimism.

In this study, we adopt the two-dimensional approach to answer our research question:

RQ1. How the interplay between optimism and pessimism predicts creativity.

Different individuals may combine different levels of both optimism and pessimism, some individuals may even be "paradoxical optimists" (i.e. simultaneously optimist and pessimist; Burke *et al.*, 2000; Lopes *et al.*, 2011; Peter Boettke considered himself as being "pessimistically optimistic about the future"; Boettke, 2016), and the interplay between optimism and pessimism may have consequences for outcomes such as creativity.

Optimism, optimism-pessimism ratio, and employee creativity

Several reasons support the notion that optimism may contribute, while pessimism is detrimental, to improving employees' creativity. As Carver *et al.* (2010, p. 883) pointed out, "It might seem paradoxical that people who expect good things to happen take active steps to make sure good things do happen. But experience presumably teaches people that their own efforts play an important part in many kinds of life outcomes. Optimists may be more confident than pessimists that their efforts will be successful. For that reason, they are quicker to engage those efforts when there is a need for them." Such efforts may require being creative. Taking credit for favorable events in their lives, individuals with greater optimism reinforce their self-esteem and morale, and the consequence may be greater creativity (Lyubomirsky *et al.*, 2006). Creativity involves coming up with something that challenges the status quo. It is an inherently difficult endeavor that entails hard work (van Knippenberg, 2017; Zhou and George, 2003). Because individuals experiencing optimism distance themselves from unfavorable life events, it is less likely that they experience self-blame and despair when carrying out efforts to find creative solutions for problems and take advantage of opportunities. They build positive expectations that motivate goal pursuit, and are more likely to formulate plans of action, to persevere when facing difficulties, and to look for creative ways to solve problems and use opportunities to work toward goals (Kluemper *et al.*, 2009; Youssef and Luthans, 2007).

Differently, when experiencing pessimism, individuals are more likely to be passive and to give up, and are less persistent (Carver *et al.*, 2010). They are also more likely to adopt more of a self-censorship attitude when creative ideas emerge in their minds (Williams, 2002) and to be less creative (Park, 2016; Seligman, 2011). Park (2016, p. 117) illustrated the argument by stating that pessimists "believe that the special theory of relativity will follow the unfortunate path of past theories, such as the ether theory of light."

These motivational and behavioral arguments may be complemented with cognitive and affective ones. Optimism tends to be associated with positive affect, and pessimism with negative affect (Chang *et al.*, 1997; Marshall *et al.*, 1992; Segerstrom *et al.*, 2017). Considering that affect influences cognitive processing, it is thus possible that pessimism leads employees to adopt a "tight" processing approach (Fiedler, 1988) and to be more "tuned to an analytic style of processing, in which the situation is treated in a more cautious and careful manner" (Kaufmann, 2015, p. 143). Optimism, in turn, leads employees to adopt a "loose" processing approach and to be more willing to explore novel procedures and possibilities (Fiedler, 1988; Kaufmann, 2015). A possible consequence of these differences is that optimism boosts creativity (Rego *et al.*, 2012a; Seligman, 2011), while pessimism influences employees to be less creative. From the above arguments, and taking into account that each individual is characterized by a combination of optimism and pessimism (i.e. a ratio between optimism and pessimism), we derive the following hypothesis:

H1. The employee optimism-pessimism ratio relates positively with creativity.

We consider, moreover, that the relationship between the optimism-pessimism ratio and creativity is not linear. A (highly) optimistic individual with an extremely low level of pessimism may be satisfied with the status quo, see (only) opportunities in every problem, and develop a relaxed attitude toward the current task environment, thereby neglecting difficulties and risks inherent to problems (George and Zhou, 2002; Kaufmann, 2015). As a consequence (s)he may neglect the need to face the problem in a truly creative (i.e. new and useful, i.e. realistic) way. Or (s)he may propose new ideas without considering their realism or usefulness for solving the problem or responding to the opportunity. Although optimism may lead individuals to respond to opportunities with novel ideas, and to continue to strive and cope actively with the problems

encountered in seeking desirable outcomes, some degree of pessimism may lead them to develop dissatisfaction or frustration with the status quo (Amabile *et al.*, 2005; George and Zhou, 2002; Kaufmann, 2015) and help them to be more realistic when they face problems that block the path to their goals (Charyton *et al.*, 2009; Ickson *et al.*, 2014).

Two theories or approaches help us to support the above arguments. The first is the dynamic process approach of personality (Hoff *et al.*, 2012; Vancouver, 2008). This approach explains dynamic and motivational processes that build up the personality structure and may affect people's behavior, including creativity. According to this approach, "creativity [...] flourishes in a zone between so called primary and secondary processes. The primary process provides free associations that may furnish new and pioneering ideas, the secondary process provides the necessary tools of communication and reality adaptation, which might include evaluation of an idea and how it can be developed into something that will actually be of use" (Hoff *et al.*, 2012, p. 255). We suggest that optimism may nourish the primary process of producing ideas, while pessimism may help the individual during the secondary process to check how those ideas fit reality. It is the tension "between the paralogical dreamlike thinking characterizing primary process functioning and the more rational thinking at the level of secondary process functioning" (Hoff *et al.*, 2012, p. 246) that allows that the ideas are not only new but also useful (i.e. able to deal with the organizational and job realities). This approach is consistent with Kaufmann (2015), who suggested that creativity emerges from a dual-process operating at the interface of System 1 (which is automatic, implicit, and intuitive, and "allows responding readily to hunches and impressions," p. 150) and System 2 (deliberate, analytical/logic, and systematic/methodical) thinking (Kahneman, 2011; see also Hélie and Sun, 2010, about how creativity may emerge from the simultaneous and iterative involvement of implicit and explicit processes of explicit and implicit knowledge).

The second approach results from the preparedness theory (Sweeny *et al.*, 2006; Sweeny and Shepperd, 2007). Preparedness "is an adaptive goal state of readiness to respond to uncertain outcomes" (Carroll *et al.*, 2006, p. 64), and creativity is, by definition, a process and an outcome involving uncertainty. Preparedness involves "being equipped for setbacks should they occur but also a readiness to capitalize on opportunity should it knock" (Shepperd *et al.*, 2006, p. 26). In some instances, preparedness requires being ready to take advantage of opportunities. In other instances, it involves being equipped to handle problems, difficulties, and setbacks. While optimism best serves the goal of preparedness "by organizing thoughts and activity around goal pursuit and persistence and the acquisition of opportunities and resources" (Sweeny *et al.*, 2006, p. 302), and "by directing energy toward seeking and facilitating positive outcomes" (Sweeny and Shepperd, 2007, p. 1065), pessimism helps individuals to "direct thoughts and actions toward assessing and responding to changes in the local environment" (Sweeny *et al.*, 2006, p. 302). This involves taking actions, intensifying efforts, and mobilizing resources directed at proactively reducing the likelihood of undesired outcomes, failures, and disappointment. Creativity may be such a proactive stance that emerges from a combination of optimism and pessimistic assessments of the reality.

In short, if a high level of optimism is not accompanied by a certain level of pessimism, employees may be caught up in a kind of Pollyanna effect (Matlin and Gawron, 1979), facing organizational problems and opportunities without realism, underestimating obstacles, and becoming unable to propose new and useful ideas for dealing realistically with problems and opportunities (Ickson *et al.*, 2014; Shepperd *et al.*, 2006; Sweeny *et al.*, 2006). Therefore, we suggest that beyond a certain threshold of optimism-pessimism ratio, the positive relationship between the ratio and creativity weakens, the possible positive effects of (high) optimism being offset by a very low level of pessimism. Thus, we hypothesize:

- H2. The relationship between the optimism-pessimism ratio and creativity has an inverted U-shaped pattern in which, after a certain level, the positive relationship between the ratio and creativity weakens.

Method

Sample and procedures

We personally invited leaders from our professional networks, in their workplaces, to participate in the study by asking their permission to deliver a questionnaire to an employee (randomly selected by the researcher) in which the employee could report his/her own optimism/pessimism. We also invited the leaders to report the creativity of the employee randomly selected by the researcher. In total, 134 leaders (59.0 percent female) from 75 organizations operating in several sectors (e.g. clothing, automotive, furniture, education, retailing, and consulting), agreed to participate, each having reported the creativity of a single employee. The responses were delivered directly to the researcher in a closed envelope. Leaders' schooling were as follows: 15.7 percent had nine or fewer schooling years, 27.6 percent had between 11 and 12 schooling years, and 56.7 percent had an undergraduate degree at least. Other characteristics of the leaders who participated are shown in the columns including means (M) and standard deviations (SD) of Table I. The 134 employees (62.8 percent female) performed a great diversity of jobs (e.g. consultants, sales, clerks, software developers, designers). Regarding schooling, 14.2 percent had nine or fewer schooling years, 42.5 percent had between 11 and 12 years of formal education, and 43.3 percent had college degrees. Other sample characteristics are shown in Table I.

Measures

Creativity. The employees' creativity was measured through 13 items proposed by Zhou and George (2001). Its validity has been supported in several studies (e.g. De Stobbeleir *et al.*, 2011; George and Zhou, 2007; Harris *et al.*, 2014; Rego *et al.*, 2012a). Supervisors were asked to focus on employees' behaviors performed over the last three months. Shalley and Gilson (2004, p. 35) observed that "managers play a key role in that they are often the individuals best suited to make the determination of whether an employee's outcome should be regarded as creative." Sample items are: "Suggested new ways to achieve goals or objectives"; "Came up with new and critical ideas to improve performance" (all items in the Appendix). Supervisors were asked to report how frequently the employee adopted, over the last three months, each of the 13 behaviors on a scale ranging from 1 (never) to 7 (frequently). A principal component analysis (KMO: 0.93) suggested a single factor explaining 64.87 percent of variance (Cronbach's α : 0.95).

Optimism and pessimism. Optimism and pessimism were measured with the revised version of the Life Orientation Test (LOT-R; Scheier *et al.*, 1994: all items in the Appendix), which "has more than adequate internal consistency" and "high test-retest reliability" (Perczek *et al.*, 2000, pp. 71-72). The LOT-R is an abbreviated version of the original LOT (Scheier and Carver, 1985), and includes ten items. Three items are positively worded (e.g. "In uncertain times, I usually expect the best"), three are negatively worded (e.g. "I hardly ever expect things to go my way"), and four items are fillers. On a seven-point scale, individuals were asked to report the degree to which each statement applied to themselves (1: "the statement does not apply to me at all"; 7: "[...] applies completely [...]"). An overall optimism score is often computed by summing the positively worded questions with the reverse of the negatively worded questions (e.g. Hmieleski and Baron, 2009). However, there are reasons to believe that the scales represent two different dimensions, optimism and pessimism. Therefore, through confirmatory factor analyses (CFA; using LISREL with the maximum likelihood estimation method), we compared the single factor model (RMSEA: 0.22; GFI: 0.85; CFI: 0.64; IFI: 0.65) with the two-factor model (RMSEA: 0.04; GFI: 0.98; CFI and IFI: 0.99). The two-factor model is significantly better ($\Delta\chi^2_{(1)} = 58.95; p \leq 0.001$) than the single factor model. Cronbach's α s are 0.66 (optimism; 0.72 without the first item) and 0.73 (pessimism). Although the former α is lower than 0.70, it is higher than 0.60, a value considered acceptable by some authors.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Employee gender ^a	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Employee age	33.80	9.58	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—
3. Employee schooling ^b	2.28	0.70	0.07	-0.31***	—	—	—	—	—	—	—	—	—	—	—	—
4. Employee org. tenure	5.54	7.59	-0.06	0.67***	-0.29***	—	—	—	—	—	—	—	—	—	—	—
5. Length of supervisor-employee working relationship	4.52	6.43	-0.10	0.57***	-0.23**	0.86***	—	—	—	—	—	—	—	—	—	—
6. Leader gender ^a	—	—	0.07	-0.06	-0.03	-0.07	-0.15	—	—	—	—	—	—	—	—	—
7. Leader age	39.69	10.64	-0.04	0.21*	-0.03	0.15	0.13	0.29***	—	—	—	—	—	—	—	—
8. Leader schooling ^b	2.41	0.75	0.08	-0.28***	0.46***	-0.17*	-0.20*	-0.18*	-0.44***	—	—	—	—	—	—	—
9. Tenure as a leader	4.31	5.91	-0.19*	-0.34***	-0.18*	0.57***	0.62***	-0.01	0.23**	-0.17	—	—	—	—	—	—
10. Being relaxed	4.29	1.50	0.03	-0.03	0.06	0.03	0.02	-0.02	0.10	0.01	0.08	—	—	—	—	—
11. Being calm	4.69	1.22	0.01	0.08	-0.20*	0.13	0.02	0.02	-0.08	0.10	0.03	0.14	—	—	—	—
12. Optimism (O)	5.08	0.97	-0.04	-0.01	0.07	0.14	0.15	-0.02	0.04	-0.02	0.10	0.38***	0.13	—	—	—
13. Pessimism (P)	3.21	1.04	0.07	0.20*	-0.22*	0.09	0.05	0.10	0.09	-0.26**	0.04	-0.24**	-0.32***	-0.24**	—	—
14. O/P ratio	1.82	0.95	-0.09	-0.17	0.16	-0.01	0.02	-0.04	0.06	0.11	0.02	0.34***	0.29***	0.61***	-0.80***	—
15. Creativity	4.50	1.01	-0.08	-0.21*	0.21*	-0.19*	-0.13	0.04	0.04	0.00	-0.12	0.21*	0.07	0.36***	-0.29***	0.37***

Notes: $n = 134$. ^a0: female; 1: male; ^b1: nine or fewer years of schooling; 2: 10-12 years; 3: at least an undergraduate degree. * $p < 0.05$. ** $p < 0.01$; *** $p < 0.001$

Predictor of
employee
creativity

Table I.
Means, standard
deviations, and
correlations

Discriminant validity. Considering the sample size, and the high number of items to measure creativity, we followed the recommendation of Little *et al.* (2002) and created six parcels of creativity when conducting CFA to test discriminant validity for optimism, pessimism, and creativity. Although the eight-factor model fits the data only modestly regarding RMSEA (0.10), other fit indices are acceptable (e.g. CFI and IFI: 0.90). Considering the modest sample size, the RMSEA's limitations (Kenny *et al.*, 2015), and that the eight-factor model is significantly better than the seven-factor model, in which optimism and pessimism were merged into a single factor ($\Delta\chi^2_{(7)} = 62.40$; $p \leq 0.001$), it is acceptable to consider optimism, pessimism, and creativity as different constructs.

Control variables. Gender, age, formal education, organizational tenure, and the length of the supervisor-employee working relationship were also included as control variables, for several reasons: age, tenure, education, and gender appear to be related to creativity (Dong *et al.*, 2017; Furnham and Niderstrom, 2010; Rego *et al.*, 2009; Tierney *et al.*, 1999); and the length of supervisor-subordinate working relationship may interfere with, or reflect, the quality of leader-member exchange, thus influencing how supervisors and employees behave toward each other (Tierney *et al.*, 1999; van Knippenberg, 2017). Leader gender, age, schooling, and tenure as a leader were also included because they may interfere with the quality of the leader-member exchange and/or with how the leader describes the employee's creativity. We also included two fillers from the LOT-R as proxies of positive affect: "It's easy for me to relax" (i.e. relax); "I don't get upset too easily" (i.e. calm). Because Cronbach's α is very low (0.24), these variables were used separately. They were included for control because theoretical and empirical evidence suggests that positive affect is a predictor of creativity (Fredrickson, 2004; Rego *et al.*, 2012a). In this study, relaxation correlates positively with optimism ($r = 0.38$, $p < 0.001$) and creativity ($r = 0.21$, $p < 0.05$) and negatively with pessimism ($r = -0.24$, $p < 0.01$), and calmness correlates negatively with pessimism ($r = -0.32$, $p < 0.001$). In CFAs in which these two variables were included within the optimism factor, the pessimism factor, or as an autonomous factor, Lambdas emerged as very low (e.g. -0.04 and 0.13 , when included in the optimism factor, and -0.06 and 0.05 , when included in the pessimism factor).

Findings

Table I reports means, standard deviations, and correlations. Employee age correlates positively with pessimism and negatively with creativity. One possible explanation is that older workers, by being affected by ageism and negative stereotypes (Fineman, 2011; Hummert, 1999), are more pessimistic about their employability and their future in the organization (Axelrad *et al.*, 2013). Such pessimism makes them more cautious (Thiel *et al.*, 2012) and less creative (Seligman, 2011). Employee schooling correlates negatively with pessimism and positively with creativity. It is possible that less educated employees are more pessimistic about their employability in the competitive labor market and their future in the organization. Differently, more educated employees perform more intrinsically motivating jobs, and intrinsic motivation leads to more creativity (Anderson *et al.*, 2014; Shin, 2015; Zhu *et al.*, 2016). Employee tenure correlates negatively with creativity, a finding inconsistent with Kark and Carmeli (2009). One possible reason for our finding emerges from the strong relationship between age and tenure ($r = 0.67$, $p < 0.001$, Table I; see the above explanation for the negative relationship between age and creativity). Leader schooling correlates negatively with pessimism. A possible explanation is that employees are more optimistic about their future in the organization if their leaders are more educated and, thus, able to lead the team more effectively. Being relaxed correlates negatively with pessimism and positively with optimism, the optimism-pessimism ratio and creativity. Being calm correlates negatively with pessimism and positively with the

optimism-pessimism ratio. These findings are consistent with the notion that positive affect, states, and traits tend to be positively associated and negatively associated with negative affect, states, and traits. Optimism correlates negatively with pessimism, and positively with the optimism-pessimism ratio and creativity. Pessimism correlates negatively with the optimism-pessimism ratio and creativity. The optimism-pessimism ratio correlates positively with creativity.

Hierarchical regression analyses, with bootstrapping (1,000 samples), were carried out to test our hypotheses (Table II). In step 1, control variables were included. In step 2, optimism was added. In step 3a, both the optimism-pessimism ratio and the optimism-pessimism ratio square were added (because of multicollinearity, pessimism was not included). The optimism-pessimism ratio and the optimism-pessimism ratio square were included simultaneously because we sought to test if the relationship between the optimism-pessimism ratio and creativity is curvilinear. Curvilinear relationships occur when two conditions are met: the β of the optimism-pessimism ratio must be significantly positive; the β of the optimism-pessimism ratio square must be significantly negative. In step 3b, we added pessimism (instead of optimism-pessimism ratio and the optimism-pessimism ratio square) to step 2, and compared the findings with those emerging from step 3a. Our aim was to test which interplay between optimism and pessimism represents the data better: the one in which optimism and pessimism operate separately or the one in which optimism and pessimism interact.

The findings indicate the following. First, optimism predicts unique variance of creativity (step 2; $\beta = 0.33$, $p < 0.001$), while pessimism does not (step 3b; $\beta = -0.17$, $p > 0.05$). Second, when the optimism-pessimism ratio ($\beta = 0.59$, $p < 0.001$) and the optimism-pessimism ratio square ($\beta = -0.43$, $p < 0.05$) are considered, these variables predict unique variance of creativity, while optimism ($\beta = 0.11$, $p > 0.05$) does not (step 3a). Thus, *H1* is supported. Third, the β of the optimism-pessimism ratio is significantly positive, and the β of the optimism-pessimism ratio square is significantly negative, which suggests a curvilinear relationship. The curve estimation was also carried out. The findings (Figure 1) suggest that the quadratic relationship represents the relationship better than does the linear relationship. The explained variance increases 8 percent (from 0.14 to 0.22). This indicates that the relationship between the optimism-pessimism ratio and creativity has an inverted U-shaped pattern such that, past a certain threshold, the positive relationship between the ratio and creativity weakens. At the right end of the curve, the relationship between optimism-pessimism ratio and creativity even becomes slightly negative. Thus, *H2* is supported.

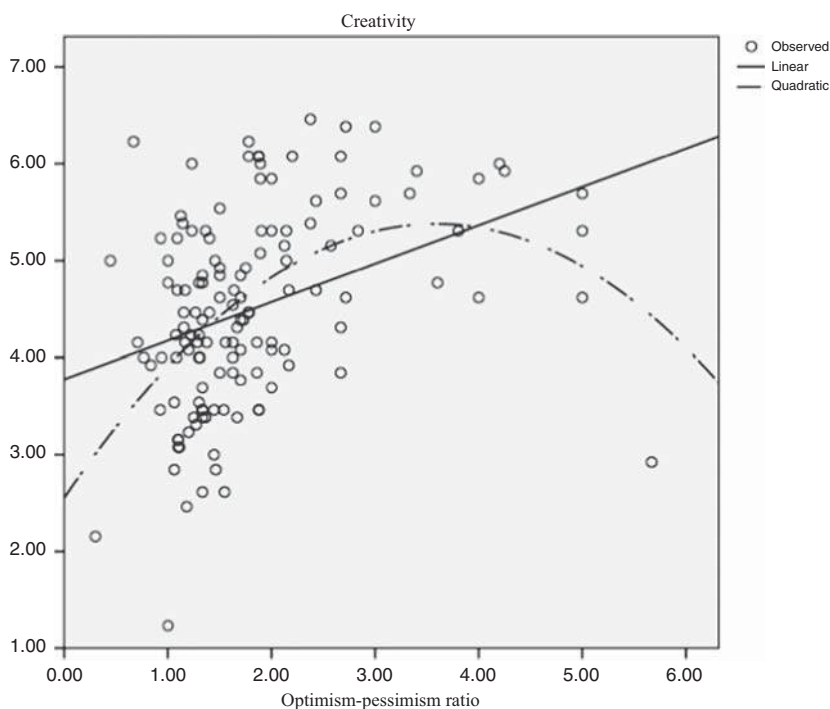
Discussion and conclusion

The findings suggest that optimism and pessimism may be considered to be different dimensions, and that such a dimensionality matters in explaining employees' creativity. The finding is consistent with some literature (e.g. Appaneal, 2012; Chang *et al.*, 1994; Herzberg *et al.*, 2006; Kivimaki *et al.*, 2005; Kubzansky *et al.*, 2004; Lopes *et al.*, 2011; Robinson-Whelen *et al.*, 1997) and does not support the argument of authors who consider that "distinct loadings of optimism and pessimism items in factor analysis are simply an artefact" (Kam and Meyer, 2012, p. 123; see also McPherson and Mohr, 2005). Even though Segerstrom *et al.* (2011, p. 129) have recommended treating the LOT-R as unidimensional, they recognize that such a "recommendation may not extend to all possible research questions." We conclude that the research questions discussed in this paper lead to, and support, the conceptual adoption of the bi-dimensional model. Considering the two dimensions separately allows the introduction of the construct of optimism-pessimism ratio, and the findings suggest that the relationship between this ratio and creativity is positive (supporting *H1*), on the whole, but that it has an inverted U-shaped pattern (supporting *H2*).

Table II.
Regression analyses
(with bootstrapping,
1,000 samples)

	Step 1 β	[lower, upper bound] ^d	β	Step 2 [lower, upper bound] ^d	β	Step 3a [lower, upper bound] ^d	β	Step 3b [lower, upper bound] ^d
Gender ^a	-0.10	[-0.56, 0.18]	-0.09	[-0.54, 0.19]	-0.08	[-0.52, 0.19]	-0.08	[-0.50, 0.21]
Age	-0.11	[-0.04, 0.01]	-0.07	[-0.03, 0.02]	-0.05	[-0.03, 0.02]	-0.05	[-0.03, 0.02]
Schooling ^b	0.23*	[0.02, 0.60]	0.18	[-0.03, 0.53]	0.16	[-0.04, 0.50]	0.16	[-0.08, 0.49]
Tenure	-0.21	[-0.11, 0.06]	-0.26	[-0.12, 0.05]	-0.21	[-0.10, 0.05]	-0.24	[-0.11, 0.05]
Length of supervisor-employee working relationship	0.21	[-0.07, 0.11]	0.16	[-0.07, 0.10]	0.13	[-0.08, 0.09]	0.13	[-0.08, 0.09]
Leader gender ^a	0.04	[-0.31, 0.44]	0.03	[-0.30, 0.42]	0.03	[-0.31, 0.38]	0.05	[-0.29, 0.46]
Leader age	0.01	[-0.02, 0.02]	0.02	[-0.02, 0.02]	0.03	[-0.02, 0.02]	0.02	[-0.02, 0.02]
Leader schooling ^b	-0.15	[-0.60, 0.15]	-0.11	[-0.55, 0.18]	-0.17	[-0.60, 0.09]	-0.14	[-0.53, 0.15]
Tenure as a leader	-0.12	[-0.08, 0.03]	-0.10	[-0.07, 0.02]	-0.09	[-0.07, 0.03]	-0.10	[-0.07, 0.03]
Being relaxed	0.19*	[0.01, 0.24]	0.08	[-0.08, 0.18]	0.03	[-0.11, 0.14]	0.06	[-0.10, 0.17]
Being calm	0.14	[-0.01, 0.24]	0.10	[-0.04, 0.21]	0.03	[-0.13, 0.16]	0.04	[-0.13, 0.19]
Optimism (<i>O</i>)			0.33***	[0.10, 0.54]	0.11	[-0.12, 0.38]	0.30***	[0.09, 0.51]
Pessimism (<i>P</i>)							-0.17	[-0.40, 0.05]
<i>O/P</i> ratio ^c					0.59***	[0.22, 1.01]		
<i>O/P</i> ratio square					-0.43*	[-0.33, -0.02]		
<i>F</i>	2.11*		3.28***		3.93***		3.35***	
<i>R</i> ²	0.16		0.25		0.32		0.27	
<i>R</i> ² change	0.16		0.09		0.07		0.02	
<i>F</i> change	2.11*		13.76***		6.11**		3.39	

Notes: *n* = 134. ^a0, female; 1, male; ^b1: nine or fewer years of schooling; 2, 10-12 years; 3, at least an undergraduate degree; ^cto reduce multicollinearity, the variable was centered before calculating the *O/P* ratio square; ^d95% confidence interval. **p* < 0.05; ***p* < 0.01; ****p* < 0.001



Predictor of
employee
creativity

Equation	Model summary				Parameter estimates			
	R^2	F	df1	df2	Sig.	Constant	b1	b2
Linear	0.14	21.13	1	132	0.000	3.78	0.40	
Quadratic	0.22	18.92	2	131	0.000	2.56	1.58	-0.22

Figure 1.
The curvilinear
relationship
between the
optimism-pessimism
ratio and creativity

It is the interplay between optimism and pessimism that explains this curvilinear relationship. Considering optimism and pessimism as a duality may uncover complex relationships between optimism/pessimism and creativity that would otherwise remain obscure.

However, it is not enough to approach the constructs separately. It is also necessary to consider the ratio between the two. The inclusion of this ratio in the regression vs the inclusion of the two dimensions separately increases the predictive power of employees' creativity (step 3b vs step 3a, Table II). By taking into account that the relationship between optimism and creativity is positive, and the relationship between pessimism and creativity is negative, one would conclude that fostering optimism and mitigating pessimism would increase employees' creativity. This interpretation, although accurate in general, would be incomplete: a certain level of pessimism may help highly optimistic individuals to be more creative. This argument is consistent with the dynamic process approach of personality (Hoff *et al.*, 2012) and suggests that while optimism nourishes the primary process of producing ideas, pessimism allows checking, in the secondary process, how those ideas fit reality. It is also possible that while optimism best serves the goal of preparedness and helps the individual to direct energy toward seeking and facilitating positive outcomes, pessimism helps individuals to "direct thoughts and actions toward assessing and responding to changes in the local environment" (Sweeny *et al.*, 2006, p. 302), and this may involve creativity. Our findings are also aligned with Kaufmann's (2015) framework of mixed moods. This author argued that the

positivity approach (“based on the premise that positive material is more abundant, better organized and more extensively connected in memory than neutral or negative material,” p. 142) must be complemented with a more balanced perspective, in which the interplay between the positive and the negative matters for the employees’ creativity. Our findings support extending this framework to the interplay between optimism and pessimism.

Therefore, although we propose that a balance between optimism and pessimism may be necessary to foster creativity, we propose a dual balance that differs from the “sensible balance” (Sweeny and Shepperd, 2007, p. 1064), which sees optimism and pessimism as extremes of the same construct. In a duality, they are opposing but mutually constituting poles (Farjoun, 2010). While these scholars argue that developing pessimism necessarily involves shelving optimism (Shepperd *et al.*, 2006; Sweeny *et al.*, 2006; Sweeny and Shepperd, 2007), we consider that developing pessimism does not necessarily require forgoing optimism, and that the interplay between optimism and pessimism matters for employees’ creativity.

The findings corroborate the literature maintaining that researchers should focus on positive phenomena without disregarding the (possibly positive) impact of the negative ones (Fredrickson, 2009, 2013; Kaufmann, 2015), and suggest that such an approach may be particularly useful to predict employees’ creativity. The findings move beyond the optimism/pessimism dualism as predictor of creativity in organizational settings and corroborate the literature focusing on the duality of a positivity ratio, converging with Fredrickson’s (2013, p. 818) argument that “(a) problems can occur with too much positivity and (b) appropriate negativity plays an important role in human flourishing.” The findings are also indicative of the fact that too much of a good thing is not necessarily the best way to reach a goal. This is an important contribution to understanding the factors that may be enacted to encourage employees’ creativity, points out the negatives/positives of the positives/negatives (Collinson, 2012; Judge and Ilies, 2004), and helps to avoid the risks of (over)positivity for employees’ performance and creativity. The findings also bolster the value of a duality conceptual lens through which to study organizational behavior and the social sciences in general (Farjoun, 2010). Our study contributes to the nascent literature on dualities, by explaining optimism and pessimism as being dually involved in the creation of positive outcomes.

Limitations and future studies

Despite these valuable contributions, the study is not free of limitations, and further work is necessary to test if the findings are replicated in other contexts and to use other methodological procedures. First, the reliability of the optimism (0.66) measure, although similar to the one found by Kivimaki *et al.* (2005; i.e. 0.65) is lower than 0.70. This value would increase to 0.72 if one item was removed. However, this would imply measuring optimism with just two items and would result in losing content coverage. Future studies may use measures with wider content coverage. Second, in comparison with the linear equation, the quadratic one increases only 8 percent of variance of creativity. Moreover, the wide values’ scattering of Figure 1 makes the empirical (nonlinear) pattern less reliable.

Third, being cross-sectional, the study examines neither the causal links between the optimism-pessimism ratio and creativity nor other plausible causal links. For example, creativity may lead individuals to experience more optimism, and the inability to produce creative solutions may increase pessimism. Future studies may adopt longitudinal or quasi-experimental designs. It is also possible that supervisors are influenced by a halo effect that leads them to describe employees with higher optimism-pessimism ratios more positively (i.e. rating them with higher creativity scores) than those with lower ratios. Supervisors’ ratings may also have been influenced by their own levels of optimism, pessimism, and affect. Therefore, future studies should: control for the supervisors/raters’

optimism, pessimism, and affect; test if the result found here is replicable in the same and in other contexts; and/or collect objective measures of creativity. Fourth, the study was carried out at a single moment and did not capture the dynamics that occur over the course of time involving changes in optimism/pessimism and creativity. Future longitudinal studies may be carried out to explore this process. Research diaries and/or the experience sample methodology may be particularly appropriate tools for gathering data in future studies (Amabile *et al.*, 2005). Such a procedure would allow testing if our proposal makes sense empirically (i.e. the duality of optimism and pessimism as co-originators of creative work).

Fifth, the study does not include moderators. It is likely that the optimism-pessimism ratio operates differently in different organizational/team climates and contexts (Mathisen *et al.*, 2012; Zhou and Hoever, 2014). For example, it is possible that the optimism-pessimism ratio is especially predictive of creativity in some contexts, such as sales, where most contacts with customers may recommend creative behaviors and performance. Future studies should explore this possibility, an opportunity out of the reach of this paper due to the small sample size. Some features of the organizational context and culture (e.g. a learning culture, psychological safety; Agars *et al.*, 2012; Martins and Terblanche, 2003; van Knippenberg and Hirst, 2015; Yeh-Yun Lin and Liu, 2012; Zdunczyk and Blenkinsopp, 2007) and some leadership behaviors (e.g. leader support, ethical leadership, authentic leadership; Mainemelis *et al.*, 2015; Politis, 2005; Simmons and Sower, 2012; Uusi-Kakkuri *et al.*, 2016; Williams, 2004) may also constitute opportunities for the optimism-pessimism ratio to turn into creative behaviors. Finally, future studies may explore the controversial topic of a “critical” positivity ratio. Although this study measured creativity through a seven-point scale, the optimal level (3.6), from a mere statistical point of view (maximum of a quadratic equation: the first parameter estimate, b_1 , is divided by twice the second one, b_2 ; see the bottom of Figure 1) is similar to the one found by Rego *et al.* (2012a), who used a five-point scale to measure creativity. Considering that the literature has presented different tipping points for different contexts and variables, and that the mere idea of the possible existence of any tipping point has been vehemently criticized (Brown *et al.*, 2013, 2014), future studies should continue to explore whether an ideal tipping point is, or is not, consistent within contexts and distinct across contexts.

Conclusion

The study enriches literature on employees’ creativity and the dynamics emerging from the optimism-pessimism interplay as well as the literature on the dualities of organization. Positivity promotes creativity, but some level of negativity may help positivity to produce positive outcomes, namely in terms of creativity (George and Zhou, 2007; Kaufmann, 2015; Tsai *et al.*, 2012). Therefore, our study is, to a certain extent, aligned with Csikszentmihalyi (1997), who defended that a creative personality contains opposites (see also Hoff *et al.*, 2012). It is also aligned with Kaufmann (2015), who argued that the “mainstream view,” which strongly celebrates the significance of positive affect, is insufficient to explain creativity, and that negative affect and positive affect may facilitate, or reinforce, the potential presented in each other in influencing/predicting creativity. Our research suggests that a similar pattern may emerge from the interplay between optimism and pessimism. Instead of viewing optimism and pessimism as opposite poles of the same construct, research may consider that they represent different constructs and that, at least in certain circumstances, both may interact and thus influence creativity in a positive way. Duality approaches enrich organizational studies by presenting processes in a richer and nuanced way than those advanced by dualistic forms of polarity.

This duality also has practical implications. First of all, it is important that organizations are not caught in the “positivity trap.” Adopting the assumption that optimists experience

more positive affect and thus are more creative (Rego *et al.*, 2012a, b; Wojtczuk-Turek and Turek, 2015), and looking to drive the pessimism away from the organization may lead to poor HR selection decisions and induce managers to create overoptimistic contexts that end up jeopardizing employees' creativity. Both optimism and pessimism are important in organizational contexts and may contribute to employee creativity. Second, considering that most of the work in modern organizations is carried out in teams, where individuals interact and cooperate in producing individual and team outcomes, it may be advisable (Hmieleski and Baron, 2009) to have team members with varying levels of optimism and pessimism.

In sum, our study does not fully support Oettingen and colleagues, who have called attention to the traps emerging from the "positive thinking" (e.g. Kappes and Oettingen, 2011; Oettingen, 2012, 2014) and have argued that "Positive thinking impedes performance because it relaxes us and drains the energy we need to take action" (Oettingen, 2016). But we suggest that some level of negative thinking may be an important ally of positive thinking in boosting the employees' creativity. Why bother proposing new and useful ideas for solving problems if the problems are seen as non-problems or that they are problems that will solve themselves?

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Appendix

Measures

Optimism and pessimism (from Scheier et al., 1994)

In uncertain times, I usually expect the best (optimism).

It is easy for me to relax (filler).

If something can go wrong for me, it will (pessimism).

I am always optimistic about my future (optimism).

I enjoy my friends a lot (filler).

It is important for me to keep busy (filler).

I hardly ever expect things to go my way (pessimism).

I do not get upset too easily (filler).

I rarely count on good things happening to me (pessimism).

Overall, I expect more good things to happen to me than bad (optimism).

Creativity (from Zhou and George, 2001)

Suggests new ways to achieve goals or objectives.

Comes up with new and practical ideas to improve performance.

Searches out new technologies, processes, techniques, and/or product ideas.

Suggests new ways to increase quality.

Is a good source of creative ideas.

Is not afraid to take risks.

Promotes and champions ideas to others.

Exhibits creativity on the job when given the opportunity to.

Develops adequate plans and schedules for the implementation of new ideas.

Often has new and innovative ideas.

Comes up with creative solutions to problems.

Often has a fresh approach to problems.

Suggests new ways of performing work tasks.

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