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2016

10.1111\_caim.12182.pdf

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# Regulatory Focus, Task Engagement and Divergent Thinking

Frederik Beuk and Tim Basadur

We investigate the effect of individuals' regulatory focus on divergent thinking performance. We analysed 3576 ideas, generated by 341 English-speaking adults who participated in two separate divergent thinking tasks. A promotion focus results in higher levels of creative potential. Based on regulatory fit theory, we find that task engagement mediates the positive effect of a promotion focus on creative potential. Our findings are robust regardless whether fluency, flexibility or uniqueness is used as the creative potential measure. Our study further uncovers that regulatory focus does not only change the quantity of ideas, but also impacts the type of ideas generated. Promotion focus individuals generate a broader range of ideas than prevention focus individuals.

## Introduction

Divergent thinking ability is crucial for successful creative problem solving, whether it be in the context of problem finding, solution finding or in solution implementation (Basadur, Basadur & Beuk, 2014). Higher performance during phases that require divergent thinking typically leads to better (Nemeth & Kwan, 1987; Basadur, Runco & Vega, 2000) and more creative outcomes (Runco, 2010). The current study investigates the impact of individuals' regulatory focus on divergent thinking performance, and pays special attention to the mediating role of task engagement. Divergent thinking tools like brainstorming require participants to regulate their own thought processes and behaviour in order to maximize creative output (Osborn, 1953; Paulus, Kohn & Arditti, 2011). Central to successful divergent thinking is the deferral of judgment about individual ideas until the idea generation phase has been completed (Runco, 2010). Because of this emphasis on self-regulation, regulatory focus theory is a germane theoretical lens to investigate divergent thinking performance. Regulatory focus theory (Higgins, 1997) has been used in several creativity studies (e.g., Friedman & Förster, 2001; Baas, De Dreu & Nijstad, 2008); however, limited attention has been given to the mechanism behind this effect of regulatory focus on creative performance.

At the core of regulatory focus theory is that individuals differ in their goal attainment

strategy. Based on a lifetime of environmental feedback and conditioning, individuals acquire a trait-like tendency to approach successful outcomes, called a promotion focus, or to avoid negative outcomes, called a prevention focus. Regulatory focus theory does not predict an individual's overall level of success in goal achievement. Both foci can lead to equally successful goal attainment, but through different goal expressions.

We argue that an individual's regulatory focus predicts divergent thinking performance, that a promotion focus in particular has a greater fit (Higgins, 2000) with the activities during the idea generation or ideation phase stage of the creative process, and that a prevention focus is less conducive to divergent thinking.

Divergent thinking is the generation of a variety of different ideas based on given information (Guilford & Hoepfner, 1971) and is the precursor to deciding on the best idea(s). Extant research demonstrates that the more inclusive the list of alternatives is, the greater the likelihood that the best idea is selected (Basadur, Runco & Vega, 2000; Runco, 2010). Many tests of creativity are in essence divergent thinking tests, including the Torrance Tests of Creative Thinking, and the well-used Alternate Uses of a Brick test (Guilford, 1956). Although not synonymous, divergent thinking tests are useful estimates of creative thinking (Runco, 1991). Divergent thinking performance is traditionally measured by fluency, flexibility and originality

scores (Acar & Runco, 2012). Fluency scores are determined by counting the total number of relevant ideas given, flexibility by determining the total number of different categories into which the ideas can be classified, and originality scores are based on the statistical infrequency of the ideas in relation to the total ideas given (Torrance, 1964). Divergent thinking tests represent estimations 'of the potential for creative thinking and problem solving,' and are considered to provide objective insights into creative potential in the workplace (Runco, 2010, p. 424).

In the following section, we first propose to replicate a frequently reported link between promotion focus and higher divergent thinking performance, but set out to establish whether this also holds true for different operationalizations of divergent thinking performance, and hypothesize how these operationalizations relate to each other. We then study the main effects of regulatory focus on task engagement and self-report performance, and ultimately test whether task engagement can be a mediator between individual's regulatory focus and divergent thinking performance.

### Conceptual Development

A promotion focus has been linked with higher creative performance and a prevention focus linked with higher analytical performance (Seibt & Förster, 2004). The current view is that creativity is not merely serendipitous, but instead effortful, requiring an approach strategy. It does not result from an avoidant strategy, where a focus on safety and security from danger prevents individuals from taking risks. In fact, creativity by definition involves stepping into the unknown and accepting uncertainty inherent with risk of failure. Increasingly, research into the effect of regulatory focus on creativity focuses on the boundary conditions under which this effect is no longer true. For example, Roskes (2014) argues that, although constraints generally hamper creativity, constraints that focus cognitive effort can increase creativity. Similarly, Baas, De Dreu and Nijstad (2011) find that as long as undesirable end states have not yet been avoided, prevention-focused individuals perform at similar levels of originality and creativity as promotion-focused individuals. Regardless of these boundary conditions, substantial support remains for the main effect that promotion focus individuals generate more creative solutions than do prevention focus individuals (Crowe & Higgins, 1997; Friedman & Förster, 2001; Seibt & Förster, 2004). One mechanism behind this effect is that

promotion focus individuals have a tendency to eagerly avoid errors of omission, whereas prevention focus individuals vigilantly avert errors of commission (Crowe & Higgins, 1997; Keller & Bless, 2006). Our view is that when promotion focus individuals are asked to generate a list of ideas, they perceive a lower threshold to include ideas, resulting in a higher number of ideas generated (fluency). This tendency to set a lower bar for idea inclusion also translates into the generation of a higher number of different idea categories, resulting in a higher flexibility score. Finally, promotion focus individuals favour a riskier processing style (Keller & Bless, 2006), leading them to come up with more out-of-the-ordinary or unique responses. Further, a promotion focus increases memory search for novel responses (Friedman & Förster, 2001), which suggests that individuals draw upon more mental resources to help accomplish the creative task. In sum, when comparing the divergent thinking output of individuals, we hypothesize the following:

*H1: Individuals with a stronger promotion focus score higher in: (a) idea fluency, (b) idea flexibility, (c) idea uniqueness.*

These three measures of creative divergent thinking output can be insightful, but are also typically strongly correlated (Clark & Mirels, 1970). Additional performance information can hide in the relationship between these measures. The ratio between fluency and flexibility is an indication for the depth with which a respondent investigates a certain creative avenue. A high quotient is indicative of a large number of ideas in a small number of categories, whereas a quotient approaching one is indicative of creative responses in as many different categories. The dual pathway model of creativity (De Dreu, Baas & Nijstad, 2008; Nijstad et al., 2010) suggests there are two pathways to creative output: cognitive flexibility and persistence. A higher ratio between fluency and flexibility is indicative of persistence, whereas a lower ratio is indicative of cognitive flexibility. A more global processing style, often associated with a promotion focus (Friedman & Förster, 2001; Pham & Chang, 2010), enhances cognitive flexibility compared to individuals with a more local processing style. When a task requires broad thinking, e.g., the improvement of an existing product, a promotion focus would enhance performance because it boosts cognitive flexibility (Crowe & Higgins, 1997). On the other hand, when a task requires a more in-depth approach to a more narrowly defined problem, e.g., different ways to categorize a large

set of data, a prevention focus would enhance performance because it boosts persistence (Nijstad et al., 2010). Finally, prevention focus individuals favour consistency in their behaviour (Zhang, Cornwell & Higgins, 2013). Once a certain idea category is identified, prevention focus individuals will be more likely to generate new ideas within that same idea category. Therefore we hypothesize that:

*H1d: Promotion focus individuals have a lower ratio between fluency and flexibility (i.e., fewer ideas per idea category) than prevention focus individuals.*

To investigate how regulatory focus may impact the creative potential of respondents, we focus particularly on the engagement in the divergent thinking activities expressed through participants' self-perception of creative performance, and their self-reported task engagement. Based on regulatory fit theory (Higgins, 2000), we expect that those who experience the greatest fit between their regulatory style and the divergent thinking assignments will report higher task engagement and higher performance (Freitas & Higgins, 2002).

Divergent thinking tasks favour the generation of a large quantity of new creative ideas, rather than a specific narrow quest for the ideal or optimal idea (Van Dijk & Kluger, 2011). For example, the instructions typically encourage the generation of a large quantity of ideas, and de-emphasize the focus on considering only high quality ideas (Paulus, Kohn & Arditto, 2011). The difference in strategic goal orientations suggests that a link between regulatory focus and task engagement will be stronger for promotion focus individuals as such guidelines particularly resonate with individuals with a promotion focus, while diminishing the motivational impact of failure avoidance for prevention-focused individuals. This greater fit experienced by promotion focus individuals results in higher levels of anticipated engagement, as well as actual engagement of the task once completed (Freitas & Higgins, 2002; Bianco, Higgins & Klem, 2003). We therefore hypothesize:

*H2a: Promotion focus individuals report higher levels of task engagement on divergent thinking tasks than prevention focus individuals do.*

In turn, higher levels of task engagement can result in increased motivation and subsequent enhanced performance (Bianco, Higgins & Klem, 2003). Moreover, higher levels of regulatory fit between regulatory focus and task objectives also upwardly bias self-evaluations of

performance (Freitas & Higgins, 2002). These higher self-perceptions of creative performance can in turn result in higher actual creative performance (Tierney & Farmer, 2002), creating positive reinforcement that influences subsequent creative efforts.

*H2b: Promotion focus individuals rate their own performance on divergent thinking tasks higher than prevention focus individuals do.*

Higgins (2006) posits that high levels of regulatory fit create a cognitive experiential value that impacts task engagement. Conditions of high fit help to sustain individuals' engagement, whereas conditions of non-fit, conversely, disrupt engagement. Research indicates that high levels of regulatory fit motivate people to more fully engage in the activities in which they perceive fit (Förster, Higgins & Idson, 1998; Higgins, 2000; Vaughn, Baumann & Klemann, 2008), and spend more time on those activities (Wang & Lee, 2006). Given the fit we propose between the nature of divergent thinking tasks and a promotion focus, we therefore expect that:

*H2c: Promotion focus individuals engage in the divergent thinking tasks for more time than prevention focus individuals do.*

Hypotheses 1 and 2 discuss the positive relationship between a promotion focus and creative performance, as well as the positive relationship between a promotion focus and engagement in divergent thinking exercises. However, it is also important to understand how the combination of these two factors impact creative output. In general, it is known that fuller engagement with a creative exercise improves creative output (Reiter-Palmon & Robinson, 2009). On the one hand, it could be that a promotion focus allows for more engagement in the creative exercise. On the other hand, it is also possible that engagement moderates the relationship between a promotion focus and creative performance, in essence enhancing its effect. Higgins (1997) suggests that the effect of engagement primarily is a mediator and not a moderator. High regulatory fit, according to theory, results in greater engagement in tasks, which then increases the sense of value people perceive in what they are doing, and this value takes the form of higher motivation and more positive feelings about their efforts (Higgins, 2000, 2006). For individuals with a promotion focus working on divergent thinking tasks, higher engagement should result in feelings of enjoyment and high perceptions of accomplishment (Freitas & Higgins, 2002; Bianco, Higgins & Klem, 2003). Furthermore, positive feedback

loops can occur when the engagement leads to more effort spent on the activity, which in turn results in higher performance. We therefore hypothesize:

*H3: Task engagement mediates the relationship between regulatory focus and creative performance on divergent thinking tasks.*

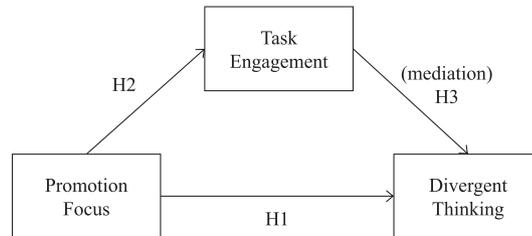


Figure 1. Conceptual Model

The three hypotheses combined form the conceptual model shown in Figure 1.

## Methodology

### Sample

We recruited 341 non-student participants for this study through StudyResponse, a non-profit provider of pre-screened online respondents for academic purposes (Stanton & Weiss, 2002). This panel has been used successfully for several creativity studies (e.g., Agypt, Rubin & Spivack, 2012; Eschleman et al., 2014). Each respondent was paid US \$7 for their participation. Given the nature of our study, we sought a sample of respondents with high proficiency in English. We eliminated all potential participants who indicated English was not their first language, and further verified that all respondents could write English at a (near) native level by analysing a short writing exercise. Ages ranged between 22 and 72 ( $M = 43.1$  years,  $SD = 10.7$  years), and 39.7 per cent of the sample was female. The sample was highly educated, 62.2 per cent had completed college and 27.2 per cent had at least some graduate education. On average, the survey took respondents 22.8 minutes ( $SD = 9.0$ ) to complete.

### Measures

Two previously developed alternative generation exercises were used to assess the respondents' creative potential: The Food for Thought exercise (Mikulincer, Paz & Kedem, 1990; Choi & Thompson, 2005), and a product improvement exercise that is adapted from the work of Guilford (1956) and Torrance's (1974)

subtest 4, which examined ways to improve a toy elephant to make it more fun to play with. For the Food for Thought creativity exercise, participants must consider a list of 12 fruits (banana, apple, pear, strawberry, mango, cherry, orange, nectarine, raspberry, kiwi, blueberry and peach) and are tasked with generating criteria that would sort the fruits into meaningful subgroups. The exercise is unique in that it consists of elements of two classic cognitive exercises associated with creativity research: divergent thinking and sorting. The exercise asks participants to consider how the fruit might be categorized, which is to think divergently about convergence (Basadur, Basadur & Beuk, 2014).

For the product improvement exercise we showed participants a picture of a white clawfoot bathtub, and asked them to generate ideas on how this bathtub could be improved. This exercise is a variation of the product improvement test in the Torrance Tests of Creative Thinking (Torrance, 1964).

No time limit was set for respondents, as time spent on the exercises was one of the dependent variables of interest (cf. Mednick, 1962). In addition, Florack and Hartmann (2007) find that adding time pressure reinforces the state-specific regulatory focus, and thereby limits the impact of the respondent's trait-specific regulatory focus. Two independent judges standardized the responses and designed a categorization structure based on the ideas generated by all the respondents. Fluency was calculated by counting the number of ideas per respondent. Flexibility was calculated by creating a lexicon of all ideas, and compiling similar ideas into categories. The flexibility score represents the number of different idea categories the respondent used. We constructed two sub-measures: first, a fine-grained categorization scheme, and second, a cruder categorization scheme with fewer meta-categories. Finally, uniqueness was computed by counting the ideas that were mentioned by 5 per cent or less of the respondents.<sup>1</sup>

After each of the creative potential exercises, respondents completed a three-item self-evaluation on how creative they considered their performance, and a four-item self-evaluation based on the Intrinsic Motivation Inventory (Ryan, 1982; McAuley, Duncan & Tammen, 1989) that captured the engagement with the exercise (see the Appendix). For practical rather than theoretical reasons we decided to measure the respondents' chronic promotion and prevention foci with the 11-item Regulatory Focus Questionnaire (RFQ) (Higgins et al., 2001) rather than prime or evoke a specific regulatory state. An important consideration for this choice was that our experiment was conducted online, and manipulating and properly assessing

respondents' state regulatory focus was expected to be more complex and subject to error.

## Results

For the Food for Thought exercise, 329 respondents generated a total of 2,169 ideas, or 6.6 ideas per respondent on average. Two judges then standardized the ideas, correcting for different spellings or alternative ways to describe the same idea (Mikulincer, Paz & Kedem, 1990; Choi & Thompson, 2005). This resulted in 246 unique ways of categorizing the 12 fruits. The same judges then collapsed these 246 unique categorization ideas into 44 category groups, and seven meta-categories.<sup>2</sup> For the bathtub improvement exercise, 323 respondents generated a total of 1,407 valid ideas, reflecting on average 4.35 valid ideas per respondent. A similar approach as for the Food for Thought creativity exercise was taken to compile and categorize the ideas. After compilation, 562 unique improvement ideas were identified, fitting 67 different idea categories. These 67 categories of improvement ideas were then reduced to five meta-categories. Similar to the Food for Thought exercise we calculated fluency, uniqueness, flexibility-67, and flexibility-5 measures.

Table 1 shows there is a high correlation between the different creative output measures fluency, flexibility and, to a lesser degree, uniqueness ( $r=0.55-0.97$ ,  $p < 0.00$ ). In line with meta-analytic findings (Gorman et al., 2012), the RFQ-promotion and RFQ-prevention scales are only weakly correlated ( $r=0.11$ ,  $p=0.07$ ). Because recent simulation studies have shown that typical discriminant validity criteria such as an examination of the cross-loadings and the Fornell-Larcker criterion only identify a small portion of discriminant validity violations (Henseler, Ringle & Sarstedt, 2015), we use the heterotrait-monotrait ratio (HTMT) to assess discriminant validity between all constructs. The HTMT values between all constructs range between 0.10 and 0.38, well below the conservative threshold of 0.85 (Kline, 2011).

We regress the fluency scores of the fruit and bathtub exercises on the promotion and prevention scores of respondents. Both the fruit and bathtub exercise fluency models reach significance,  $F_{(2,249)}=9.56$ ,  $p < 0.00$ , Adj  $R^2=6.4$  per cent, and  $F_{(2,247)}=7.34$ ,  $p < 0.00$ , Adj  $R^2=4.9$  per cent with only the promotion score having a significant and positive impact on the fluency outcome,  $\beta=0.25$ ,  $p < 0.00$  and  $\beta=0.22$ ,  $p=0.001$  for the fruit and bathtub exercises, respectively (see Table 2). As we test multiple models based on the same dependent data, caution should be given to the increased likelihood of statistical

findings by chance (Bland & Altman, 1995). A common remedy, albeit one not without controversy (Perneger, 1998) would be to adjust the necessary  $p$ -values downward by a factor 4, representative of the maximum number of significance tests we perform on the same dependent variable. In other words, to avoid type I errors,  $p$ -values over 0.0125 should lead to rejecting the hypotheses discussed in Table 2. Even with taking the Bonferroni adjusted  $p$ -values into account, Hypothesis 1a is supported: promotion-focused participants score higher in fluency than do prevention-focused individuals.

To test Hypotheses 1b and 1c, we regress the flexibility and uniqueness scores of the fruit and bathtub exercises on promotion and prevention scores. We mostly find support for Hypothesis 1b that promotion focus individuals score higher on flexibility. For the fruit categorization exercise, this effect remains at both the low and high level of abstractness of the categories. For the bathtub improvement exercise, the support is strong at the 67 meta-categories operationalization of creative potential, but substantially weaker when creative potential is assessed on only five meta-categories. Although the model is directionally in line with the other findings and by relaxed standards could be seen as marginally significant,  $F_{(2,247)}=2.44$ ,  $p=0.09$ , it is clear that a Bonferroni adjusted  $p$ -value does not satisfy acceptable levels of rigour. Finally, the effect of regulatory focus on uniqueness measures as described in Hypothesis 1c is also supported for both types of divergent thinking exercises.

We also assess the ratio between fluency and flexibility. There is a weak but positive correlation between the fluency–flexibility ratio for the fruit categorization and bathtub improvement exercises ( $r=0.15$ ,  $p=0.02$ ). Regressing the fluency–flexibility ratio onto the respondents' promotion and prevention score yields a significant model for the bathtub improvement exercise,  $F_{(2,247)}=6.04$ ,  $p < 0.01$ , Adj  $R^2=3.9$  per cent. The impact of a promotion focus is significant and positive,  $\beta=0.17$ ,  $p < 0.01$ , whereas the impact of the respondents' prevention focus is not significant. However, the fruit categorization model fails to reach significance,  $F_{(2,249)}=1.07$ , n.s., providing only partial support for Hypothesis 1d.

We use the same regression methodology to test Hypothesis 2 (see Table 3). We find support for Hypothesis 2a, i.e. promotion focus individuals report higher task engagement than prevention focus individuals. This holds true even when we control for objective performance as measured by the respondents' fluency scores. This finding is mirrored by the self-reported creative performance, which also is higher for promotion focus individuals than it is for prevention focus individuals, supporting

Table 1. Correlation Table of Regulatory Focus and Divergent Thinking Performance Measures

Regulatory Focus	Mean	SD	N	item	$\alpha$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1. Promotion Orientation	22.2	3.9	265	6	0.72																
2. Prevention Orientation	16.5	4.1	266	5	0.81	0.11															
<b>Fruit Categorization Exercise</b>																					
3. Number of ideas	7.5	4.8	251	-	0.26*	0.09															
4. Idea categories based on 44 categories	5.6	3.0	251	-	0.20*	0.05	0.91*														
5. Idea categories based on 7 meta-categories	3.1	1.4	251	-	0.23*	0.08	0.69*	0.74*													
6. Ideas only given by 5% or less of respondents	2.4	2.9	251	-	0.19*	0.11	0.85*	0.68*	0.57*												
7. Self Evaluation of Performance	9.4	3.3	266	3	0.92	0.21*	-0.02	0.14**	0.10	0.19*	0.20*										
8. Self Evaluation of Enjoyment	13.8	3.3	265	4	0.77	0.26*	0.14**	0.27*	0.24*	0.25*	0.24*	0.67*									
9. Time spent (in seconds)	117.4	95.1	255	-	0.20*	0.04	0.60*	0.57*	0.49*	0.54*	0.05	0.20*									
<b>Bath Improvement Exercise</b>																					
10. Number of ideas	5.0	3.2	248	-	0.23*	0.10	0.61*	0.58*	0.44*	0.51*	0.02	0.17*	0.41*								
11. Idea categories based on 67 categories	4.5	2.6	248	-	0.23	0.08	0.58*	0.59*	.045*	0.47*	0.00	0.16**	0.42*	0.97*							
12. Idea categories based on 5 meta-categories	2.1	0.8	248	-	0.13**	-0.04	0.44*	0.46*	0.32*	0.31*	-0.05	0.12	0.29	0.62*	0.66*						
13. Ideas only given by 5% or less of respondents	3.4	2.8	266	-	0.19*	0.11	0.57*	0.54*	0.43*	0.50*	0.04	0.19*	0.41*	0.91*	0.88*	0.55*					
14. Self Evaluation of Performance	9.7	3.1	265	3	0.91	0.21*	-0.03	0.00	-0.05	0.05	0.04	0.65*	0.46*	-0.03	0.07	0.05	0.02	0.07			
15. Self Evaluation of Enjoyment	13.6	3.3	261	4	0.75	0.25*	0.04	0.08	0.04	0.10	0.08	0.43*	0.58*	0.15**	0.27*	0.27*	0.13**	0.25*	0.71*		
16. Time spent (in seconds)	103.2	91.0	251	-	0.21*	0.14**	0.46*	0.46*	0.34*	0.38*	0.02	0.18*	0.63*	0.61*	0.59*	0.39*	0.61*	0.05	0.23*		

\* =  $p < 0.01$ ;\*\* =  $p < 0.05$

Table 2. Regression Models of Fluency, Flexibility, and Uniqueness Measures of Divergent Thinking

Dependent Variable	Model Significance	Adj $R^2$	Promotion	Prevention
Fruit – Fluency	$F_{(2,249)} = 9.56, p < 0.00$	6.4%	$\beta = 0.25, p = 0.00$	$\beta = 0.06, n.s.$
Fruit – Flexibility – 44 categories	$F_{(2,249)} = 5.49, p = 0.01$	3.5%	$\beta = 0.20, p = 0.00$	$\beta = 0.03, n.s.$
Fruit – Flexibility – 7 categories	$F_{(2,249)} = 7.55, p = 0.00$	5.0%	$\beta = 0.23, p = 0.00$	$\beta = 0.05, n.s.$
Fruit – Uniqueness	$F_{(2,264)} = 5.64, p = 0.00$	3.5%	$\beta = 0.18, p = 0.00$	$\beta = 0.09, n.s.$
Bathtub – Fluency	$F_{(2,247)} = 7.34, p = 0.00$	4.9%	$\beta = 0.22, p = 0.00$	$\beta = 0.07, n.s.$
Bathtub – Flexibility – 67 categories	$F_{(2,247)} = 7.33, p = 0.00$	4.9%	$\beta = 0.22, p = 0.00$	$\beta = 0.06, n.s.$
Bathtub – Flexibility – 5 categories	$F_{(2,247)} = 2.44, p = 0.09$	1.2%	$\beta = 0.14, p = 0.03$	$\beta = -0.06, n.s.$
Bathtub – Uniqueness	$F_{(2,264)} = 5.75, p = 0.00$	3.5%	$\beta = 0.18, p = 0.00$	$\beta = 0.09, n.s.$

Table 3. Regression Models of Task Engagement and Self-evaluation of Creative Performance

Dependent Variable	Model Significance	Adj $R^2$	Promotion	Prevention	Performance
Fruit – Task engagement	$F_{(3,249)} = 4.68, p < 0.01$	4.2%	$\beta = 0.19, p < 0.01$	$\beta = -0.02, n.s.$	$\beta = 0.10, n.s.$
Fruit – Self-evaluation	$F_{(3,248)} = 11.68, p = 0.00$	11.4%	$\beta = 0.18, p < 0.01$	$\beta = 0.14, p = 0.03$	$\beta = 0.21, p < 0.01$
Bathtub – Task engagement	$F_{(3,243)} = 4.79, p < 0.01$	4.4%	$\beta = 0.23, p = 0.00$	$\beta = -0.08, n.s.$	$\beta = 0.02, n.s.$
Bathtub – Self-evaluation	$F_{(3,246)} = 9.34, p = 0.00$	9.3%	$\beta = 0.19, p = 0.00$	$\beta = -0.01, n.s.$	$\beta = 0.23, p = 0.00$

Table 4. Regression Models of Time Spent on Fruit and Bathtub Exercises

Dependent Variable	Model Significance	Adj $R^2$	Promotion	Prevention
Time Spent on Fruit	$F_{(2,258)} = 4.44, p = 0.01$	2.6%	$\beta = 0.18, p = 0.01$	$\beta = 0.04, n.s.$
Time Spent on Bathtub	$F_{(2,252)} = 4.70, p = 0.01$	2.9%	$\beta = 0.14, p = 0.02$	$\beta = 0.11, n.s.$
Ideas per second Fruit	$F_{(2,242)} = 2.56, n.s.$			
Ideas per second Bathtub	$F_{(2,236)} = 1.74, n.s.$			

Hypothesis 2b. Not surprisingly, the effect of objectively measured creative performance does play a significant role in respondents' self-evaluation of performance.

In addition to these self-report measures of performance and engagement, we also investigate the amount of time spent on each exercise (see Table 4). We find support for Hypothesis 2c. The model that explains the time spent on the fruit exercise is significant, accounting for 2.6 per cent of the variance in time spent,  $F_{(2,258)} = 4.44, p = 0.01$ . As expected, the respondents' promotion focus is the only significant driver behind these results,  $\beta = 0.18, p < 0.01$ . For the bathtub improvement exercise, a regression model with the respondents' regulatory focus as independent variables explains 2.9 per cent of the variance in time spent,  $F_{(2,252)} = 4.70,$

$p = 0.01$ , and shows significant positive effects for promotion-focused respondents,  $\beta = 0.14, p = 0.02$ . When adding the actual time spent in addition to the respondents' regulatory focus to explain divergent thinking performance, a clear picture emerges that persistency pays off. For the bathtub exercise, a model with these three variables explains 24.8 per cent of the variance in creative fluency,  $F_{(2,235)} = 26.88, p < 0.00$ , with the respondents' promotion focus and the time spent on the exercise as the two significant drivers,  $\beta = 0.16, p < 0.01$  and  $\beta = 0.47, p < 0.00$ , respectively. These results are also present in the fruit categorization exercise, where a model with the regulatory focus and time spent explains 30.1 per cent of the variance in creative fluency,  $F_{(2,242)} = 35.78, p < 0.00$ . Again, the respondents' promotion focus and the time spent

are the significant drivers,  $\beta=0.18$ ,  $p < 0.01$  and  $\beta=0.49$ ,  $p < 0.00$ , respectively.

Finally, we look at the number of ideas generated per second for both the fruit categorization and bathtub improvement exercises. Not surprisingly, there is a substantial correlation between the speed of idea generation for both exercises,  $r=0.62$ ,  $p < 0.00$ . However, neither promotion, nor prevention focus predicts the ideas per second for either creative exercise.

We test for mediation with a PLS path model (Ringle, Wende & Becker, 2015) for the bathtub improvement exercise. Given the consistency of our findings in Hypotheses 1 and 2 for the different divergent thinking outcome measures, we use fluency, flexibility and uniqueness as indicators of the latent variable 'Divergent Thinking'. This approach is justified by a high Cronbach's alpha of 0.92, and an average variance extracted of 0.82 for this composite measure. As our sample included respondents with a wide range of ages, we controlled for the effect of age on divergent thinking performance.

Initially, the path between promotion focus and divergent thinking performance is significant and positive,  $\beta=0.17$ ,  $p < 0.01$  (see Figure 2). When adding the path between promotion focus and exercise engagement, the direct effect loses its significance,  $\beta=0.11$ , in favour of the mediated path. In other words, the impact of regulatory focus on divergent thinking performance is mediated by the engagement or intrinsic motivation for the bathtub improvement exercise. The results are slightly less clear for the fruit categorization exercise. Without including engagement as a mediator, the path coefficient for the direct effect of a promotion focus on divergent thinking is  $\beta=0.20$ ,  $p < 0.01$ . When adding the mediation effect, the strength of the main effect path decreases, but is still significant at the 5 per cent level,  $\beta=0.14$ ,  $p=0.03$ . Given that the results for the fruit categorization exercise are directionally supportive of a mediation effect, and the bath improvement exercise is clearly indicative of a mediation effect, we consider Hypothesis 3 mostly supported (Figure 2).

## Discussion

The amount of variance that is explained by the focal variables of Hypothesis 1 ranges between 1.2 and 6.4 per cent. This is in line with what one would expect when only considering regulatory focus as the explanation for such complex outcome variables as creative performance, creative self-evaluation and the time spent on the creative exercise. The importance of our study lies in the consistency of our findings over these different outcome measures. A promotion focus is directly linked to higher divergent thinking output, and this effect is mediated by the increased engagement promotion-focused individuals experience when working on a divergent thinking task. This is important, because creative processes start with the generation of alternatives (Mumford, Medeiros & Partlow, 2012; Basadur, Basadur & Beuk, 2014), and the more alternatives that are generated, the better is the ultimate creative output (Basadur, Runco & Vega, 2000, Girotra, Terwiesch & Ulrich, 2010). Moreover, the consistency in our findings over two independent creative tasks, and across the different creative output measures of fluency, flexibility and uniqueness, including the different operationalizations of the latter at five percent, two percent, one percent, and truly unique ideas, is important for other researchers who rely on creative fluency as the only outcome measure. The lack of support for the flexibility model that investigates the bathtub improvement exercise with only five meta-categories provides a caveat for researchers that the level of aggregation of creative performance could matter.

In Hypothesis 2 we investigated the regulatory fit effect. This effect suggests that the appeal of a message is enhanced when it matches the regulatory focus of the individual (Maliviya & Brendl, 2014). We argued that this regulatory fit effect explains the greater creative performance of promotion-focused individuals on divergent thinking tasks. Typical divergent thinking task instructions that tell respondents to 'list all of the ways you can think of ...' and

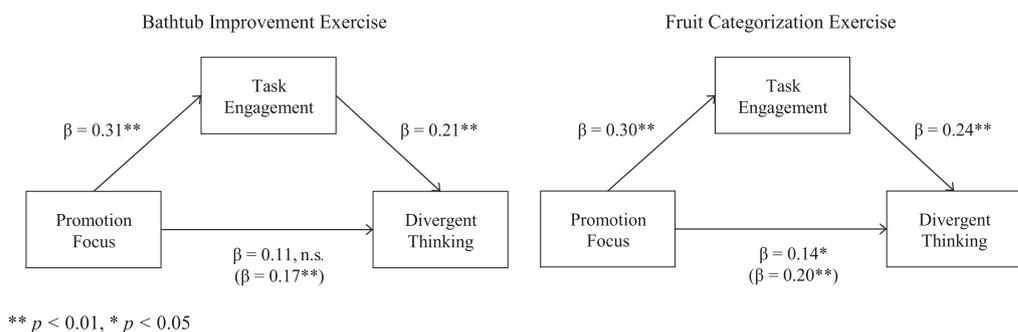


Figure 2. Mediation Effect of Exercise Engagement on the Relationship between Promotion Focus and Divergent Thinking.

to generate 'as many ideas as you can think of' are strong matches with a promotion focus, and therefore trigger higher task engagement and subsequent creative performance in individuals with a promotion focus. Conversely, when prevention focus individuals participated in the divergent thinking tasks, they experienced a regulatory mismatch, and consequently their goal drives were not activated to the same extent as the promotion-focused individuals, resulting in lesser creative performance.

We focused our investigation on the effects of individuals' chronic regulatory focus, without priming or inducing respondents to temporarily assume a certain regulatory state. This choice is inspired by the notion that to maximize creative performance, organizations may want to go beyond the simple temporary effect of situationally inducing a promotion focus. Evidence from affect regulation suggests that trait-consistent states may increase performance beyond either the state or trait (Tamir, 2005; Keller & Bless, 2006). Hence, our study into the baseline effect of the individual's chronic regulatory focus provides a starting point upon which further initiatives can be added to see if creative potential can be further enhanced.

The majority of our hypotheses are supported by the results from the two divergent thinking exercises. However, for Hypothesis 1d we expected to find that individuals with a promotion focus would have fewer ideas per category than those with a prevention focus, because promotion focus respondents would be less focused on trying to capture all the possible ideas within a category once identified, and consequently would be more tempted to jump to another meta-category for the next idea they generated. This notion was indeed supported for the bathtub improvement exercise. Subsequent product improvement ideas from prevention focus individuals were more likely to stay within the same meta-category. This finding has practical implications. First, it suggests that the regulatory focus of the individual not only influences the quantity of ideas, but also influences the type of ideas that he or she generates. For certain types of creative activities a deeper exploration of meta-categories would be beneficial, for example, the discovery of ideas for incremental innovations. For other types of creative activities, for example, generating ideas for more radical innovations, it may be preferable to generate ideas that fall into a larger number of meta-categories.

However, for the fruit categorization exercise we did not observe the hypothesized effect. The most likely explanation for the different results can be found in the differences in the two tasks. Although both divergent thinking exercises require the generation of ideas, the boundaries in the bathtub improvement exercise are qualitatively different from those in the fruit categorization exercise. It may be that the fruit

categorization task constrained participants to consider only more logical ideas, whereas the bathtub improvement exercise did not impose such logic constraints. The bathtub task is a classic divergent thinking exercise, and participants were free to think of any and all possible ideas that might improve the given bathtub. In the fruit categorization exercise, however, participants were constrained in their idea generation by the necessity that their ideas be plausible categories. In addition, some respondents benefited from more readily available knowledge about the listed fruits. Although both exercises are designed around everyday products that nearly everyone is familiar with, in hindsight it may be that vegetarians or nutrition-conscious persons, regardless of their regulatory focus, may find thinking about fruit categories easier than other people.

The findings for Hypothesis 2c are consistent with our regulatory fit argument and confirm that a promotion focus leads to more time spent on the creative exercises. Although the amount of time spent has a substantially larger effect size on creative fluency than regulatory focus, our follow-up analysis revealed that even when accounting for the extra time spent, promotion focus individuals still have a higher creative fluency. These findings underscore the importance of persistence in the idea generation stage of creative behaviour (Nijstad et al., 2010), and at the same time suggest that regulatory fit, similar to the hedonic tone from the dual pathway model of creativity, functions as a linkage between creative flexibility and creative persistence.

In practice this means that creative potential can be improved by selecting individuals with a stronger promotion focus, and stimulating persistence during the idea generation process (Basadur, Basadur & Beuk, 2014). Managers should know that task engagement is an important aspect of maximizing creative output. Although promotion focus individuals are already more likely to enjoy ideation activities, actions to further facilitate task engagement will be beneficial.

## Conclusion

We confirmed an important finding in the extant literature, namely that a promotion focus leads to more creative output. These findings remain substantially unchanged regardless of whether fluency, flexibility or uniqueness is used as the performance measure.

We use regulatory fit theory (Higgins, 2000) to explain why particularly promotion-focused individuals are more engaged in divergent thinking exercises, and demonstrate that the link between regulatory focus and divergent thinking performance is in fact mediated by task engagement.

We believe that our findings carry practical relevance, particularly because the costs of implementing our suggestions to improve regulatory fit are small, while the return on generating the potentially one extra idea that ultimately makes it through the entire creative process can be substantial.

Finally, we placed our results in the framework of the dual pathway model of creativity (De Dreu, Baas & Nijstad, 2008; Nijstad et al., 2010), and noted that regulatory focus influences both creative flexibility, as well as creative persistence.

### Limitations and Future Research

Our study unfortunately does not come without substantial limitations. We deployed existing scales for Task Enjoyment and RFQ. In hindsight, the similarities in wording of two items may have increased the risk of common method bias (Podsakoff et al., 2003). Although we could not find strong evidence for common method bias, for example a Harman's one-factor solution showed poor fit, we cannot fully rule out common method bias as a contributing factor to our findings. As we had been very conservative in the constructs that we collected for our study to avoid fatiguing respondents, we did not have an unrelated marker variable available to further rule out this bias.

The generalizability of our findings also has limitations. Although we believe that our findings can hold relevance for divergent thinking as part of the inputs for more complex creative processes, our divergent thinking exercises were conducted online, were isolated from any further creative process, and did not have real consequences for the respondents. Moreover, our two exercises only represent a small sample of individuals' creative potential. It therefore remains speculative whether performance in brainstorming sessions or other real-life creative processes show the same relationships with task engagement and regulatory focus as in our experiments. Yet, given the effect of a promotion focus on self-evaluations and the feedback loops that can occur because of that, a more in-depth analysis of the actual creative ideas that were generated may reveal interesting avenues for future research (cf. Basadur, Runco & Vega, 2000).

### Appendix

*Self-evaluation of Performance* (Tierney & Farmer, 2002)

1. The improvements I suggested are creative.
2. The improvements I suggested are novel.
3. The improvements I suggested are original.

*Self-evaluation of Task Engagement* (Ryan, 1982; McAuley, Duncan & Tammen, 1989)

1. I enjoyed this activity very much.
2. This activity did not hold my attention at all. (reverse coded)
3. I think I did well on this activity, compared to others.
4. I put a lot of effort into this activity.

*Regulatory Focus Prevention Sub-scale* (Higgins et al., 2001)

1. Growing up, would you ever 'cross the line' by doing things that your parents would not tolerate? (reverse coded)
2. Did you get on your parents' nerves often when you were growing up? (reverse coded)
3. How often did you obey rules and regulations that were established by your parents?
4. Growing up, did you ever act in ways that your parents thought were objectionable? (reverse coded)
5. Not being careful enough has gotten me into trouble at times. (reverse coded)

*Regulatory Focus Promotion Sub-scale* (Higgins et al., 2001)

1. Compared to most people, are you typically *unable* to get what you want out of life? (reverse coded)
2. How often have you accomplished things that got you 'psyched' to work even harder?
3. Do you often do well at different things that you try?
4. When it comes to achieving things that are important to me, I find that I don't perform as well as I ideally would like to do. (reverse coded)
5. I feel like I have made progress toward being successful in my life.
6. I have found very few hobbies or activities in my life that capture my interest or motivate me to put effort into them. (reverse coded)

### Notes

1. For sensitivity analysis, we also calculated uniqueness scores based on 2 per cent and 1 per cent of the respondents, as well as truly unique ideas, i.e. mentioned by only one individual. The results remain largely unchanged based on these other operationalizations.
2. For example, two respondents suggested the fruits could be categorized based on 'interior colour' and 'inside colour'. Judges standardized this idea to

'colour of flesh' which was grouped together in one of the 44 category groups called 'visual characteristics of fruit', including other ideas such as whether the fruits were 'yellow or not'. The visual characteristics were ultimately grouped together into the meta-category called 'physical characteristics of fruit' in which other category groups such as 'weight' and 'texture' were also present.

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