Understanding Innovating from Failure: Mechanisms and Pathways

Shen-Yang Lin

ABSTRACT

Failure is almost inevitable in the innovation process. However, little is known about how individuals can innovate from failure. Drawing on the dual pathway to creativity model and the cognitive appraisal theories, this study proposes two pathways of innovating from failure: a cognitive flexibility pathway and a negative emotion pathway. Using a sample of 252 undergraduate students, this study found that the cognitive flexibility-innovating from failure link is fully mediated by learning from failure, and the negative emotion-innovating from failure link is moderated by self-compassion.

1. INTRODUCTION

In a competitive environment, innovation is important for maintaining competence (Christensen, 2013). However, most innovations face a high failure rate because of the complex environment. Studies have shown that new product development has a failure rate of 40-90% (Gourville, 2006). While failure is almost inevitable in the innovation process, it is possible to innovate from failures. For example, the 3M Post-it Notes were developed from a failed glue product. Pfizer developed Viagra from the failed cardiac drug Sildenafil (Cannon & Edmondson, 2005). Yet, little is known about how individuals can innovate from failure. Therefore, this study aims to understand innovating from failure.

To understand the psychological process of innovating from failure, this study draws on cognitive appraisal theories of the stress (Lazarus & Folkman, 1984) and the dual pathway to creativity model (DPCM; De Dreu, Baas, & Nijstad, 2008). When confronting failure, the challenge appraisal may result in learning behaviors, whereas the threatening appraisal triggers negative emotions, and the two pathways together may lead to innovating from failure.

Following this logic, first, this study proposes the cognitive flexibility-innovating from failure link is mediated by learning from failure. Innovating from failure requires the integration of failure-related knowledge and novel information. When failure occurs, individuals may feel positively challenged and aim to build competence from failure (Amabile, Barsade, Mueller, & Staw, 2005; Dweck, 2000). Cognitive flexibility broadens attention and increases sensibility to environmental stimuli (Dennis & Vander Wal, 2010), which may help individuals to learn more and capture more novel ideas about improving failure.

Second, this study proposes the negative emotion-innovating from failure link is moderated by self-compassion. Negative emotion is like a double-edged sword which can result in both negative consequences (e.g., self-doubt) and positive consequences (e.g., focusing on the problems) (De Dreu et al., 2008; George & Zhou, 2007; Kaufmann, 2003). Self-compassion refers to the ability to regard one's feelings of suffering with a sense of warmth, connection, and concern (Neff, 2003a, 2003b). High self-compassionate individuals regard their negative emotions after failure as part of the larger human experience (Neff, 2003a), and thus individuals feel comfortable to probe failure with their negative emotions. Conversely, low-compassionate individuals increase the tendency to blame themselves after failure (Nolen-Hoeksema, 2000) (Figure 1).

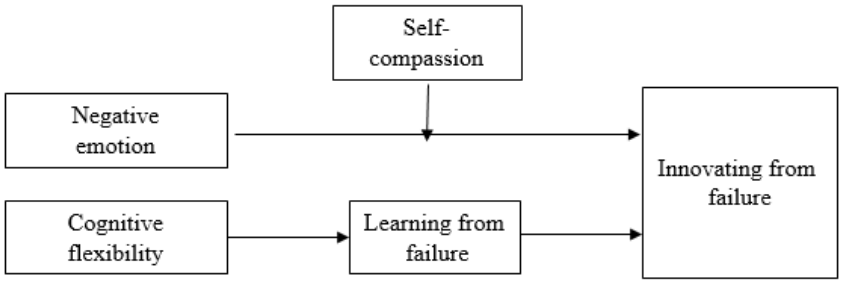

Figure 1 Conceptual Model of Innovating from Failure

1.1 Theoretical Background

Innovation is defined as "the intentional introduction and application within a role, group or organization of ideas, processes or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, organization or wider society" (West & Farr, 1990, p. 9). Failure is conceptualized subjectively as unacceptably low performance (e.g., Shepherd & Cardon, 2009, p. 924; Shepherd & Kuratko, 2009, p. 452; Shepherd, Patzelt, & Wolfe, 2011, p. 1229) or objectively as the nonattainment of an expected result (Cannon & Edmondson, 2001, p. 216; 2005, p. 330; Edmondson, 2004), which specifically indicates that the discrepancy must be improved. Applying the argument that "innovation involves both idea generation and idea implementation" (e.g., Amabile, 1996; Bledow, Frese, Anderson, Erez, & Farr, 2009; Hülsheger, Anderson, & Salgado, 2009) in the failure situation, I define innovating from failure as generating ideas from the nonattainment of a desired goal, which is perceived as a failure, and implementing this insight to ensure the original failure is innovative.

DPCM suggests creativity can be achieved through cognitive flexibility and cognitive persistence (De Dreu et al., 2008; Nijstad, De Dreu, Rietzschel, & Baas, 2010). DPCM proposes

that a flexibility pathway helps individuals employ novel ideas and remote association, whereas a persistence pathway with negative emotions foster systematic information processing.

1.2 Challenge/Threat Appraisals as Reactions to Failure

According to Lazarus' transactional model of stress (Lazarus & Folkman, 1984), when confronting the threat of failure, individuals may appraise the situation differently due to their perception. Cognitive appraisal is defined as the process of evaluating a stimulus regarding its relevance and implications. The primary appraisal is about the evaluation of potential harm, where negative emotions may occur. The secondary appraisal involves cognitively assessing one's ability to successfully deal with the difficulties, where the challenge appraisal and learning activities may occur. Taking cognitive appraisal theories of the stress (Lazarus & Folkman, 1984) and the dual pathway to creativity model together (DPCM; De Dreu et al., 2008), this study proposes two pathways of innovating from failure (i.e., a cognitive flexibility pathway and a negative emotion pathway).

Cognitive Flexibility Pathway

Dual Pathway to Creativity Model (DPCM; De Dreu et al., 2008) suggests that individuals can achieve creativity and innovation through a cognitive flexibility pathway, which includes global, diverse information-processing style, and explorative behaviors. For example, De Dreu, Nijstad, and Baas (2011) demonstrate that cognitive flexibility can lead to creativity.

According to the idea of challenge appraisals (Lazarus & Folkman, 1984), individuals may be challenged to do better after failure. Cognitive appraisal can foster learning and innovating from failure because it helps individuals to focus on positive outcomes and potential gains, which may lead to greater creativity (Friedman & Förster, 2001). Failure may provide individuals rich information to learn (McGrath, 2001). As such, when confronting failure, individuals may feel positively challenged and thus they may perceive more learning opportunities from failure. Moreover, failure is often an unfamiliar situation with which individuals have little related experience. This challenge appraisal may stimulate exploratory behavior (Friedman & Förster, 2000), which may enable individuals to discover and learn more diverse information related to failure. Furthermore, because cognitive flexibility involves mindset switching, it may help individuals to perceive failure as a resource for learning rather than as an experience of defeat. Hence, cognitive flexibility can enhance learning from failure.

Learning from failure is defined as the sense that one is acquiring, and can apply, knowledge

and skills (Shepherd et al., 2011; Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005). Learning goal orientation theory proposes that individuals may view failure as an opportunity to build competence (Dweck, 2000). When failure occurs, individuals can feel positively challenged, and be motivated to learn more information from failure. Such learning behavior may help individuals master their domain knowledge, which is related to greater creativity and innovation after failure (Amabile, 1996; Hirst, Van Knippenberg, & Zhou, 2009). Moreover, as individuals learn more about failure, they become better in making novel associations with failure. Therefore, learning from failure may lead to innovating from failure.

Cognitive flexibility also enhances innovating from failure. Cognitive flexibility broadens attention and increases sensibility to environmental stimuli (Dennis & Vander Wal, 2010), which may help individuals to capture more novel ideas about improving failure. Moreover, cognitive flexibility enables individuals to be open to a new experience and reduces levels of latent inhibition (Carson, Peterson, & Higgins, 2003). Thus, individuals are more likely to incorporate novel information to improve their failed products and ideas. In sum, this study proposes:

Hypothesis 1 The cognitive flexibility-innovating from failure link is mediated by learning from failure.

Negative Emotion Pathway

Dual Pathway to Creativity Model (DPCM; De Dreu et al., 2008) suggests that individuals can achieve creativity and innovation through a cognitive persistence pathway, which evokes alertness and vigilance, attention to detail, and systematic thinking and information processing (Roskes, Elliot, & De Dreu, 2014).

According to the idea of threat appraisals (Lazarus & Folkman, 1984), individuals may be stimulated negative emotions, which may enhance persistence and perseverance after failure. Negative emotion narrows attention and stimulates persistence, which can lead to creativity (De Dreu et al., 2008; Nijstad et al., 2010). A number of research has shown that negative emotion is positively related to creativity. For example, negative emotion may facilitate the optimization of solution requirements and the generation of the best solutions from limited resources (Simon, 1965; Vosburg, 1998). Thus, negative emotion may help an individual identify optimal strategies for dealing with failure by narrowing the individual's attention to failure. Second, negative emotion can stimulate persistence in cognitive activities by employing a systematic, constrained, and analytical approach (De Dreu et al., 2008; George & Zhou, 2007; Kaufmann & Vosburg, 2002; Nijstad et al., 2010). Negative emotion helps individuals employ a "tight" processing mode to control failure.

Third, negative emotion leads to more realistic perceptions (Alloy, Abramson, & Viscusi, 1981; Kaufmann & Vosburg, 2002). Innovation involves both idea generation and idea implementation (Amabile, 1996). Realistic perceptions is related to idea implementation, and thus may be positively related to innovating from failure.

Failure is a time-consuming and cognitively demanding situation, which relies on effortful processing rather than hedonic processing. Negative emotions enable individuals to exploit failure in depth and thus may lead to innovating from failure.

When confronting failure, individuals may react maladaptively to this threatening situation. Though negative emotion may lead to innovating from failure, negative emotion may involves harmful thoughts after failure, such as self-doubting, self-blaming and self-loathing. Self-compassion can activate self-soothing systems after failure, which buffer the threat of failure (Leary, Tate, Adams, Batts Allen, & Hancock, 2007). Self-compassion refers to the ability to regard one's feelings of suffering with a sense of warmth, connection, and concern (Neff, 2003a, 2003b). Neff (2003b) proposed three major components of self-compassion: self-kindness, common humanity, and mindfulness. According to Neff (2003a), self-kindness refers to treating oneself with kindness, warmth, and a nonjudgmental attitude. Common humanity refers to considering an individual's experience as part of the larger human experience rather than separate and isolated (Neff, 2003a). Mindfulness refers to holding negative thoughts and emotions in balanced awareness rather than overidentifying with them (e.g., Neff, 2003a; Neff, Hsieh, & Dejitterat, 2005). High self-compassionate individuals regard negative emotions from failure as a common human experience. Therefore, they can benefit more from negative emotions by stimulating persistence, and thus may result in more innovation from failure (De Dreu et al., 2008; George & Zhou, 2007; Kaufmann & Vosburg, 2002; Nijstad et al., 2010). Conversely, for those with low self-compassion, individuals benefit less from negative emotions after failure.

Hypothesis 2 The negative emotion-innovating from failure link is moderated by self-compassion in such a way that the higher the self-compassion, the stronger the relationship.

2. METHODS

2.1 Research Setting, Participants, and Procedures

In this study, I collected data from undergraduate university students because failure occurs often in university settings. This survey contains three parts: open-ended questions to cue

failure-related memory (Part 1), a state measurement of failure-related items using a 5-point Likert scale (Part 2), and a personality trait measurement using 5-point Likert scales (Part 3).

Table 1 Means, Standard Deviations, and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7
1. Gender	1.42	0.49							
2. Effort	3.74	0.97	-.01						
3. Importance of failure	3.85	0.91	.07	.18**					
4. Negative emotion after failure	2.67	1.11	.20**	-.09	.22**				
5. Self-compassion	2.99	0.45	.08	-.02	-.07	-.26**			
6. Cognitive flexibility	3.64	0.55	.09	.21**	.11	-.05	.25**		
7. Learning from failure	3.31	0.75	.10	.08	.10	.19**	.16*	.42**	
8. Innovating from failure	2.82	0.91	.01	.21**	.05	.22**	.12	.24**	.55**

* $p \leq .05$; ** $p \leq .01$ (two-tailed)

2.2 Measures

Negative emotions. The five emotional states listed were scared, afraid, nervous, worried, and anxious. The scared, afraid, and nervous items were modeled from the Positive Affect–Negative Affect Scale (PANAS) (Watson, Clark, & Tellegen, 1988).

Learning from failure. I measured individuals' retrospective accounts of learning from failure. Sample items includes, "I have learned better execute a strategy to improve the situation" (Shepherd et al., 2011). The Cronbach's α of the seven items was .86.

Innovating from failure. The measurement of innovating from failure was adopted from Scott and Bruce (1994). In this study, I excluded, "As a result of the experience, I sought out new technologies, processes, techniques, and/or ideas" and "I investigated and implemented new ideas" because of the low factor loadings. The Cronbach's α of the remaining four items was .88.

Cognitive flexibility. The measurement of cognitive flexibility is from the alternative subscale from Dennis and Vander Wal (2010). Sample items included "I consider multiple options before making a decision." Item 1 (I am good at sizing up a situation) was deleted because of low item-total correlation. The Cronbach's α of the remaining 12 items was .88.

Self-compassion. The survey measured individuals' trait self-compassion (Neff, 2003a). The Cronbach's α for the self-compassion scale was .84. Following previous studies, self-compassion is measured as an overarching concept (Neff, 2003a, 2011; Neff et al., 2005; Neff & McGehee, 2010; K. D. Neff, Kirkpatrick, & Rude, 2007; K. D. Neff & Vonk, 2009).

Control variables. I controlled for gender (1 = male, 2 = female), the importance of failure, and effort invested (ranging from 1 [not at all] to 5 [a great deal]).

3. RESULTS

3.1 Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was performed in Mplus 7.0 (Muthén & Muthén, 2010) to test whether the five variables are distinct from each other. Because the 26-item self-compassion and the 12-item cognitive flexibility measurement may result in the underestimation of model fitness (Nunnally, Bernstein, & Berge, 1978), I created three item parcels for self-compassion and three item parcels for cognitive flexibility. CFA results showed an excellent model fit (χ^2= 527.931, $p < .01$; df = 242; χ^2/ df = 2.18; CFI = 0.904; TFI = 0.890; RMSEA = 0.071; and SRMR = 0.058), suggesting that it was appropriate to treat the five constructs as distinct variables. I also performed two comparison models: (1) aggregating items measuring negative emotion and self-compassion into an overall affect construct, and (2) aggregating items measuring cognitive flexibility, learning from failure and innovating from failure into an overall cognition construct. Both of these two models produced much poorer fit (with Model 1: χ^2 = 643.717, $p < .01$; df = 246; χ^2/df = 2.61; CFI = 0.866; TFI = 0.850; RMSEA = 0.083; and SRMR =0.082; with Model 2: χ^2 = 1025.994, $p < .01$; df = 249; χ^2/df = 4.12; CFI = 0.739; TFI = 0.711; RMSEA = 0.115; and SRMR = 0.095). The poorer fit of these two alternative models suggests that it is more desirable to treat the five constructs separately in my analysis.

Hypotheses Testing

Table 1 displays correlations among variables. Hypothesis 1 was tested with a regression analysis using SPSS. According to Baron and Kenny (1986), mediation is present when the following conditions are met: (1) The independent variable is associated with the dependent variable. (2) The independent variable is associated with the mediating variable. (3) The mediating variable is associated with the dependent variable. (4) The impact of the independent variable on the dependent variable is reduced (i.e., not significant) after controlling for the mediator. Gender, effort,

and the importance of failure were controlled in the following mediation-testing processes. The results provided full support for this hypothesis; cognitive flexibility was significantly positively related to learning from failure (β = .42, p = .00) and innovating from failure (β = .24, p = .00). Learning from failure was also significantly positively related to innovating from failure (β = .55, p = .00). The influence of cognitive flexibility on innovating from failure was no longer significant (β = -.04, p = .70) after loading learning from failure onto the regression. This finding suggests that hypothesis 1 was supported.

Hypothesis 2 predicted that self-compassion moderates the relationship between negative emotion and innovating from failure in such a way that the higher the self-compassion, the stronger the relationship. Hypothesis 2 was tested with SPSS by the causal steps suggested by Baron and Kenny (1986). I standardized the negative emotion and self-compassion variables and multiplied the two standardized variables to create a continuous interaction term. I conducted ordinary least squares regression analyses by first entering the control variables, followed by the standardized negative emotion and self-compassion and, finally, the interaction term. The analysis showed that the interaction term (β = .22, p < .00) significantly predicts innovating from failure (Table 2). A hierarchical regression demonstrated the addition of the interaction term significantly increased the variance explained in overtime from r^2 = .15 to r^2 = .21 (ΔR^2 = .020, p < .00). Thus, hypothesis 2 was supported.

Table 2 Regressions for Predicting Innovating from Failure with Negative Emotion, Self-Compassion and Interactions.

		B	R^2	ΔR^2	F	ΔF
Step 1						
	Gender	.02				
	Effort	.19**				
	Importance of failure	.01				
			.04	.03	3.36*	3.36*
Step 2						
	Gender	-.09				
	Effort	.22**				
	Importance of failure	-.04				
	Negative emotion	.3**				
	Self-compassion	.18**				
		.22**				
Step 3			.15	.13	8.36**	15.26**
	Gender	-.09				
	Effort	.22**				
	Importance of failure	-.04				
	Negative emotion	.30**				
	Self-compassion	.18**				
	Negative emotion x Self-compassion	.22**				
			.21	.20	10.89**	20.22**

N=252

** p < .01
* p < .05

Next, I plotted the interactions using the standardized regression coefficients of the regression lines for individuals who were high (one standard deviation above the mean) and low (one standard deviation below the mean) on the moderator (Aiken & West, 1991). As Figure 2 shows, negative emotion was highly positively associated with innovating from failure when self-compassion was high (β = .41, p < .00) and less positively associated with innovating from failure when self-compassion was low (β = .21, p < .00).

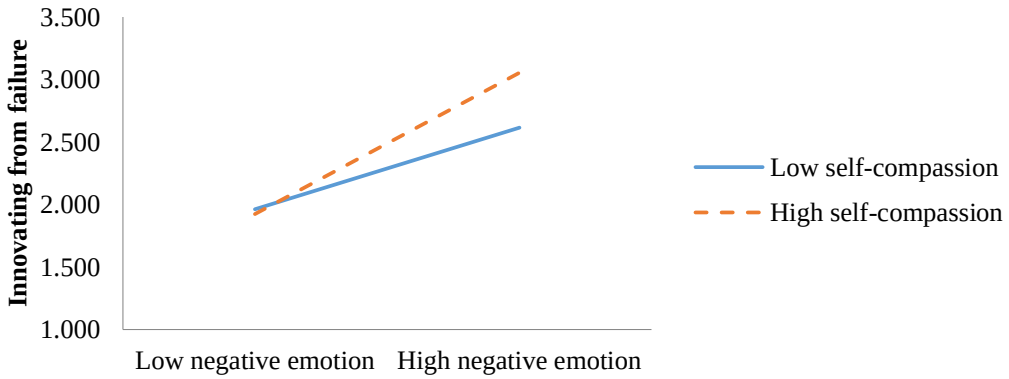

Figure 2 Moderating Role of Self-Compassion on the Relationship between Negative Emotion and Innovating from Failure

3.2 Discussions

This study contributes to the literature in several important ways. This study sheds light on innovation research by demonstrating that individuals can potentially innovate from failure. Previous research has shown that some experiences can be sources of innovation and creativity, including direct and indirect prior experiences (Gino, Argote, Miron-Spektor, & Todorova, 2010), non-routine experience, conflict (Farh, Lee, & Farh, 2010), and problem-solving experience (Von Hippel, 1994). My findings therefore extend from these studies by suggesting that individuals can potentially innovate from failure, which has been neglected in the innovation literature (De Dreu & West, 2001; Scott & Bruce, 1994; West & Farr, 1990).

The DPCM suggests creativity can be achieved through cognitive flexibility and cognitive persistence (De Dreu et al., 2008; Nijstad et al., 2010). The DPCM proposes that a cognitive flexibility pathway helps individuals employ novel ideas and remote association, whereas a persistence pathway with negative emotions helps individuals to process information systematically

and perseveringly. My findings shed lights on DPCM model and the cognitive appraisal by establishing the cognitive pathway and negative emotion pathway to innovating from failure. My findings further suggests that cognitive flexibility may enable individuals to view failure as a positive resource and influence willingness to learn and improve their skills from failure, and thus may result in innovation from failure. My finding also sheds lights on threatening appraisal theories by showing that negative emotions can be positively related to innovating from failure specifically when individuals are high in self-compassion.

This study links learning to innovating from failure. Past research has shown that learning orientation is predictive of innovative behavior (Janssen & Van Yperen, 2004). Moreover, a great deal of research has focused on learning from failure (Cannon & Edmondson, 2005; Carmeli & Gittell, 2009; Diwas, Staats, & Gino, 2012; Keith & Frese, 2005; Keith & Frese, 2008; Madsen & Desai, 2010; Van Dyck, Van Hooft, De Gilder, & Liesveld, 2010). Yet, how learning from failure may lead to innovating from failure is unknown. This study shows that learning from failure fully mediates the relationship between cognitive flexibility and innovating from failure.

3.3 Limitations

This research suffers from the problem of a lack of causality due to the retrospective study design and self-report data. As a result of a lack of causality, the impact of independent variables on dependent variables may not be fully explained. Yet, the survey explicitly reminded the participants about the state and trait measurement sections (Zhou, Shin, & Cannella, 2008).

Another potential limitation concerns the nature of the samples used in this research. As noted, the survey targeted on the samples of undergraduate students as university is a place where failure can occur. However, the university may not be able to capture the socio-political issue (Baer, 2012; Janssen, 2005). To overcome this issue, future research should adopt longitudinal and field study design to demonstrate the external validity (Bello, Leung, Radebaugh, Tung, & Van Witteloostuijn, 2009).

3.4 Conclusions

As the technology and environment change faster, organizations and individuals may confront more failures in the innovation process. This study raises the importance of innovating from failure. Rather than discarding failed ideas, organizations and individuals should try to transform failures into innovation. This study suggests that individuals may innovate from failure through either a cognitive flexibility pathway or a negative emotion pathway.

REFERENCES

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*: Sage.

Alloy, L. B., Abramson, L. Y., & Viscusi, D. (1981). Induced mood and the illusion of control. *Journal of personality and social psychology, 41*(6), 1129.

Amabile, T. M. (1996). Creativity in context.

Amabile, T. M., Barsade, S. G., Mueller, J. S., & Staw, B. M. (2005). Affect and creativity at work. *Administrative science quarterly, 50*(3), 367-403.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*(6), 1173.

Bello, D., Leung, K., Radebaugh, L., Tung, R. L., & Van Witteloostuijn, A. (2009). From the editors: Student samples in international business research. *Journal of International Business Studies, 40*(3), 361-364.

Bledow, R., Frese, M., Anderson, N., Erez, M., & Farr, J. (2009). A dialectic perspective on innovation: Conflicting demands, multiple pathways, and ambidexterity. *Industrial and Organizational Psychology, 2*(3), 305-337.

Cannon, M. D., & Edmondson, A. C. (2001). Confronting failure: Antecedents and consequences of shared beliefs about failure in organizational work groups. *Journal of Organizational Behavior, 22*(2), 161-177.

Cannon, M. D., & Edmondson, A. C. (2005). Failing to learn and learning to fail (intelligently): How great organizations put failure to work to innovate and improve. *Long Range Planning, 38*(3), 299-319.

Carmeli, A., & Gittell, J. H. (2009). High-quality relationships, psychological safety, and learning from failures in work organizations. *Journal of Organizational Behavior, 30*(6), 709-729.

Carson, S. H., Peterson, J. B., & Higgins, D. M. (2003). Decreased latent inhibition is associated with increased creative achievement in high-functioning individuals. *Journal of personality and social psychology, 85*(3), 499.

Christensen, C. (2013). *The innovator's dilemma: When new technologies cause great firms to fail*: Harvard Business Review Press.

De Dreu, C. K., Baas, M., & Nijstad, B. A. (2008). Hedonic tone and activation level in the mood-creativity link: Toward a dual pathway to creativity model. *Journal of personality and social psychology, 94*(5), 739.

De Dreu, C. K., Nijstad, B. A., & Baas, M. (2011). Behavioral activation links to creativity because of increased cognitive flexibility. *Social Psychological and Personality Science, 2*(1), 72-80.

De Dreu, C. K., & West, M. A. (2001). Minority dissent and team innovation: The importance of participation in decision making. *Journal of applied psychology, 86*(6), 1191.

Dennis, J. P., & Vander Wal, J. S. (2010). The cognitive flexibility inventory: Instrument development and estimates of reliability and validity. *Cognitive therapy and research, 34*(3), 241-253.

Diwas, K., Staats, B., & Gino, F. (2012). Learning from my success and from others' failure: Evidence from minimally invasive cardiac surgery.

Dweck, C. S. (2000). *Self-theories: Their role in motivation, personality, and development*: Psychology Press.

Edmondson, A. C. (2004). Learning from failure in health care: Frequent opportunities, pervasive barriers. *Quality and Safety in Health Care, 13*(suppl 2), ii3-ii9.

Farh, J.-L., Lee, C., & Farh, C. I. (2010). Task conflict and team creativity: A question of how much and when. *Journal of Applied Psychology, 95*(6), 1173.

Friedman, R. S., & Förster, J. (2000). The effects of approach and avoidance motor actions on the elements of creative insight. *Journal of personality and social psychology, 79*(4), 477.

Friedman, R. S., & Förster, J. (2001). The effects of promotion and prevention cues on creativity. *Journal of personality and social psychology, 81*(6), 1001.

George, J. M., & Zhou, J. (2007). Dual tuning in a supportive context: Joint contributions of positive mood, negative mood, and supervisory behaviors to employee creativity. *Academy of Management Journal, 50*(3), 605-622.

Gino, F., Argote, L., Miron-Spektor, E., & Todorova, G. (2010). First, get your feet wet: The effects of learning from direct and indirect experience on team creativity. *Organizational Behavior and Human Decision Processes, 111*(2), 102-115.

Gourville, J. T. (2006). Eager sellers. *Stony Buyers, Harvand Business Review*, 99-106.

Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology, 94*(5), 1128.

Hirst, G., Van Knippenberg, D., & Zhou, J. (2009). A cross-level perspective on employee creativity: Goal orientation, team learning behavior, and individual creativity. *Academy of Management journal, 52*(2), 280-293.

Janssen, O., & Van Yperen, N. W. (2004). Employees' goal orientations, the quality of leader-member exchange, and the outcomes of job performance and job satisfaction. *Academy of management journal, 47*(3), 368-384.

Kaufmann, G. (2003). The effect of mood on creativity in the innovative process. *International handbook on innovation*, 191-203.

Kaufmann, G., & Vosburg, S. K. (2002). The effects of mood on early and late idea production. *Creativity Research Journal, 14*(3-4), 317-330.

Keith, N., & Frese, M. (2005). Self-regulation in error management training: Emotion control and metacognition as mediators of performance effects. *Journal of Applied Psychology, 90*(4), 677.

Keith, N., & Frese, M. (2008). Effectiveness of error management training: A meta-analysis. *Journal of Applied Psychology, 93*(1), 59.

Lazarus, R. S., & Folkman, S. (1984). Stress. *Appraisal, and coping, 725*.

Leary, M. R., Tate, E. B., Adams, C. E., Batts Allen, A., & Hancock, J. (2007). Self-compassion and reactions to unpleasant self-relevant events: The implications of treating oneself kindly. *Journal of Personality and Social Psychology 92*(5), 887.

Madsen, P. M., & Desai, V. (2010). Failing to learn? The effects of failure and success on organizational learning in the global orbital launch vehicle industry. *Academy of Management Journal, 53*(3), 451-476.

McGrath, R. G. (2001). Exploratory learning, innovative capacity, and managerial oversight. *Academy of Management Journal, 44*(1), 118-131.

Muthén, L. K., & Muthén, B. O. (2010). *Mplus: Statistical analysis with latent variables: User's guide*: Muthén & Muthén.

Neff. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223-250.

Neff. (2003b). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85-101.

Neff. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Psychology Compass, 5*(1), 1-12.

Neff, Hsieh, Y.-P., & Dejitterat, K. (2005). Self-compassion, achievement goals, and coping with academic failure. *Self and Identity, 4*(3), 263-287.

Neff, & McGehee, P. (2010). Self-compassion and psychological resilience among adolescents and young adults. *Self and Identity, 9*(3), 225-240.

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*(1), 139-154.

Neff, K. D., & Vonk, R. (2009). Self-compassion versus global self-esteem: Two different ways of relating to oneself. *Journal of Personality, 77*(1), 23-50.

Nijstad, De Dreu, C. K., Rietzschel, E. F., & Baas, M. (2010). The dual pathway to creativity model: Creative ideation as a function of flexibility and persistence. *European Review of Social Psychology, 21*(1), 34-77.

Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of abnormal psychology, 109*(3), 504.

Nunnally, J. C., Bernstein, I. H., & Berge, J. M. t. (1978). *Psychometric theory* (Vol. 226): McGraw-Hill New York.

Roskes, M., Elliot, A. J., & De Dreu, C. K. (2014). Why is avoidance motivation problematic, and what can be done about it? *Current Directions in Psychological Science, 23*(2), 133-138.

Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal, 37*(3), 580-607.

Shepherd, D. A., & Cardon, M. S. (2009). Negative emotional reactions to project failure and the self-compassion to learn from the experience. *Journal of Management Studies, 46*(6), 923-949.

Shepherd, D. A., & Kuratko, D. F. (2009). The death of an innovative project: How grief recovery enhances learning. *Business Horizons, 52*(5), 451-458.

Shepherd, D. A., Patzelt, H., & Wolfe, M. (2011). Moving forward from project failure: Negative emotions, affective commitment, and learning from the experience. *Academy of Management journal, 54*(6), 1229-1259.

Simon, H. A. (1965). *Administrative behavior* (Vol. 4): Cambridge Univ Press.

Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. (2005). A socially embedded model of thriving at work. *Organization Science, 16*(5), 537-549.

Van Dyck, C., Van Hooft, E., De Gilder, D., & Liesveld, L. (2010). Proximal antecedents and correlates of adopted error approach: A self-regulatory perspective. *The Journal of social psychology, 150*(5), 428-451.

Von Hippel, E. (1994). "Sticky information" and the locus of problem solving: Implications for innovation. *Management science, 40*(4), 429-439.

Vosburg, S. K. (1998). Mood and the quantity and quality of ideas. *Creativity Research Journal, 11*(4), 315-324.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The panas scales. *Journal of personality and social psychology, 54*(6), 1063.

West, M. A., & Farr, J. L. (1990). *Innovation and creativity at work: Psychological and organizational strategies*: John Wiley & Sons.

Zhou, J., Shin, S. J., & Cannella, A. A. (2008). Employee self-perceived creativity after mergers and acquisitions interactive effects of threat—opportunity perception, access to resources, and support for creativity. *The Journal of Applied Behavioral Science, 44*(4), 397-421.