EVEN SHERLOCK NEEDS A DR. WATSON: A THEORY OF CREATIVITY CATALYSTS

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To my parents Haluk and Gulgun.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iv
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF SYMBOLS AND ABBREVIATIONS	xi
SUMMARY	xii
CHAPTER	
1 INTRODUCTION	1
2 THEORY DEVELOPMENT	10
Creativity Catalysts: Conceptual Development	10
Related Concepts	15
Motives behind Serving as a Creativity Catalyst	18
Hypotheses Development	20
Social Capital of Creativity Catalysts	20
Learning Goal Orientation of Creativity Catalysts	29
Interaction between Learning Goal Orientation and Relational Social Capital	34
3 PILOT STUDY	38
Overview	38
Methodology	39
Sample Characteristics	40
Measures	40
Intensity and Span of Creativity Catalysts' Contribution	40

Creativity of the Classmates 44
Analysis and Results 45
Discussions of the Study 1 Findings 47
4 MAIN STUDY 49
Power Analysis 49
Methodology 49
Sample Characteristics 53
Measures 55
Intensity and Span of Creativity Catalysts' Contribution 55
Independent Variables 58
Control Variables 64
Analysis and Results 69
An Alternative Approach: Dyadic Level Analysis 80
Overview 80
Dyadic Level Measures 82
Analysis and Results 85
Discussion of the Study 2 Findings 88
5 DISCUSSION 92
General Discussion of Findings 92
Theoretical Contributions 95
Managerial Implications 99
Limitations and Future Research Directions 100
Conclusion 103
APPENDIX A: SCALES USED IN THE PILOT STUDY 105
APPENDIX B: MAIN STUDY – SURVEY 1 106

APPENDIX C: MAIN STUDY – SURVEY 2 110

APPENDIX D: MAIN STUDY – SUPERVISOR SURVEY 113

REFERENCES 114

LIST OF TABLES

		Page
Table 1:	Pilot Study Descriptive Statistics and Correlations	45
Table 2:	Data Collection	52
Table 3:	Principal Component Analysis	70
Table 4:	Main Study Descriptive Statistics and Correlations	73
Table 5:	OLS Regression on Intensity of Contribution Including All Controls	74
Table 6:	OLS Regression on Intensity of Contribution Excluding Insignificant Controls	74
Table 7:	Negative Binomial Regression on Span of Contribution Including All Controls	78
Table 8:	Negative Binomial Regression on Span of Contribution Excluding Insignificant Controls	78
Table 9:	Dyadic Level Descriptive Statistics and Correlations	87
Table 10:	HLM Test for Alternative Dyadic Analysis on the Intensity of Dyadic Contribution	88

LIST OF FIGURES

		Page
Figure 1:	The Intensity and Span of a Creativity Catalyst's Contribution	12
Figure 2:	The Theoretical Model	37
Figure 3:	"Who Contributes to My Creativity as a Creativity Catalyst" Matrix	41
Figure 4:	"To Whom This Catalyst Contributes to" Matrix	42
Figure 5:	Dichotomized "To Whom This Catalyst Contributes to" Matrix	43
Figure 6:	"Who Are My Creative Classmates" Matrix	44
Figure 7:	Interaction between Relational Social Capital and Structural Social Capital on Intensity of Contribution	76
Figure 8:	Interaction between Relational Social Capital and Learning Goal Orientation on Intensity of Contribution	76
Figure 9:	Interaction between Relational Social Capital and Structural Social Capital on Span of Contribution	79
Figure 10:	Interaction between Relational Social Capital and Learning Goal Orientation on Span of Contribution	80

LIST OF SYMBOLS AND ABBREVIATIONS

df	Degrees of freedom
F	F-test statistic
f^2	Effect size in power analysis
N	Sample size
HLM	Hierarchical Linear Modeling
LGO	Learning Goal Orientation
MBA	Master of Business Administration
OCB	Organizational Citizenship Behaviors
OCBI	Interpersonal Organizational Citizenship Behaviors
OLS	Ordinary Least Squares
p	p-value significance level
QAP	Quadratic Assignment Procedure
R^2	Squared correlation coefficient
r	Correlation coefficient
SC	Social Capital
SD	Standard deviation
α	Cronbach's alpha, reliability coefficient
β	Regression coefficients
χ^2	Chi-square goodness of fit statistic
ΔR^2	Change in R^2
t	t-statistic for simple slopes test

SUMMARY

In this dissertation I seek to answer the research question of who are those people that have the ability and motivation to facilitate other people's creative thinking. Actors who are in the creator's social environment, such as her coworkers and family members, can potentially enhance the creator's level of creativity. Although these contacts can be active collaborators of the creator's thinking processes and can eventually have a significant impact on organizational creativity, so far their role in organizational life has been overlooked by researchers. Consequently, in my dissertation I develop a theory of "creativity catalysts", and define a creativity catalyst as an employee who helps to improve the usefulness and novelty (i.e. creativity) of the ideas and products produced by another employee (i.e. the creator) through direct interpersonal interaction with the creator. I examine two aspects of serving as a catalyst to another's creativity: the *intensity* of a creativity catalyst's contribution and the *span* of a creativity catalyst's contribution. Intensity of contribution is conceptualized as the extent to which the creativity catalyst can improve the output generated by the creators to be more novel and useful. Span on the other hand, is the number of people that perceive an individual as a catalyst for her own creative performance.

To answer the research question, I develop and empirically test a theory of creativity catalysts by integrating a social capital theory lens (i.e. structural social capital and relational social capital) with a stable motivational orientation (i.e., learning goal orientation). First, I argue that a catalyst's relational social capital (i.e., quality of relationships with her coworkers) in the organizational communication network

determines her *motivation* to take the role of a creativity catalyst. Second, I argue that the catalyst's structural social capital (i.e., the extent to which she can connect with the disconnected others in her network structure) underlines her ability to contribute to others' creativity. Integrating these two arguments, I hypothesize that the catalyst's relational social capital (i.e., the motivation to become a creativity catalyst) interacts with her structural social capital (i.e., the ability of a creativity catalyst) in predicting both the intensity and span of the catalyst's contribution to her coworkers' creativity. Second, I hypothesized that learning goal orientation, a stable motivational orientation, interacts with the situational motivational characteristic of relational social capital in predicting both the span and intensity of a catalyst's contribution to her coworkers' creativity. To test my hypotheses, I first ran a pilot study on a sample of full-time MBA students in order to validate the creativity catalyst measure; and then tested my hypothesized model on employees from two companies, using multiple data sources over multiple phases of data collection. Consequently, I found support for both of these interaction hypotheses on the intensity and span of a creativity catalyst's contribution to her coworkers' creativity. Theoretical and practical implications of these findings, and future research directions are discussed.

CHAPTER 1

INTRODUCTION

In 1905, Albert Einstein, one of the greatest minds of the 20th century, published his famous paper "On the Electrodynamics of the Moving Bodies". This paper which had a great impact on modern physics does not have any citations, or any acknowledgements, except one last sentence: "Let me note that my friend and colleague Michele Besso steadfastly stood by me in my work on the problem discussed here, and that I am indebted to him for several valuable suggestions". Michele Besso was Einstein's close friend from Federal Polytechnic University, and later Einstein recruited Besso to join him at the Swiss Patent Office. In his biography of Einstein, Isaacson (2008) reports that during the many days they worked together before the publication of this paper, Einstein would talk to Besso about the dilemmas in his mind. When Einstein was about to give up, he suddenly solved the problem during one of his discussions with Besso, and five weeks after this event, he submitted his paper. Besso was not the genius behind the paper; however he gave feedback to Einstein, helped him focus and think through the issues, and provided emotional support to Einstein no matter what. Theo Gogh, Vincent van Gogh's brother, constantly helped and supported his brother in order to stay focused and be productive. A similar but fictional example can be seen in the relationship between the detective, Sherlock Holmes, and Dr. Watson. Dr. Watson was a medical doctor, so he was a smart character, but he did not have the creativity and insight that Sherlock Holmes had. The author Sir Arthur Conan Doyle explained that he created Dr. Watson as a humble character whom Sherlock does not hesitate to turn to in order to get moral and

physical assistance through his thinking process. This dissertation will be about the Michelle Bessos, Theo Goghs, or Dr. Watsons in organizational life: individuals who are *catalysts* of other people's creativity. That is, those that have the ability, resources, and motivation to augment and support others' creative thinking.

Creativity is defined as developing products, processes, or procedures that are both novel and useful (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Shalley, Zhou, & Oldham, 2004). In this dissertation, I focus on those people who have the ability and motivation to enhance their coworkers' creativity. Hence, my research question is: Who can act as a better creativity catalyst for her coworkers' (i.e., the creators) creative performance? I define a creativity catalyst as an employee who helps to improve the usefulness and novelty (i.e., creativity) of the ideas and products produced by another employee (i.e., the creator) through direct interpersonal interaction with the creator on a specific task. I examine two aspects of serving as a catalyst to another's creativity: the *intensity* of a creativity catalyst's contribution and the *span* of a creativity catalyst's contribution. Intensity of contribution is conceptualized as the extent to which the creativity catalyst can improve the output generated by the creators to be more novel and useful. Span on the other hand, is the number of people that perceive an individual as a catalyst for her own creative performance.

There are multiple actions that can be taken by a creativity catalyst to improve the creator's creative performance. For instance, the catalysts can improve the creator's creative performance instrumentally by providing information (Perry-Smith, 2006), giving insightful feedback (De Stobbeleir, Ashford, & Buyens, 2011), and asking challenging questions (Cross & Thomas, 2010). The creativity catalyst can also facilitate

the creative performance of the creator in an emotional way by providing support and encouragement (Madjar, Oldham, Pratt, 2002; Perry-Smith & Mannucci, forthcoming). These actions do not require a catalyst to be creative. As a matter of fact, giving advice to others has been found to diminish the creativity of the help givers (Mueller & Kamdar, 2011). Therefore, the creative performance of the catalysts is not expected to act as a determinant of being a strong creativity catalyst.

In order to answer the research question, I will develop a theory of creativity catalysts by integrating social capital theory (i.e., structural social capital and relational social capital of the catalysts) and a stable motivational orientation (i.e., learning goal orientation) of the catalysts. The first contribution of this dissertation will be developing the concept and theory of creativity catalysts. In its special issue on "Secrets of Geniuses of the Time Magazine", Cloud (2013) stated that the common factor among the most talented individuals in a variety of fields is that someone helped them to become who they are. In other words, inclusion of creativity catalysts can potentially improve the creative performance of the talented employees. Enhancing other employees' creativity is not only important at an individual level. In a team or organizational setting where all employees may expend some effort in commenting on or contributing to each other's creativity, the level of team or organizational creativity could be facilitated as well (Hargadon & Bechky, 2006). For instance, Pixar Animation Studios emphasizes a peer culture where employees help each other by sharing their own expertise during the idea generation process in order to maintain and enhance company creativity (Catmull, 2008). Therefore, the creative performance of an organization does not only depend on the performance of creative employees, but also on the impact of the creativity catalysts in

the organization. As the catalysts' improve their coworkers creativity, organizational creativity improves as well, which has important implications on organizational survival and innovation (Oldham & Cumming, 1996). In addition to its benefits to the coworkers' and organizational performance, being a creativity catalyst can have benefits to the catalyst herself. First, similar to the premise that creative people gain a more central position in the organization over time (Perry-Smith & Shalley, 2003), creativity catalysts can start to move to a more central position in their organizational network. This would be because creativity catalysts would become popular members of the network since their coworkers who are trying to be creative would be eager to build relationships with them. As the creativity catalysts gain a more central position, they would gain a higher informal status (Ibarra, 1993). Second, some employees have a stronger concern for their organization (Bolino, 1999). For those employees, helping their coworkers and feeling that they are putting effort toward the benefit of their organization can increase their level of satisfaction (Le, Impett, Kogan, Webster, & Cheng, 2012). Although creativity catalysts can be important facilitators of their coworkers' (i.e., the creators') and eventually their organizations' creative performance, and it can have a positive influence on the catalyst's own attitudes and organizational status, no formal theory on creativity catalysts has been developed before.

The second contribution of this dissertation will be shifting the research focus from the characteristics of the creator to the characteristics of the creativity catalyst. Some researchers has previously focused on the role of one's contacts for an individual's own creativity. For instance, following Bandura's social cognitive theory (1986), it has been found that having creative coworkers can augment one's own creativity, because

creative coworkers act as creative role models that the employees can observe and learn from them creative behaviors (Shalley & Perry-Smith, 2001; Zhou, 2003). In addition to coworkers, leaders (e.g. Gong, Huang, & Farh, 2009; Zhang & Bartol, 2010) have been found to influence followers' creativity. Receiving support from family members (Madjar, Oldham, & Pratt, 2002) can also be an important determinant of a supportive work environment, which is a critical facilitator of creative thinking (Amabile, Conti, Coon, Lazenby, & Herron, 1996). Therefore, there is research evidence that suggests that a creator's contacts, such as her coworkers, leaders, or family members can potentially facilitate the creator's level of creativity. All of these perspectives however, overlook the characteristics of the contacts of the creators (i.e., the catalysts). The catalysts can be active collaborators of creative thinking of the creators during the idea generation (Hargadon & Bechky, 2006) and integration processes (Obstfeld, 2005). Therefore, it is important to figure out who these "catalysts" are (Kwon & Adler, 2014; Perry-Smith & Mannucci, forthcoming), and what types of relationships and characteristics they should have in order to be better creativity catalysts for their coworkers and organizations

To answer the research question of who are better creativity catalysts, understanding the social capital of the catalysts is critical. The influence of a number of contextual factors such as job characteristics (Shalley, Gilson, & Blum, 2000), extrinsic motivation and rewards (Eisenberger & Rhoades, 2001; George & Zhou, 2002), and leadership characteristics (Shalley & Gilson, 2004; Tierney, Farmer, & Graen, 1999; Tierney & Farmer, 2004) on creative performance has been examined. The impact of an employee's social networks on her creativity is a contextual factor that has started to receive increasing attention in the creativity literature. This approach highlights the social

side of creativity (Perry-Smith, 2008), arguing that creative people are not lone geniuses (Taylor & Greve, 2006), and that they can benefit from their social relationships when they are trying to be creative (Perry-Smith & Mannucci, forthcoming). This dissertation contributes to the developing literature on social capital and creativity by taking a different angle. So far the studies in this area have focused on the social relationships of the creator, while examining the relational characteristics of the creator's contacts, defined here as creativity catalysts, has been suggested to be an important area for future research (Kwon & Adler, 2014; Perry-Smith & Mannucci, forthcoming).

Here, I argue that the social capital of a creativity catalyst impacts the span and intensity of the catalyst's contribution to her coworkers' creative performance. The relational dimension of social capital, which is the quality of relationships one has with her coworkers (Tsai & Ghoshal, 1973), determines the catalyst's *motivation* to contribute to her coworkers' creativity, while the structural dimension, which is the characteristics of one's network pattern, determines the catalyst's *ability* to contribute to others creativity. A catalyst would be more intrinsically motivated to help and invest time and resources to transfer knowledge (Sosa, 2011), give feedback, provide emotional support, and ask challenging questions to those that she has strong relationships with. If the catalysts have stronger relationships with their coworkers (i.e. stronger relational social capital), they are more likely to be motivated to spend the extra effort, time and resources to improve their coworkers' creativity. Also, employees with stronger relational social capital with their coworkers are more likely to be committed and attached to their organization (Mossholder, Settoon, & Henagan, 2005; Labianca & Brass, 2006), so they would want their entire organization to perform better. In other words, these types of

catalysts can be more motivated to have a higher span of contribution compared to those with weaker relationships with their coworkers. Additionally, having the right amount of motivation may not lead to enhanced levels of performance if the employees do not have sufficient ability to perform well (Locke, Mento, & Katcher, 1978). People's structural social capital gets stronger the more they connect people who are not already connected to each other by bridging the structural holes in her network pattern (Burt, 1992). Creativity catalysts that have a stronger structural social capital have access to a wide range of non-redundant information since they bridge over structural holes (Burt, 2004; Fleming, Mingo, & Chen, 2007; Kijkuit & van den Ende, 2010), and thus their ability to intensely contribute to their coworkers' creativity increases. In addition, by providing new and non-redundant information, they can contribute to a higher span of coworkers compared to catalysts with weaker structural social capital. Following the arguments that suggest abilities and motivation interact in predicting performance (Locke, et al., 1978), in this dissertation I suggest that the relational and structural social capital of a creativity catalyst interact in predicting the catalyst's intensity and span of contribution to her coworkers' creativity.

The relational social capital dimension provide the catalysts' situation-dependent motivation (Chen et al., 2000; Kanfer, 1992) to help others. Although a person can be more motivated to help others if she has strong relationships (Sosa, 2011), this does not necessarily imply that this person will be specifically motivated to get involved in the creative process of their coworkers. Stable goal orientations determine why people choose to follow different directions under similar situations (Dweck & Kegett, 1988). I focus on learning goal orientation (LGO) as a stable motivational orientation that could

lead people to choose to become a creativity catalyst. People with a high LGO, who believe their abilities are malleable (Dweck & Leggett, 1988) and are more motivated to learn new skills to improve their abilities (Hirst et al., 2009), are eager to get involved in challenging situations, because these situations provide them an opportunity to learn (Dweck & Leggett, 1988). A creativity catalyst with a high LGO would be more motivated to focus on and invest in helping the creative process of others, because she can potentially learn by being a part of this challenging situation and helping others become more creative. Therefore, I argue that a creativity catalyst with a high LGO can make more intense contributions to the creative performance of her coworkers by actively getting involved in the creativity process compared to a creativity catalyst with a low LGO. In addition, catalysts with a higher learning goal orientation would see the interactive process of contributing to others' creativity as an opportunity to improve themselves. Contributing to the creativity of a wide group of coworkers would increase the catalysts' chance of acquiring information from different sources, and learning about different thinking styles from each coworker. Hence, I argue that catalysts with a higher learning goal orientation would be more motivated to contribute to the creativity of a wider span of coworkers. Finally, contextual factors and individual characteristics work together in predicting performance (Oldham & Cummings, 1996). Therefore, in my theoretical model, I expect that a catalyst's stable trait-like dispositional orientations (i.e. learning goal orientation) can strengthen the relationship between situation dependent motivation mechanisms (i.e. relational social capital) and the intensity and span of a catalyst's contribution.

In this dissertation, Chapter 2 will be a presentation of the theoretical framework. In Chapter 3, the research design will be described extensively, followed by the analysis and results in Chapter 4. In the final chapter, I will discuss the theoretical and practical implications of my findings and present potential future research directions.

CHAPTER 2

THEORY DEVELOPMENT

Creativity Catalysts: Conceptual Development

Creativity is defined as services, products, processes or procedures that are considered to be both novel and useful (Amabile et al., 1996; Shalley, Zhou, & Oldham, 2004). Creative people are not lone geniuses (Taylor & Greve, 2006), since they do not generate creative outputs in isolation from the social context surrounding them (Perry-Smith, 2008). In fact, individual creativity is influenced by the interaction of personal factors and contextual factors (Woodman, Sawyer, & Griffin, 1993). The relationship between an employee and her contacts is one of the contextual factors that influence employee creativity because employees can benefit from their social relationships when they are trying to be creative (Perry-Smith & Mannucci, forthcoming). For instance, it has been found that an employee's relationships with her teammates (e.g. Liao, Liu, & Loi, 2010), leaders (Tierney et al., 1999; Zhang & Bartol, 2010) or coworkers (e.g. Perry-Smith, 2006; Zhou, 2003) impacts her creative performance, highlighting the social side of creativity. An employee's coworker can play the role of a *creativity catalyst* by contributing to her creativity. Although having creative employees is important for organizational competitiveness and survival (Oldham & Cummings, 1996), from a social perspective, I argue that creativity catalysts are also influential actors for organizational success.

I define a creativity catalyst as an employee who helps to improve the usefulness and novelty (i.e., creativity) of the ideas and products produced by another employee (i.e., the creator) through direct interpersonal interaction with the creator on a specific

task. Therefore, becoming a coworker's creativity catalyst is a role that any employee can take regardless of her formal job title in the organization. Here, I examine two aspects of creativity catalysts: the *intensity* of a catalyst's contribution and the *span* of a catalyst's contribution. Intensity of contribution is conceptualized as the extent to which the catalyst can help to improve the output of her coworkers to be more novel and useful (i.e., creative). Span on the other hand, is the number of people that perceive an individual as a catalyst for her own creative performance. In short, if there are a lot of coworkers that name a particular employee as a catalyst of their creativity, the span of contribution of this employee as a catalyst increases. Intensity, however, is the average degree of a person's contribution to her coworkers' creativity regardless of the number of people she has contributed to. For instance, a person may have only 2 contacts that perceive her as a creativity catalyst, which would refer to a low span; but she may be perceived as contributing a great deal to them, which stands for a high intensity. In a different scenario, a person may have 20 people who think that she has contributed to their creativity, and they may all indicate that this person has been highly influential in contributing to their creativity. This case would indicate a high span-high intensity contribution situation. In short, all combinations of high-low intensity and high-low span are possible (See Figure 1). In Figure 1, the number of nodes (i.e., the creators) represent the span, and the thickness of the lines between the catalyst and the creator represent the intensity of contribution.

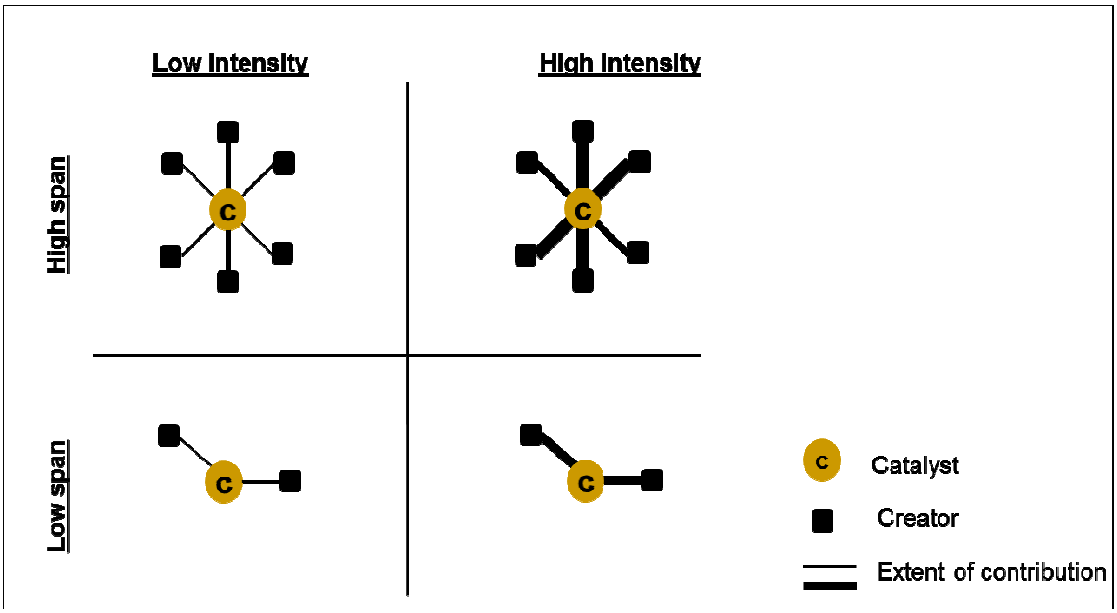


Figure 1: The Intensity and Span of a Creativity Catalyst's Contribution

Just as creativity has been examined both as an outcome (Amabile et al., 1996; Elsbach & Hargadon, 2006; Oldham & Cummings, 1996; Perry-Smith & Shalley, 2003; Shalley, 1991) and as a process (Csikszentmihalyi, 1997; Drazin, Glynn, & Kazanjian, 1999; Gilson, Mathieu, Shalley, & Ruddy, 2005; Gilson & Shalley, 2004; Mumford, 2000; Shalley & Perry-Smith, 2008), the act of being a creativity catalyst can also be examined both as an outcome and a process. Being a creativity catalyst has a process aspect, because catalysts can contribute to the creative thinking process of their coworkers. According to Amabile (1983), creative process has five main stages (i.e., task presentation, preparation, idea generation, idea validation, and outcome assessment). Catalysts can improve their coworkers' creativity during all of these different stages of the creative process. For instance, catalysts can contribute to a creator's idea generation process by highlighting observed problems, giving ideas, and providing constructive feedback. The actions taken by a catalyst during the stages of the creator's creative

process constitute the process aspect of being a creativity catalyst. The outcome of this process, the extent to which a catalyst can help a coworker to improve her creative output provides, is the outcome aspect of being a creativity catalyst. In this dissertation, the emphasis will be on the outcome aspect rather than the process aspect.

A catalyst can improve coworkers' creativity in various ways. According to the componential model of creativity (Amabile, 1983), creativity has three components: task relevant knowledge, creativity relevant processes, and intrinsic motivation. The actions that a catalyst performs in order to contribute to the creativity of her coworkers can enhance one or more of the three components of creativity. For instance, the catalysts can improve the creator's creativity by providing information (Perry-Smith, 2006) which can facilitate the task relevant knowledge of the creator. A catalyst can also contribute to her coworkers' creativity relevant skills and task relevant knowledge by giving insightful feedback (De Stobbeleir et al., 2011). In addition, in order to be creative, employees need to look at a problem from many different viewpoints (Csikszentmihalyi, 1997). Catalysts can help to broaden the creators' view of a specific problem by asking her interesting questions and challenging them to consider different perspectives (Cross & Thomas, 2010). Therefore, catalysts can potentially improve the creators' creativity relevant processes by asking challenging questions and pushing the creator to think more broadly and potentially in different ways**.** Last but not least, providing emotional support and encouragement can augment the creator's creativity by increasing her intrinsic motivation and positive affect, with both having been found to positively affect creativity (Amabile et al., 1996; Perry-Smith & Mannnucci, forthcoming).

An employee who is not creative herself can surprisingly act as a very strong creativity catalyst for her coworkers. The behaviors performed by a catalyst to improve others' creativity such as providing information, giving insightful feedback, asking interesting questions, and providing emotional support do not require the catalysts to be creative themselves. Therefore, being creative is not necessarily a determinant of how successful an employee is in catalyzing others' creative thinking. Essentially, Mueller & Kamdar (2011) argued and found that giving advice to others actually impedes one's own creativity due to two reasons. First, giving help to others diminishes the time and resources that the advice giver could have spent on focusing on her own tasks. Second, help givers usually see their own perspectives as superior to those who seek help. Therefore, although the help givers are exposed to the ideas and perspectives of the help seekers during their interaction, they might not absorb help seekers' perspectives and question their own thinking. In short, in this dissertation the emphasis will be on the role of certain characteristics of the catalysts (i.e., social capital and learning goal orientation) in improving others' creativity above and beyond the role of the catalysts' own level of creativity.

It should be noted that a catalyst can also augment her coworkers' creativity on a specific task without direct interpersonal interaction with the creators. This passive influence can take place through observing the behaviors of a creative role model (Shalley & Perry-Smith, 2001). For instance, listening to another party's (i.e., the catalyst's) thoughts during a meeting can spark ideas in the creator's mind, potentially improving the creator's creativity relevant skills. In this case, the catalyst is not directly and purposefully interacting with the creator. Furthermore, there are no motives or

planning processes behind this contribution. Therefore, it is difficult to detect its occurrence and its antecedents. In other words, when a catalyst enhances coworkers' creativity by serving as a creative role model and is sparking ideas, this can occur more randomly and may not be easily detected. In addition, this form of contribution cannot be categorized as a type of helping behavior, since helping behaviors are usually intentional (Williams & Anderson, 1991). Consequently, this type of indirect contribution is out of the scope of this dissertation and will not be included in the conceptualization and operationalization of creativity catalysts[1].

Related Concepts

Even though a formal theory of creativity catalysts has not been developed, there are some concepts that have some similarities with "creativity catalysts". The first concept that relates somewhat to creativity catalysts is creative role models. According to Bandura's social cognitive theory (1986), individuals observe and learn from the behaviors of others. When an employee has a creative coworker, this employee can perceive her creative coworker as a role model for herself. Observing the behaviors of a creative coworker (i.e., creative role model) can contribute to the creativity relevant processes of the employee, and eventually can increase the employee's creative performance (Shalley & Perry-Smith, 2001; Zhou, 2003). Even though creative role models can contribute to other people's creativity, they are different from creativity

[1] There are two more situations that we can observe one party enhancing another parties' creativity, but they are also out of the scope of this study. First, support from outside organization members, such as family members has been found to be critical for individuals' creativity (Madjar, Oldham & Pratt, 2002) as family support can generate psychological safety (Edmonson, 1999) and positive affectivity (Madjar et al., 2002). Since the contributors are outside of the work context, this type of contribution is not considered here. Second, team-member exchange relationships within a team (Liao, Liu & Loi, 2010) or within an organization in the form of organizational climate (Tesluk, Farr, & Klein, 1997) can contribute to one's creativity. However, this dissertation focuses on individual creativity and her interpersonal relationships.

catalysts. First, creative role models improve the creativity of their coworkers because the coworkers observe the role models' behavior. The role models might not be aware that they are being observed. Therefore, the role models do not have to interpersonally interact with the creators on a specific task in order to enhance her creativity. As explained above, a contribution that does not include a direct interpersonal interaction is outside the scope of the conceptualization of creativity catalysts in this paper. Second, the literature on creative role models focus on the creator's performance, hence the creative role models have not been considered as the focal actors of the creative process. By developing the concept of creativity catalysts, I will be shifting the focus away from the creators to the catalysts who contribute to the creative performance of the creators. Finally, employees are chosen to be creative role models by their coworkers because they are creative. However, as I stated earlier, creativity catalysts do not have to be creative in order to contribute to their coworkers' creativity.

Second, transformational leaders provide a case where one party (i.e., the leader) contributes to the creativity of another party (i.e., the follower). Transformational leaders are those that seek to transform the values and self-concepts of their followers (Bass, 1985). It has 4 dimensions: intellectual stimulation, individualized consideration, charisma, and inspirational motivation (Bass, 1985). Transformational leaders have a direct effect on their followers' creativity, because these dimensions can help facilitate creativity relevant behaviors at the workplace (Gumusluoglu & Ilsev, 2009). For instance, through intellectual stimulation, leaders encourage exploratory thinking (Gumusluoglu & Ilsev, 2009) by setting expectations for their followers to be creative (Gong et al., 2009), and encouraging them to challenge the status quo (Shin & Zhou, 2003). By

individualized consideration, the leaders support their followers during challenging times, which encourages the followers' creativity relevant actions (Gong et al., 2009). Due to their charisma leaders can be perceived as charismatic role models by their followers that the followers observe and learn from (Shin & Zhou, 2003). Hence, followers model the idea development behaviors that they observe from their leaders (Gong et al., 2009), which eventually can improve follower creativity. Finally, inspirational motivation facilitates followers' idea development by encouraging them to work towards the organizational vision (Gumusluoglu & Ilsev, 2009). It has also been found that transformational leaders have an indirect effect on employee creativity through augmenting employee intrinsic motivation (Shin & Zhou, 2003), employee creative self-efficacy (Gong et al., 2009), and employee empowerment (Gumusluoglu & Ilsev, 2009).

Transformational leaders can be considered as creativity catalysts since they can enhance their subordinate's creativity by inspiring and intellectually stimulating them. However, catalysts who are also the leaders of the creators will not be considered in this dissertation. The reason is that when there is a supervisor-subordinate relationship between the catalysts and the creators, the motives of the parties change. Specifically, the followers (i.e., creators) might try to be creative only to be appreciated by their leaders, while the leaders (i.e., creativity catalysts) might try to contribute to their coworkers' creativity as an expected behavior, rather than a voluntary extra role behavior (i.e., OCB-I). Therefore, a boundary condition for the model hypothesized and tested in this dissertation is examining the catalysts among coworkers who are not the supervisors of the creators.

The final related concept that will be discussed here is interpersonal organizational citizenship behaviors (OCB-I). Taking the role of a creativity catalyst can be considered as an organizational citizenship behavior. Organizational citizenship behaviors (OCBs) are discretionary behaviors that contribute to the functioning of the organization, which are not explicitly recognized by the formal organizational reward system (Organ, Podsakoff, & MacKenzie, 2006). Putting effort toward helping to enhance coworkers' creativity is not usually indicated in the formal job description of employees, so such behaviors could be considered as citizenship behaviors directed at other employees (OCB-I). OCB-I behaviors are those that are targeted at individuals in the organization, such as helping and cooperative behavior (Ilies, Fulmer, Spitzmuller, & Johnson, 2009). Accordingly, being a creativity catalyst can be considered as an OCB-I since the catalysts try to help their coworkers to improve their creativity, and they can do this in different ways. They can contribute in an instrumental way by providing information (Perry-Smith, 2006), giving insightful feedback (De Stobbeleir et al., 2011), and asking challenging questions (Cross & Thomas, 2010). The catalyst can also facilitate the creative performance of the creator in an emotional way by providing emotional support and encouragement (Madjar, Oldham, Pratt, 2002; Perry-Smith & Mannucci, forthcoming). Therefore, being a creativity catalyst of coworkers' creativity can be considered as a type of OCB-I behaviors.

Motives behind Serving as a Creativity Catalyst

Improving coworkers' creativity by taking the role of a catalyst can be considered as an OCB-I behavior since it is primarily targeted at the coworkers. Employees choosing to perform OCBI-s by being a creativity catalysts can have both other-directed motives,

or self-serving motives (Bolino, 1999; Bowler, Halbesleben, & Paul, 2010; Halbesleben, Bowler, Bolino, & Turnley, 2010; Rioux & Penner, 2001) Prosocial motivation is an other-serving motive that leads individuals to engage in proactive behaviors with the purpose of benefiting others in the organization (Grant & Rothbard, 2013). A catalyst with a high prosocial motive might have the mere intention of helping out a coworker by improving the coworker's creative performance (Brief & Motowidlo, 1986).

In this dissertation I argue that the self-serving motive that relates to choosing to be a creativity catalyst is the developmental motive (Clary & Snyder, 1991). A developmental motive is the motive behind learning and acquiring new skills and knowledge (Clary & Snyder, 1991). When a catalyst puts effort in contributing to another party's creativity, she would learn from this challenging experience (Elliot & Dweck, 1988). Therefore, the experience of interacting with another person during her creative process can add to the skill set of the catalyst, which can eventually translate into improved catalyst performance. Furthermore, a catalyst can keep learning from the creator during future interactions. Specifically, when the catalyst helps the creator, due to social exchange norms, the catalyst can expect the creator to reciprocate her help in the future (Cropanzano & Mitchell, 2005), which can serve as a source of learning and improvement for the catalyst. Therefore, it can be argued that catalysts also might have a *developmental motive* in helping the other party and contributing to their creativity. Self-serving and other-directed orientations are independent constructs (Rioux & Penner, 2001), so they are not two end points of a single continuum (De Dreu & Nauta, 2009). Since they are not mutually exclusive; an employee performing OCBs can have both motives at the same time (Bolino, 1999). In this dissertation, I will emphasize the self-

serving developmental motive behind becoming a creativity catalyst, because these motives are very unique about becoming a creativity catalyst among the other OCB-I behaviors. Accordingly, I will introduce the learning goal orientation of a catalyst as a stable motivational dispositional characteristic behind her self-serving developmental motive to assume a creativity catalyst role. While emphasizing the unique role of self-serving developmental motives in serving as a creativity catalyst, I will control the catalysts' prosocial motivation in order to omit potential alternative explanations.

Hypotheses Development

Social Capital of Creativity Catalysts

Social capital represents the resources embedded in social networks that cannot be fully understood without looking at the underlying network structure (Fang et al., 2011; Lin, 1999). Here, two dimensions of social capital (i.e., structural social capital and relational social capital) of a creativity catalyst are introduced as the predictors of the intensity and span of her contribution to coworkers' creativity. The structural dimension of social capital, in the form of social network structures, is the most studied dimension of social capital (Moran, 2005). However, much less attention has been paid to the relational characteristics of social capital (Moran, 2005), which is about the quality of the relationships that one has with her contacts (Tsai & Ghoshal, 1998). Recently, there has been a growing interest in integrating the structural and relational dimensions in order to have a more complete understanding of social capital (e.g. Levin et al., 2014; Moran, 2005). This dissertation follows this approach and brings the structural and relational dimensions together. I argue that while the relational dimension determines the motivation of a creativity catalyst to invest the time and resources in order to improve

others creativity, the structural dimension makes the catalyst more capable in terms of improving other's creativity.

Social Capital Theory

According to Marx's traditional capital theory, the value of surplus is only captured by the capitalists (Lin, 2008). However, social capital constitutes a part of neo-capital theories, since employees can invest in it by themselves through relationship building (Lin, 2008). It is a resource just like human capital and financial capital (Lyons, 2002), except it does not exist in the individuals themselves, but is embedded in their relationships (Adler & Kwon, 2002). In addition, this type of capital is as important as other types of capital, because it leads individuals to desired outcomes by providing information and resource flow, increasing their influence, and generating social recognition (Fang, Duffy, & Shaw, 2011).

Social capital is one of the fastest growing areas in organizational research (Borgatti & Foster, 2003). In fact, the effect of social capital has been studied on a number of organizational outcomes such as promotions (Burt, 1997), influence and power (Brass, 1984), turnover (Krackhardt & Porter, 1986), career satisfaction and mobility (Seibert, Kraimer, & Liden, 2001), individual performance (Baldwin, Bedell, & Johnson, 1997), and creativity (Perry-Smith, 2006). Social capital has both a structural dimension and a relational dimension (Nahapiet & Ghoshal, 1998). The relational aspect corresponds to the quality of the relationships (e.g. trust and trustworthiness) that constitute one's social network (Tsai & Ghoshal, 1998). Structural social capital on the other hand is the characteristics of the network pattern (e.g., structural holes, centrality) that an individual is located in (Nahapiet & Ghoshal, 1998). Granovetter's weak tie

argument (1973) is the starting point of the relational dimension of social capital. Tie strength refers to the average closeness, duration, and frequency of relationships between actors (Granovetter, 1973). Granovetter (1973) argues that individuals have limited time and resources to build relationships. Therefore, by having weak ties, people would have more opportunities to reach out to more people since they will only be spending a limited amount of time and resources on the weaker relationships (Seibert et al., 2001). Having a high number of contacts through weak connections would help them utilize some benefits such as, increased creative performance (Perry-Smith, 2006) or access to information on new career opportunities (Seibert et al., 2001), due to the information benefits of knowing a lot of people. According to this view, weak connections can be considered as yielding a strong relational social capital situation.

As opposed to this view, some other researchers examine the importance of the strength of *strong* ties (Krackhardt, 1992). According to them, information would be transferred only if people trust each other and build a strong relationship (Coleman, 1990). I follow the second perspective in this dissertation and argue that *stronger relationships* characterized by higer levels of trust and shared norms (Nahapiet & Ghoshal, 1998) lead to *stronger relational social capital* and that these strong relationships increase the motivation of a catalyst to invest more time and resources to improve their coworkers' creativity, leading to a higher intensity and span of contribution. Consequently, strong relational social capital and strong relationships are used interchangeably in this dissertation.

Burt (1992) carried the focus of network studies away from the relationship level to the *structure* of the overall network leading to a structural social capital perspective.

Burt perceived Granovetter's weak ties argument as a starting point of the information benefits of his structural holes argument. He argued that the actual causal agent of the argument is not the weak ties, but the structural holes (Hansen, 1999). He defined structural holes as: "…the separation between non-redundant contacts. Non-redundant contacts are connected by a structural hole. A structural hole is a relationship of redundancy between two contacts the hole is a buffer, like an insulator of an electric circuit" (Burt, 1992, p. 22). If a focal person's (i.e., ego) network with her contacts (i.e., alters) contains a lot of structural holes, her network includes a lot of contacts who are not connected to each other, and the ego acts as a bridge over structural holes connecting the disconnected contacts. There is a debate within the network structure perspective on the importance of structural holes. Some researchers that follow Burt claim that brokerage over structural holes is the main antecedent of developing new ideas (Burt, 2004; Hargadon & Sutton, 1997), since it is a way of integrating diverse ideas and perspectives from a variety of contacts. However, as opposed to Burt's structural holes perspective, Coleman (1990) and other researchers (e.g. Obstfeld, 2005; Uzzi, 1997) claim that closed networks where all the actors are connected to each other without any structural holes are trust based, so they are superior to networks with structural holes. In this dissertation, I follow the perspective introduced by Burt. Hence, I argue that connecting the disconnected others by bridging more structural holes refers to a stronger structural social capital situation. In other words, the more structural holes a catalyst can bridge over, the higher ability she will have in contributing to others' creativity.

Creativity Catalysts and social capital

Although the effect of social capital has been studied for a number of organizational outcomes, one area that has recently gained popularity is the relationship between social networks and creative performance (Baer, 2010; Burt, 2004; Cattani & Ferriani, 2008; Perry-Smith & Shalley, 2003; Perry-Smith, 2006). Studies in this area have focused on the structural and relational aspects of social capital separately. For instance, Perry-Smith & Shalley (2003), Perry-Smith (2006), and Zhou and coworkers (2009) highlighted the importance of the number of weak relationships on creative performance (i.e., relational social capital). On the other hand, Burt (2004), Gargiulo and Benassi (2000), and Gargiulo, Ertug, and Galunic (2009) are some examples of studies, which discussed the significance of structural holes on generating new ideas and creativity (i.e., structural social capital).

Here, I am arguing that the relational dimension of social capital determines how much effort a catalyst will put into contributing to her coworkers' creativity, while the structural dimension determines the ability of the catalyst to contribute in a more successful way. The creativity literature puts most of the emphasis on the social capital of the creator. Burt (1998) suggested that while one way of building social capital is directly by building relationships that bridge over structural holes, another way of constructing social capital is by knowing the most strategic partners. Burt (1998) conceptualized this phenomenon as borrowing somebody else's social capital, and found that this type of networking can be beneficial for receiving promotions earlier down one's career path. Similarly, a creator can borrow her catalysts' social capital. Choosing a strategic catalyst that has the right social capital can be very beneficial for the creator's performance. For

this reason, this dissertation will focus on the relational and structural social capital of the catalyst rather that the social capital of the creator.

Following Granovetter's strength of weak ties argument (1973), the majority of creativity researchers suggest that having weak ties with contacts is important for having higher creative performance (e.g. Baer, 2010; Delmestri, Montanari, & Usai, 2005; Perry-Smith & Shalley, 2003; Perry-Smith, 2006; Zhou et al., 2009). According to this argument that emphasizes the advantages of weak ties, since individuals have limited time and resources to build network ties, having a larger number of weaker ties is more beneficial for collecting a diverse set of information and perspectives from various contacts than investing the limited time and resources on a smaller number of stronger relationships. In addition, according to homophily theory, individuals tend to keep similar others closer with strong ties; but these similar ones carry similar information with the ego (Blau, 1977; Williams & O'Reilly, 1998). Therefore, it is argued that ties with similar others would only bring redundant information and a perspective similar to what the ego already has. Hence, individuals reaching out to distant contacts that are not similar to themselves through weak ties can have better creative performance (Zhou et al., 2009).

Some more contemporary arguments on the other hand state that strong ties can also facilitate employee creativity because people connected with strong ties feel more motivated and responsible to help each other and engage with a problem (Sosa, 2011; Tortoriello & Krackhardt, 2010). Even though a number of researchers found that weak relationships are critical for creativity, I follow this latter approach and argue that stronger relationships with coworkers that are characterized by trust and shared norms

(Nahapiet and Ghoshal) are more critical for a creativity catalyst's contribution to her coworkers. Strong relationships are important for voluntarily putting the effort into helping the coworkers to be more creative. How much a catalyst concentrates on helping to improve her coworker's creative performance (i.e., intensity of contribution) depends on how close the catalyst and her coworker are connected to each other. As I mentioned before, in this dissertation I use strong relational social capital and strong relationships interchangeably and argue that having stronger relational social capital increases catalysts' motivation to spend the time and resources necessary to help contribute more intensely to a higher number of their coworkers' creativity.

First, it is suggested that, when individuals have strong relationships, they are more likely to invest the time and resources to help and support each other (Sosa, 2011). Investing time and resources in order to help coworkers' performance is an extra role behavior (Smith, Organ, & Near, 1983) for the catalysts. It is more likely that catalyst would perform these interpersonal extra-role helping behaviors if they have trust based, close relations with the creators (Settoon & Mossholder, 2002; Wagner & Rush, 2000). Therefore, building stronger relationships with their coworkers increases the motivation of the catalysts in taking the effort of trying to contribute to their coworkers' creative performance by providing information, asking challenging questions, giving insightful feedback and supporting the creator emotionally. Second, being in strong relationships is associated with positive affect (Perry-Smith & Mannucci, forthcoming), and positive affect is found to enhance creativity (George & Zhou, 2002). Thus, the positive affect generated from strong and supportive relationships with catalysts can enhance the creators' creative performance. Furthermore, employees who have a stronger social

capital (i.e. stronger relationships to their coworkers) are more likely to be attached and committed to their organization (Mossholder, Settoon, & Henagan, 2005; Labianca & Brass, 2006). Due to their attachment, they want their organization to perform better not only for their own sake, but also for the sake of their coworkers who they are strongly connected to and for the sake of their organizational survival. Therefore, I argue that catalysts with stronger relationships to their coworkers would have higher motivation to contribute to a higher number of coworkers' creativity compared to the catalysts with weaker connections, so that their coworkers and the entire organization can benefit from their contribution.

Having high levels of *motivation* may not be enough to attain enhanced levels of performance if an employee does not have sufficient *abilitie*s to perform (Locke et al., 1978). The structural dimension of social capital determines the catalyst's capability to enhance the creativity of her contacts. If a catalyst is in touch with people that are already connected to each other, the information and insights that the catalyst can share with her coworkers will be very limited. This is because in network structures where most of the contacts are already connected to each other, there is a high amount of redundant information (Burt, 1992, 2004; Zhou et al., 2009). In other words, the catalysts that are embedded in network structures with fewer structural holes would have a lower capability to contribute to their coworker's creativity, because they do not have a lot of diverse information and perspectives to bring to the table. On the other hand, having access to a wide array of contacts via connecting to unconnected contacts by bridging over structural holes can help the catalysts to provide a wide range of non-redundant information to the creators (Burt, 2004; Fleming et al., 2007; Kijkuit & van den Ende,

2010). Thus the catalysts' ability to intensely contribute to their coworkers' creativity increases. In addition to providing a diverse set of information, since catalysts who connect the disconnected others have access to a broader range of perspectives, they can ask a wider variety of challenging questions to stimulate the creator's thinking. Finally being exposed to a variety of perspectives can help them to provide more insightful feedback. These catalysts can also have a greater ability to contribute to the creative performance of more coworkers compared to catalysts that have weaker structural social capital, because catalysts with a stronger structural social capital have the advantage of reaching out to more contacts that are not related to each other (Burt, 1992).

The ability and motivation interaction is an important determinant of performance (Locke, Mento, & Katcher, 1978). In the social networks literature this interaction has recently received some attention. For instance, Reinholt, Pedersen, and Foss (2011) argued and found that the relationship between network position and knowledge sharing is affected by the interaction of motivation and ability to share knowledge. Similarly, the extent of a catalyst's contribution to her coworkers' creativity is dependent on both the ability and motivation of the catalyst. Therefore, I argue that the effects of a catalyst's structural and relational dimensions of social capital interact on both intensity and span of creativity contribution. The most successful creativity catalysts are expected to be the ones who have strong structural social capital along with a lot of structural holes (i.e., the *ability* to provide non-redundant information to the creators) (Burt, 1992), and at the same time have strong relational social capital (i.e. strong relationships) with their contacts so that they would be more *motivated* to invest in their contacts with the purpose of improving their creativity. This is because strong relationships that span over structural

holes provide access to novel knowledge and the willingness to cooperate during the successful transfer of knowledge (Levin et al., 2014).

*H1a. The structural social capital of a catalyst moderates the positive relationship between the relational social capital and the **intensity** of contribution to her coworkers' creativity, such that this relationship is **stronger** when the catalyst has stronger structural social capital.*

*H1b. The structural social capital of a catalyst moderates the positive relationship between the relational social capital and the **span** of contribution to her coworkers' creativity, such that this relationship is **stronger** when the catalyst has stronger structural social capital.*

Learning Goal Orientation of Creativity Catalysts

In this dissertation, I focus on learning goal orientation (LGO) as a stable motivational orientation of a creativity catalyst as a predictor of her intensity and span of contribution to other's creativity. As I discussed earlier, LGO is in line with the self-serving developmental motive behind becoming a creativity catalyst.

Goals are specified levels of performance that are aspired to be reached by individuals (Locke & Latham, 1990). As explained previously, being a creativity catalyst is a form of intentional helping behavior performed with the purpose of improving the creators' creativity. Due to the purposeful nature of the actions taken by creativity catalysts, it is appropriate to focus on the individual goal orientations of the catalysts. Goal orientation is defined as a motivational orientation which effects the interpretation and responses towards achievement situations of individuals (Hirst, Van Knippenberg, & Zhou, 2009). Therefore, goal orientation theory examines why individuals choose to

follow different goals under similar situations (Dweck & Leggett, 1988). Starting in the educational psychology and child development literature, this theory has been adapted to the industrial\organizational psychology and organizational behavior literatures (Seijts, Latham, Tasa, & Latham, 2004; VandeWalle, Cron, & Slocum Jr, 2001).

In the literature, there have been discussions about goal orientation regarding whether it is a stable disposition (Button, Mathieu, & Zajac, 1996; Mehta, Feild, Armenakis, & Mehta, 2009) or a situational characteristic (Chen, Gully, Whiteman, & Kilcullen, 2000; Seijts et al., 2004), and the majority of the researchers have taken the dispositional approach. For instance, Seijts and coworkers (2004) found that it is a stable property over time. Furthermore, Kanfer & Ackerman (2000) stated that goal orientation is a motivational trait. Chen and coworkers (2000) also indicated that this orientation is a trait or individual difference, just like cognitive ability and general self-efficacy. Similarly, Elliott & Dweck (1988) highlighted the stability aspect of goal orientation by indicating that it is part of an individual's value system. Following these views, in this dissertation, I will be referring to goal orientation as a stable dispositional orientation.

According to achievement motivation theory (Elliott & Dweck, 1988), there are two main types of goal orientations: learning goal orientation and performance goal orientation. These two are independent and non-mutually exclusive characteristics. Hence, they are not on a single continuum (Button et al., 1996; Kanfer & Ackerman, 2000). Individuals with a high learning goal orientation believe that their abilities are malleable (Dweck & Leggett, 1988; VandeWalle et al., 2001; VandeWalle & Cummings, 1997). Therefore, these people seek feedback (VandeWalle & Cummings, 1997), try to improve themselves when they are faced with challenging situations (Dweck & Leggett,

1988) and are motivated to improve their skills due to their high intrinsic interest in learning (Hirst et al., 2009). On the other hand, individuals with a performance goal orientation believe that their skills are fixed and uncontrollable (Dweck & Leggett, 1988). Thus, these people feel helpless when they face challenging situations, and they do not show enhanced effort as a means for improving their performance (VandeWalle et al., 2001). People who are performance oriented have high extrinsic motivation, which means that they are trying to exhibit behavior that will get rewarded, while avoiding criticism and failure (Hirst et al., 2009).

In this dissertation, I introduce learning goal orientation as an antecedent of being a catalyst to others' creative performance. Since people with a high LGO are motivated to improve their skills (Hirst et al., 2009), and since they think their abilities are malleable (Dweck & Leggett, 1988), this type of goal orientation aligns well with the developmental self-serving motive behind serving as a creativity catalyst. Catalysts may invest their own time and resources to enhance their coworkers' creativity, because they believe they will learn from their interaction with the creators by observing the challenging situation that the creators are facing and by exchanging information with them. In addition to the current interaction, due to social exchange norms, the catalysts might also expect their help to be reciprocated by the creators in the future (Cropanzano & Mitchell, 2005), and the future relationship can be another source of information and learning experience for the catalyst.

Relationship between Learning Goal Orientation and Being a Creativity Catalyst

The effect of goal orientation on numerous outcomes has been examined in the literature, such as school performance (Elliot & Church, 1997; Seijts et al., 2004); overall

job performance (VandeWalle, Ganesan, Challagalla, & Brown, 2000); motivation to learn (Colquitt & Simmering, 1998); voluntary employee behavior (Hurtz & Williams, 2009); feedback seeking (VandeWalle & Cummings, 1997) and intrinsic motivation (Elliot & Church, 1997). The impact of a LGO on creative performance has recently received some research attention (e.g. Gong et al., 2009, Hirst et al., 2009). Specifically, LGO is thought to affect creative performance; because it plays a major role in the acquisition of creativity relevant skills, task relevant knowledge, and intrinsic motivation (Hirst et al., 2009). People with high LGO are motivated to work on their skills and learn from others. Furthermore, they have a higher intrinsic interest in working on challenging tasks such as creative tasks (Hirst et al., 2009), since they have lower levels of fear of failure (Elliot & Church, 1997) and they are more likely to seek feedback to improve themselves (VandeWalle & Cummings, 1997). Therefore, enhancement of these three should lead to improved creative performance.

This dissertation emphasizes the learning goal orientation of the catalyst who contributes to the creative performance of her coworkers, rather than focusing on its effects on the creator. This is an important twist for the creativity literature, because it shifts the attention from the creators to the catalysts. People with a high LGO are more motivated to get involved in challenging situations (Elliot & Church, 1997). Therefore, they would be more willing to be a part of the creative process of their coworkers and help others by contributing to their creativity. According to social cognitive theory, individuals gain skills and abilities by direct experience or learning from others (Bandura, 1986; Gong et al., 2009). Therefore, the catalysts with a higher LGO would see their exchange with the creators as an opportunity to improve themselves by information

transfer, and the interactions and observations made while discussing the challenging situation. The catalysts that have a high LGO would be more encouraged to focus on the interactive creative process and invest in this contribution, because they can potentially learn new information and skills. Second, people with a higher learning goal orientation see knowledge sharing as an opportunity to improve their own information quality, because constant information exchange prevents the deterioration of their existing knowledge over time (Swift, Balkin, & Matusik, 2010) Consequently, due to their high motivation for exchanging ideas and learning new knowledge, catalysts with a high LGO would invest more of their resources to contribute to their coworkers' creativity compared to catalysts with a low LGO. Hence, the intensity of their contribution to their coworkers' creativity will be higher.

In addition, catalysts with a higher learning goal orientation would be more motivated to contribute to the creativity of a wider span of coworkers. High LGO catalysts would see the interactive process of contributing to others' creativity as an opportunity to improve themselves, because it corresponds to their developmental motives. Thus, they try to contribute to the creativity of a wide group of coworkers, as this can increase the catalysts' chance of acquiring new information from different sources, and learning about different experiences, challenging situations, and thinking styles from each of their coworkers. Due to their high motivation to learn, they have a desire to have access to new knowledge and to improve themselves (Colquitt & Simmering, 1998), Consequently, these catalysts are more likely to contribute to the creativity of a wider span of coworkers.

*H2a: A creativity catalyst's level of learning goal orientation is positively related to the **intensity** of her contribution to her coworkers' creativity.*

*H2b. A creativity catalyst's learning goal orientation is positively related to the **span** of her contribution to her coworkers' creativity.*

Interaction between Learning Goal Orientation and Relational Social Capital

The relational social capital dimension underlies a catalyst's situation-dependent motivation (Chen et al., 2000; Kanfer, 1992) to help others. Although having close relationships provide a situation that motivates a catalyst to help their coworkers (Sosa, 2011), this does not necessarily imply that she will be specifically motivated to improve the creative performance of her coworkers. Those individuals with strong relational social capital may choose to perform interpersonal citizenship behaviors (Bowler & Brass, 2006) without actually getting involved in the creative process with the creator. I argue that if the catalysts with strong relational social capital are also more motivated to get involved in the creative process with the creator, the intensity of her contribution to the creators thinking will be stronger, since the help giving and help seeking behaviors between two actors together can enhance the creative thinking of a sole individual (Taylor & Greve, 2006; Hargadon & Bechky, 2006).

Contextual factors and individual characteristics interact in predicting performance (Oldham & Cummings, 1996), and stable goal orientations can be the individual characteristics that determine the different directions people follow under similar contexts (Dweck & Kegett, 1988). Following this view, in my theoretical model I expect a catalyst's stable trait-like dispositional orientations (i.e. learning goal orientation) to strengthen the relationship between situation dependent motivation

mechanisms (i.e. relational social capital) and the intensity and span of a catalyst's contribution. I argue that LGO is a stable motivational orientation that channels an employee's contribution to her strongly related coworkers specifically toward her coworkers' creativity, because catalysts with a higher learning goal orientation are more likely to be involved in the challenging creative process with the creator (Elliot & Church, 1997).

In order to understand the role of individuals' social structures, researchers have integrated macro theories on social networks and micro level theories on individual differences (Ibarra, Kilduff, & Tsai, 2005). Examining the interaction effect between LGO and relational social capital contributes to this developing trend in the social network literature. If a catalyst with strong relational social capital also has is high on learning goal orientation, she would channel her motivation to intensely contributing to others' creativity compared to the catalysts with lower levels of LGO. As discussed above, people with a higher LGO are motivated to get involved in challenging situations (Elliot & Church, 1997). Therefore, rather than providing another type of help to their coworkers, they would be eager to be involved in the creative process with their close contacts since they would enjoy participating in this challenge. Networking facilitates learning mechanisms by improving the transfer of knowledge (Podolny & Page, 1998). Catalysts with a high LGO would see the exchange with their strongly connected coworkers as an opportunity to improve their own information quality (Bandura, 1986; Gong et al., 2009, Swift et al., 2010). In other words, they would invest more in these strong relationships so that they can actually learn from their contacts. This interaction can lead to a higher intensity of contribution to their coworkers' creativity.

This interaction can explain the catalysts' span of contribution as well. Catalysts with a high learning goal orientation have a higher desire to have access to new knowledge (Colquitt & Simmering, 1998). At the same time, catalysts with stronger relational social capital are motivated to contribute to a larger group of their coworkers, because due to their strong connections they care more about their organizations' and coworkers' performance. When catalysts have higher levels of learning goal orientation and a stronger relational social capital at the same time, they have the right situational motivation and motivational disposition to contribute to as many coworkers as possible.

H3a. The learning goal orientation of a catalyst moderates the positive relationship between her relational social capital and the ***intensity*** *of contribution to her coworkers, such that this relationship is* ***stronger*** *when the catalyst has higher rather than lower LGO.*

H3b. The learning goal orientation of a catalyst moderates the positive relationship between her relational social capital and ***span*** *of contribution to her coworkers, such that this relationship is* ***stronger*** *when the catalyst has higher rather than lower LGO.*

The suggested theoretical model can be seen in Figure 2.

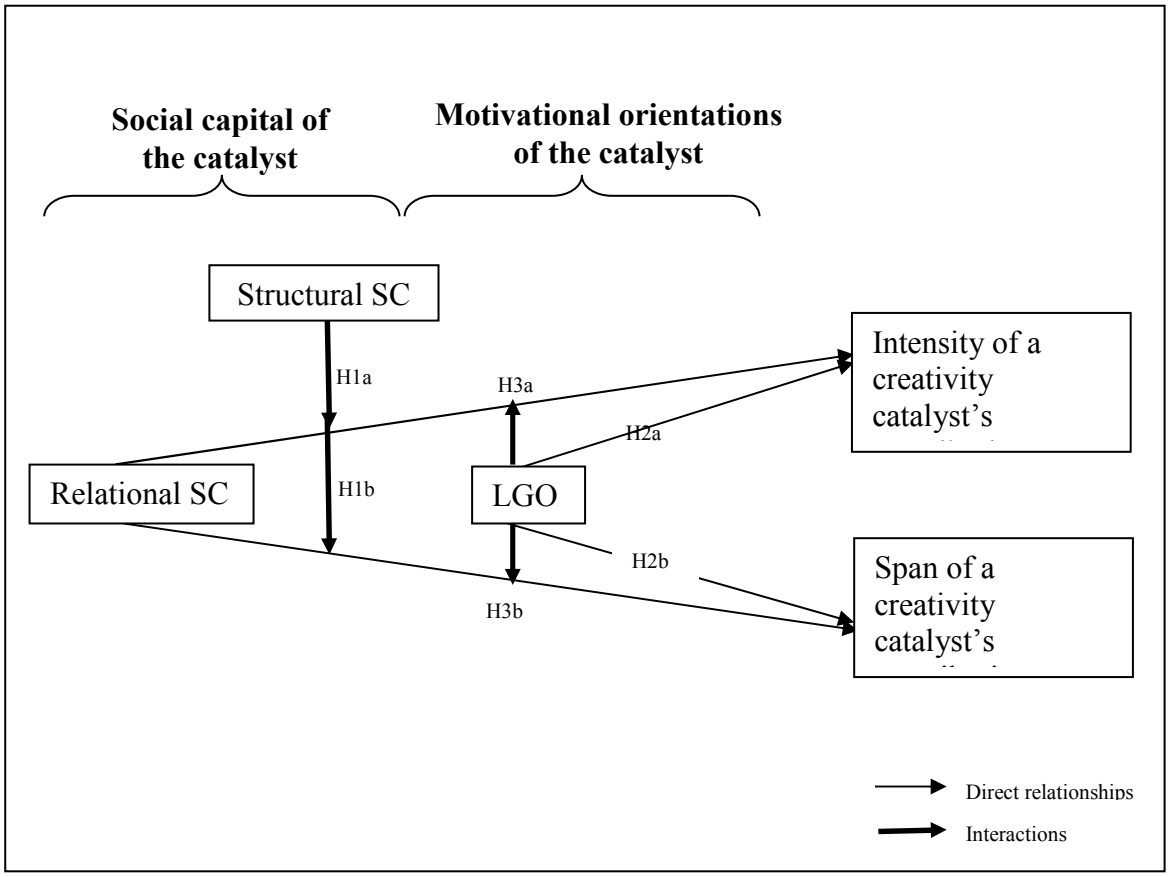


Figure 2: The Theoretical Model

CHAPTER 3

PILOT STUDY

This dissertation is composed of two research studies. First, a pilot study was conducted to validate the intensity and span of contribution measures that were developed for this dissertation. Second, the hypotheses were tested in a field setting using a multi-stage and multi-source research design in two architecture companies located in Turkey. The main field study was designed after considering the shortcomings of the survey measures used in the pilot study.

Overview

The purpose of the pilot study was to test the discriminant validities of the two contribution measures (i.e., the span and intensity of a creativity catalyst's contribution to her coworkers) that were developed for this study. Specifically, with this pilot study I tried to answer the question of "when participants are asked to nominate a number of their coworkers as catalysts of their creativity, can these participants differentiate creativity catalysts from creative coworkers?" I argue that these concepts were theoretically distinguishable for a number of reasons. First, employees who have high creativity may not be eager to be a catalyst since being a catalyst involves investing time and resources in order to improve the creative performance of their coworkers. Therefore, employees potentially need to have a reason to spend the extra effort to help their coworkers' creativity. In my dissertation a stable motivational orientation (i.e., learning goal orientation) was introduced as a factor that could determine the personal motivation to engage in the role of being a creativity catalyst. Therefore, not all creative employees

become their coworkers' creativity catalyst. Second, even if an employee is motivated to contribute to others, if she does not have sufficient social capital resources she may not still be *able* to transfer her knowledge and ability to her coworkers. Furthermore, as discussed before, the actions performed by a creativity catalyst with the purpose of enhancing coworkers' creativity do not necessarily require the catalyst to be creative. For instance, the catalyst might spend her time sharing the problems she sees about a situation, bring relevant information that she gathered after doing some research as a way to help the coworker (i.e., the creator), provide insightful feedback if she has domain specific-knowledge, and motivate and support the creator. Therefore, being a creative person is theoretically different from being a creativity catalyst. I conducted the preliminary pilot study to test whether participants can empirically distinguish creative employees from creativity catalysts.

Methodology

The pilot study was run on a sample of full-time MBA students in a major business school in the southeast of the United States. I collected the data from students who had been in the program for two months and they had attended about five courses together during these two months. In addition to the 15 hours they spent together in class, the program organizes a number of social events outside class. Furthermore, the students attend a substantial orientation program before the program starts that in part emphasize team building and developing relationships. Therefore, 2 months into the program should give them enough time to get to know each other and build relationships.

Sample Characteristics

The student sample was composed of two classes. 53 students in the first class and 66 students in the second class participated in the study with response rates of 86.89% and 92.96 respectively. I designed the survey as a paper-and-pen survey, and ran it during one of the required classes of the MBA program. Participation for the study was voluntary, but I promised the students a network map of their class and feedback about their position on the map as an incentive to have them participate. Due to confidentiality, I emailed an identification number associated with each participant on the map to the participants individually. Therefore, the participants only had information about their own position in the network map, and they did not know the identification numbers and the positions of their classmates. The questions that I used in the pilot study can be seen in Appendix 1.

Measures

Intensity and Span of Creativity Catalysts' Contribution

I provided the participants with a list of their classmates, and then asked them to nominate up to 10 classmates who contributed to their creativity (i.e., creativity catalysts). The roster method, where a list of all the relevant contacts is provided to the participants, is a commonly accepted method in social network analysis since the list minimizes recall error by minimizing the possibility of some of the contacts not being recognized by the other participants (Borgatti, Everett, & Johnson, 2013). The single item question was *"Please select from the class list on the right at least 10 classmates that you interact with while generating ideas, solving problems, preparing for class, etc. (it can be more than 10 if applicable). Among the people you have selected, please indicate the*

extent to which they contribute to your creative thinking\creative problem solving\creative idea generation?" Then I asked the respondents to rate the extent of contribution of the catalysts that they nominated on a 7-point scale, ranging from 1=*contributes very little*, to 7=*contributes a lot*. Since answering questions for all their contacts in a survey can be cumbersome and tedious for the participants, a single item question is preferred (Marsden, 1990). In addition, I provided space for nominating up to 15 contacts although they were asked to name 10 classmates, in order to give the participants the discretion to list more contacts if they felt they needed to. I preferred this free choice approach, because it has been found to have higher reliability (Ibarra, 1992; Marsden, 1990).

Intensity of creativity contribution: Using the responses of the participants for the question indicated above, I generated a non-symmetrical N X N network matrix of "who contributes to my creativity as a creativity catalyst", with the participants on each row and the nominated classmates on each column. Each cell on this matrix had the value that corresponds to the extent of contribution the creator receives from the classmates she nominated as a catalyst on a 7-point scale (See Figure 3).

		Classmates nominated as creativity catalysts			
		George	Sarah	Michael	Jane
Participants	George	-		5	6
	Sarah	5	-	2	6
	Michael			-	6
	Jane				-

Figure 3: "Who Contributes to My Creativity as a Creativity Catalyst" Matrix

As can be in Figure 3, participant George nominated Michael and Jane as creativity catalyst who contribute to his creativity with intensities of 5 and 6 respectively, while Sarah nominated George, Michael, and, Jane; and Michael nominated only Jane, Jane did not nominate any coworkers as her creativity catalyst. I took the transpose of this matrix into a new non-symmetrical N X N matrix by replacing the rows with columns, which generates the matrix of "to whom this catalyst contributes to" (See Figure 4).

		Classmates who the catalysts are contributing to			
		George	Sarah	Michael	Jane
Creativity catalysts	George	-	5		
	Sarah		-		
	Michael	5	2	-	
	Jane	6	6	6	-

Figure 4: "To Whom This Catalyst Contributes to" Matrix

As Figure 4 shows, George contributes to Sarah's creativity; Sarah is not selected to be a creativity catalyst by any of her coworkers, Michael contributes to George and Sarah; and finally Jane contributes to all her coworkers' creativity. The intensity of each catalyst's contribution to their coworker's creative performance was calculated as the average degree of contribution to the parties who nominated them as creativity catalysts. In order to calculate the intensity of creativity contribution, the total contribution of each individual on the N X N matrix (i.e., the row total) was divided by the number of times this individual is nominated as a contributor. For instance, the intensity of George's

contribution is 5; while the intensity of Michael's contribution is 3.5, calculated as: (5+2)\2.

Span of creativity contribution is the number of times the employee was nominated by others as a contributor. Out-degree centrality is defined as the number of ties directed from the ego to the alters (Freeman, 1979). Hence, the out-degree centrality of the transposed N X N matrix ("to whom this person contributes to") indicates number of times the ego (i.e., the catalyst) contributes to her alters (i.e., the coworkers who nominated the catalyst) was used as a measure of span of creativity contribution. In order to calculate the out-degree centrality, I first dichotomized the non-symmetrical N X N creativity contribution network, where 1 stands for contributory relationships, and 0 is non-contributory relationships (See Figure 5). In this case, the out-degree centralities for George, Sarah, Michael, and Jane are 1, 0, 2, and 3 respectively. I calculated the out-degree centrality of each participant with the UCINET program (Borgatti, Everett, & Freeman, 2002).

		Classmates who the catalysts are contributing to			
		George	Sarah	Michael	Jane
Creativity catalysts	George	-	1	0	0
	Sarah	0	-	0	0
	Michael	1	1	-	0
	Jane	1	1	1	-

Figure 5: Dichotomized "To Whom This Catalyst Contributes to" Matrix

Creativity of the Classmates:

The second question on the pilot survey asked the participants to nominate among their classmates the ones who they think are the most creative. The single item question is as follows: "*Again, please go back to the complete class list on the right and nominate the classmates that you think are the most creative/innovative".* The responses generated a non-symmetrical, dichotomized N X N matrix of "who are my creative classmates" based on the creativity nominations (See Figure 6).

		Classmates nominated as creative			
		George	Sarah	Michael	Jane
Participants	George	-	0	0	1
	Sarah	0	-	1	1
	Michael	1	0	-	0
	Jane	0	1	1	-

Figure 6: "Who Are My Creative Classmates" Matrix

If we look at each column of the matrix in Figure 6, we can see that George was nominated by Michael, Sarah was nominated by Jane, Michael was nominated by Sarah and Jane, and Jane was nominated by George and Sarah. Since in-degree centrality is the number of ties directed from the alter to the ego (Freeman, 1979), the number of times each participant is nominated by her classmates will be calculated using in-degree centrality. Hence, the more a classmate is nominated to be a creative classmate, the higher creativity score she receives. I used the UCINET 6 program (Borgatti et al., 2002) to calculate the in-degree centrality of the participants.

An alternative approach that I could use to evaluate participant creativity was asking the class instructors to assign a creativity score to each student. However, the students were working on team projects throughout the semester. Hence, the instructors might not have observed the individual creative performance of each team member. Also, since creativity is not specifically looked for in most of the classes, the instructors might not have a good understanding of students' creativity. In addition, the purpose of the pilot study was to see if intensity of creativity contribution is empirically distinguishable from employee creativity. For this reason, it was important to compare the evaluations from the same data source (i.e., classmates). As another alternative, I could have asked each student to rate the creativity of their classmates rather than asking them to nominate the creative ones. Since the survey was conducted during class in a limited time frame, I did not prefer this this approach.

Analysis and Results

In the pilot study, I measured the creativity of classmates, and the intensity and span of contribution of classmates to each other's creativity. The means, standard deviations, and correlations between these variables for the two classes combined together can be seen in Table 1.

Table 1: Pilot Study Descriptive Statistics and Correlations

		N	Mean	SD	1	2
1	Creativity	132	4.19	4.41		
2	Intensity	132	4.98	0.77	.17*	
3	Span	132	7.69	3.81	.41**	.08

I used the pilot study to see if participants nominated different classmates for being their creativity catalysts versus being the most creative classmates, which provides

an indication of whether the participants can distinguish between the catalysts and the creative classmates. For this reason, I examined the Pearson correlations among the creativity and the intensity and span of each participant's contribution to her classmates as a creativity catalyst for evaluation of the discriminant validity of the creativity catalyst measure. In the first class, the correlation between intensity and span was 0.16 ($p>0.05$), intensity and creativity was 0.19 ($p>0.05$), and span and creativity was 0.31 ($p<0.01$). In the second class, these correlations were 0.17 ($p>0.05$), 0.17 ($p>0.05$), and 0.31 ($p<0.01$) respectively. In the overall sample with class 1 and class 2 combined, these correlations were 0.08 ($p>0.05$), 0.17 ($p<0.05$), and 0.41 ($p<0.01$) respectively. As I expected, the correlations between intensity and creativity, and span and creativity were low to moderate, hence there was not enough evidence to conclude that people cannot distinguish people who are creative from people who act as the respondent's creativity catalysts.

In addition to observing Pearson correlations among the variables, I also tested the correlation between the dichotomized non-symmetrical N X N matrices generated by classmate nominations (i.e., "who contributes to my creativity" matrix, "who are my creative classmates" matrix, and "who are my creative role models" matrix) in order to understand whether the same classmates are nominated to be both the catalysts and the creative classmates by each participant. I ran the quadratic assignment procedure (QAP) with the UCINET program to calculate these correlations. As explained before, the significance tests used in standard packages make a number of assumptions, such as independence of observations. However, this assumption is violated in network studies (Borgatti et al., 2013). When QAP correlations are used, the problem of dependence of

observations is resolved by using a very high number of permutations generated from the observed matrices[2]. I expected a moderate correlation between "who contributes to my creativity" and "who are my creative classmates" matrices in order to argue that people can differentiate between who is creative and who contributes to their creative thinking. In the first class, the QAP correlation between the matrices as 0.14 ($p<0.01$) and in the second class this correlation was 0.13 ($p<0.01$). Again, these correlations are both low, which provided some evidence that creative people are distinct and distinguishable from creativity catalysts.

Discussion of the Study 1 Findings

The purpose of the pilot study was to evaluate the discriminant validity of the creativity catalyst measure I developed. The results provided evidence that people can distinguish creativity catalysts from creative people. Before going ahead with the main study, I examined the pilot study in detail and noticed three problems. First, in the pilot study, I asked the participants to choose the most creative classmates. Then I calculated the creativity of each participant using the number of times they were nominated as being creative. This is not a traditional measure of creativity. Also, the somewhat high correlation between span of contribution and creativity can be because they are both from the same source (i.e., both based on the nominations by the classmates). In order to eliminate this problem, in the main study I decided to ask a third party, the supervisors, to

[2] The algorithm behind calculating the QAP correlations proceeds in two steps. First, the Pearson correlation between the corresponding cells of two matrices are calculated. Second, the program permutes rows and columns of one of the matrices, and computes the correlation between the corresponding cells of the permuted matrix and the second matrix. This second step is repeated hundreds of times, in order to calculate the proportion of times that the correlations calculated in step 2 are higher than or equal to the correlation calculated in step 1. A low proportion, which is less than 0.05 indicates a strong relationship between the matrices that cannot happen by chance.

evaluate the creative performance of the participants (Tierney et al., 1999; Zhou & George, 2001).

Second, in the pilot study I asked the classmates to nominate their creativity catalysts. The relatively low variance made me question whether the respondents did not fully understand what a creativity catalyst is by the description I provided in the question. In social network studies, since single-item questions are preferred, the respondents should be given a very detailed question (Ferrin, Dirks, & Shah, 2006; Levin et al., 2014; Marsden, 1990). Therefore, in the main study I decided to include a more detailed description of a creativity catalyst, by providing some sample behaviors of a creativity catalyst. I will explain this variable in more detail in Chapter 4.

Finally, even though the participants were provided with a list of their classmates, there is still a possibility that they do not consider all of their classmates when answering a question. For instance, if a classmate is contributing to their creativity in a very small amount, they might not think of this person as their creativity catalyst. In order to reduce recall errors and biases, I decided to include a probing question in the main study (Borgatti et al., 2013). In this question, I decided to ask the respondents to go back to the class list and think of those coworkers that contribute to their creative thinking even in a very small amount. Under the light of these findings, I went ahead to test my theoretical model in the main study sample.

CHAPTER 4

MAIN STUDY

I conducted the main study in order to test the suggested theoretical model.

Power Analysis

I conducted an a priori power analysis test using the G*power software in order to determine the desired sample size (Erdfelder, Faul, & Buchner, 1996). Following the guidelines suggested by Cohen and colleagues (2003), I identified the desirable power (1-β) as 0.80, and the statistical significance level (α) as 0.05. The model that I will test has three independent variables, two interactions, and 8-10 controls. Therefore, I identified the number of predictors to be 15, with numerator degrees of freedom of 1. Finally, I used the effect size guidelines for a multiple regression analysis, following Cohen (1988) as a small (f^2 = .02), medium (f^2 = .15), or large effect (f^2 = .35) effect size. Consequently, I found that the desirable sample sizes are 379, 56, and 28 for small, medium, and large effect sizes respectively. Following the common threshold used in social network studies in the creativity field (e.g. Baer, 2010; Perry-Smith, 2006; Zhou et al., 2009), the targeted sample size I had in my mind while approaching companies was 100-150, which is higher than a desired sample size for a medium sized effect.

Methodology

In social network studies, it is important to map out the network of the entire organization rather than focusing on a small section of the organization (Ibarra & Andrews, 1993). The reason is that employees might be bridging over structural holes between departments, and if we consider only one department these relationships cannot

be captured (Zhou et al., 2009). Including every member means each participant will be expected to think and respond about their relationships with all the other employees in the organization. In order to make the data collection less cumbersome for the participants, I preferred to test my hypotheses in multiple mid-sized organizations rather than one big organization so that the participants will be able to evaluate their relationships with all of their coworkers.

When the data is provided at the same time, common method bias becomes a potential threat (Campbell & Fiske, 1959). In order to avoid this problem, I selected a *multi-stage* design in this dissertation (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The online surveys were conducted in a multi-stage session, involving two waves, 3 weeks apart from each other in order to lower any risk of common method bias among the self-response questions (Podsakoff et al., 2003). Although the complex calculation formulas of network variables reduces the probability of having a systematic bias (Doty & Glick, 1998), questions based on the nomination of the respondents from a list of coworkers provided to them were still kept separated in two different surveys. Accordingly, the participants were asked to choose the coworkers who act as a creativity catalyst to their creative performance in Survey 1, while they were asked to nominate the coworkers who they have been communicating with on work related matters as a measure of their relational and structural social capital in Survey 2 (Obstfeld, 2005). In addition, the structural and relational dimensions of social capital was evaluated separately from the self-report measure for cognitive social capital, such that the first two was included in Survey 2, while the later one was included in Survey 1. Furthermore, self-report individual measures were asked in two separate surveys such that learning goal

orientation, prosocial motivation, and cognitive social capital were covered in Survey 1; while intrinsic motivation, performance avoid and prove orientations were included in Survey 2.

Another source of common method bias is providing the data from the same person (Campbell & Fiske, 1959). Specifically, the correlation between the self-report measures can be artificially inflated (Podsakoff & Organ, 1986). In order to avoid this problem, I selected a *multi-source* research design in this dissertation (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Here there were three sources of data: self-report, evaluating by coworkers, and evaluating by supervisors. First, the dependent variables (i.e., the intensity and span of a creativity catalyst's contribution to her coworkers) were determined by the nomination of coworkers (Sparrowe & Liden, 2005); hence the data source is the coworkers. Second, two of the independent variables (i.e., relational social capital and structural social capital) are calculated by using the symmetrized communication network relationships of the organization. In other words, as a verification mechanism, a relationship is taken into account only if both parties of the dyad indicate the relationship exists. Therefore, they are not self-reported measures, but a combination of self-report and coworker report measures. Third, the other independent variable (i.e., LGO) and some of the control variables (e.g. cognitive social capital, performance prove orientation) are self-report measures. Finally, one of the control variables, employee creativity, was evaluated by the supervisors. A detailed description of the data sources of each measure and the survey that includes these measures can be seen in Table 2.

Table 2: Data Collection

Variable	Position in the theoretical model	Data source	Survey #	Source
Span of creativity contribution	Dependent variable	Coworkers	Survey 1	Developed for this study (*1 item for selecting coworkers)*
Intensity of creativity contribution	Dependent variable	Coworkers	Survey 1	Developed for this study *(1 item for rating the coworkers selection above)*
Learning goal orientation	Independent variable	Self-report	Survey 1	VandeWalle, 1997*(6 items)*
Cognitive social capital	Control variable	Self-report	Survey 1	Tsai & Ghoshal, 1998 *(2 items)*
Prosocial motivation	Control variable	Self-report	Survey 1	Grant, 2008 *(4items)*
Demographics	Control variable	Self-report	Survey 1	
Ego network constraint	Independent variable (mediator)	Combination of coworker response and self-report	Survey 2	Perry-Smith, 2006 *(1 item to select coworkers)*
Average tie strength	Independent variable (mediator)	Combination of coworker response and self-report	Survey 2	Perry-Smith, 2006 *(3 items to rate the coworkers selected above)*
Intrinsic motivation	Control variable	Self-report	Survey 2	Warr, Cook, & Wall, 1979 *(3 items)*
Performance avoid and performance prove orientations	Control variable	Self-report	Survey 2	VandeWalle, 1997*(5 items)*
Employee creativity	Control variable	Supervisor-rated	Supervisor survey	Tierney, Farmer, & Graen, 1999, *4 items*

Note: Survey 1 and supervisor survey was sent in Time 1, and Survey 2 was sent in Time 2, two weeks after Time 1.

For the main study, I preferred to conduct online surveys rather than paper-and-pen surveys, so that it was easier for the respondents to fill out the surveys. I asked the company owners to email the first survey links to their employees that I prepared on Qualtrics. A week later, I asked the owners to send a reminder email. Three weeks after the start date, I sent owners the Qualtrics link for the second employee survey and asked them to email this link to the employees. Again after a week, I asked them to send a reminder email for Survey 2. Regarding the supervisor survey, I emailed the Qualtrics link of this survey to the 10 supervisors directly on the same day that Survey 1 was sent out to the employees by the company owners. The supervisors had the entire time till the end of Survey 2 to complete the supervisor survey. Since all the supervisors responded within a week upon receiving the survey link, no reminder email was sent.

Sample Characteristics

I tested my theoretical model in two architecture companies located in Ankara, Turkey. Since the research question emphasizes creativity, I preferred to test my hypotheses in an organization that operates in a creativity relevant industry. Furthermore, I included only the employees who are required to work on creativity related tasks such as the architects, civil engineers, and interior designers in my sample. The first organization was smaller, with 36 employees working in these three occupations; and the second organization was larger with 91 employees in these occupations. Both organizations do not operate in a team-based structure. In the total sample, 79.5% of the employees were male, with an average age of 32. 74.1% of the participants had a bachelor's degree, and 16.1% had a master's degree. There was no significant difference between the two organizations regarding these characteristics. The average tenure of the

employees was 4.5 years, and there was a significant difference between the organizations on employee tenure. Specifically, the first organization was established in 2007 while the second organization was established in 1975. This difference did not yield significant differences between my study variables, except for one of the relational social capital questions (i.e. duration of relationship). To take this difference into consideration, I included "organization" as a control variable. Since catalysts who have a supervisory role for the creator are out of the scope of this dissertation, I specifically selected organizations that have relatively flat organizational structures to potentially minimize formal status differences.

As indicated above, for the main study, I conducted two employee surveys 3 weeks apart from each other and a separate supervisor survey. In the first organization, 36 employees are asked to participate in the study, and 33 of them responded to both Survey 1 and Survey 2, with a response rate of 91.6% for both surveys. In the second organization, 80 employees participated in the first survey, and 78 employees participated in the second survey out of 91 employees who are asked to participate in the study, with 87.91% and 85.7% response rates respectively (N=111). The targeted response rate I expected from each organization was between 65-90%following previous literature on social networks (Stork & Richards, 1992), and I was able to reach this threshold in both of the organizations. In addition to the two employee surveys, the supervisors were also asked to complete a survey to evaluate the creative performance of their subordinates. In the first organization 4 supervisors and in the second organization 6 supervisors received the supervisor surveys, and all of them participated with a 100% response rate for both organizations.

Measures

Since the main study was collected in Turkey, all the questions were translated to Turkish and then back translated to English by two people working independently, and then the translated items were cross-checked (Brislin, 1970). I provide more details regarding the survey questions below. The items that correspond to each scale included in the main study can be seen in Appendix 2.

Intensity and Span of Creativity Catalysts' Contribution

In the main study, I measured the same two dependent variables (i.e., intensity of a creativity catalyst's contribution and span of a creativity catalyst's contribution) that I measured in the pilot study, based on the responses of the catalyst's coworkers (Sparrowe & Liden, 2005). Although the same steps of calculation were followed here, the data collection process was slightly different since this data is based on a field sample rather than on a student sample. In addition, here I took into consideration some problems that I recognized while running the pilot study.

First, I provided a roster of coworkers to the participants. The roster method is suitable when the researcher knows the names of the entire network prior to data collection (Ibarra, 1992). Since respondents are given a roster of their coworkers, they were less subject to recall error (Borgatti et al., 2013), which increases accuracy and reliability of the measures (Labianca, Brass, & Gray, 1998). The single item question that was used in the pilot study to measure the intensity and span of creativity contribution was modified here. According to Marsden (1990), single-item questions can be preferred in social network studies to make participation less cumbersome; however in order to increase the reliability and specificity of a single-item question, the respondents should

be provided with a detailed question. Therefore, I provided some examples of activities that a catalyst might perform with the purpose of enhancing the participant's creativity (Ferrin, Dirks, & Shah, 2006; Levin et al., 2014). This time the question was formatted as: "*Please select the coworkers from the roster who help you in various ways while you are generating ideas, or solving problems, and therefore acts as a catalyst for your creativity by contributing to your creative thinking\creative problem solving\creative idea generation. Please consider that your coworkers might be contributing to your creativity in numerous ways, such as providing you with information, giving insightful feedback, asking challenging questions, stimulating your thinking, or emotionally encouraging and supporting you while you are coming up with new ideas".*

I selected these four sample behaviors, because it has been found that they can each influence one or more of the three aspects of Amabile's componential model of creativity (1983). Also, I presented my research idea to three research labs in a southestern college in the United States. I interviewed with their managers, and I had a meeting with the employees of one of the labs. During these informal interviews, I had a chance to ask the managers and employees about their thoughts on the behaviors presented as creativity catalysts. The sample behaviors and experiences they shared fell into one of these behaviors. Since I did not came across any other types of behaviors, I felt confident in including these behaviors in my measure.

After the participants selected the coworkers that contributed to their creativity, a probing question adapted from Perry-Smith (2006) appeared on the screen in order to reduce recall errors and biases (Borgatti et al., 2013). The question was as follows: *"Please refer to the list of your coworkers again, and add to your list anyone else that*

contributes to your creative thinking\creative problem solving\creative idea generation, even those who contribute less frequently or less extensively". At the end of these two questions, an unsymmetrical dichotomized N X N creativity contribution map of the organization was generated, where 1 stands for the nominated relationships by each participant, and 0 stands for the non-existing relationships. This matrix is the "who contributes to my creativity" matrix. Span of creativity contribution was computed using the transpose of this matrix. Following the same steps with the pilot study, first the transpose of this matrix was taken in order to generate the matrix of "to whom this person contributes to". Then, the out-degree centrality was calculated using the UCINET program as the measure of span of creativity contribution (Borgatti et al., 2002).

The third question asked about the extent of each nominated catalyst's contribution, which generated a valued non-symmetrical matrix. The question was: *"Now please indicate the extent to which your selected coworkers contribute to your creative thinking\creative problem solving\creative idea generation? Again, please consider that your coworkers might be a catalyst to your creativity and contribute to your creativity in numerous ways, such as providing you with information, giving insightful feedback, asking challenging questions, stimulating your thinking, or emotionally encouraging and supporting you while you are coming up with new ideas".* The respondents were asked to rate the extent of contribution of the nominated participants on a 7-point scale, ranging from 1=*contributes very little*, to 7=*contributes a lot*. The "who contributed to my creativity" matrix, which is a valued and non-symmetrical matrix was created using the responses from this question. Intensity of creativity contribution was calculated following the exact same procedures described under the pilot study.

Independent Variables

Learning Goal Orientation

I used VandeWalle's (1997) six item 7-point learning goal orientation measure adapted to an organizational field setting (α=0.87).

Network Measures

I calculated the network measures (relational social capital and structural social capital) using the symmetrized communication network of the organization. The main interest of this study was the structural and the relational social capital of the contributors; hence the content of these relationships, such as sharing information, gossiping, or receiving emotional support, is not the critical factor here. Therefore, I asked about any communication they have with their coworkers, without specifying any network content, in order to determine the communication network of the organization. So, the participants can think about all their work related communications they had with other organizational members. Accordingly, adapted from Perry-Smith (2006), I asked the employees: "*Thinking back over the past two years, with whom do you communicate about work related topics*". The employees were asked to choose the coworkers they interact with from the roster provided to them, which improves accuracy and reliability of the network measure (Marsden, 1990; Perry-Smith, 2006; Zhou et al., 2009) as explained above. I asked the respondents to think back over the last two years, because social network research has shown that participants are more accurate when they are asked to evaluate long-term patterns of behavior (Borgatti et al., 2013; Freeman, Romney, & Freeman, 1987). After the participants chose the contacts they interacted with on the online survey, a probing question adapted from Perry-Smith (2006) appeared on the

online survey screen again, as "*Please refer to the list of coworkers again, and add to your list anyone else that you communicate with, even those that you interact with less frequently, more informally, or less extensively*". Using probing questions would reduce any biases and error that could be due to remembering the past interactions (Borgatti et al., 2013). At the end of this procedure, by combining the responses of each participant, I generated an unsymmetrical N X N communications map of the organization, where 1 stands for any nominated relationships by each participant regardless of the strength of the relationship, and 0 stands for the non-reported relationships.

Structural Social Capital

I used network ego network constraint as a measure of the structural social capital of a creativity catalyst. Network constraint is a measure of structural holes, which stands for the extent to which a person is connected to a single group of interconnected colleagues (Burt, 1992, Obstfeld, 2005, Seibert, Kraimer & Liden, 2001). When none of the contacts of the ego are connected to each other but only to the ego, ego network constraint reaches its minimum value. Thus, high levels of ego network constraint stand for a weaker structural social capital while low levels of ego network constraint stand for stronger social capital. In this dissertation, when I mention high levels of "structural social capital" this refers to "low constraint"

Network constraint is calculated using the N X N communication network matrix of the organization. This matrix is an adjacency matrix, which is a non-valued binary matrix. This means that the cells of the matrix have 0 for non-reported relationships, and 1 for reported relationships (Wasserman & Faust, 2009). Therefore, on the communications network matrix generated using the question above, all the selected

relationships by the participants will be represented with 1, and the rest (non-connected dyads) will be represented by 0. Communication networks are bidirectional, as opposed to unidirectional networks such as advice giving or advice seeking. In other words, if A is communicating with B, this means B is communicating with A as well, which means the communication network matrix should be symmetrical. Therefore, I *symmetrized* the matrix generated using the participant responses (Perry-Smith, 2002; 2006). In the first organization, the percentage of symmetric pairs (both parties report a communication network tie with each other) was 55.69%, and in the second organization it was 73.14%. (Borgatti et al., 2013). Symmetrizing the matrix procedure was conducted by the UCINET program (Borgatti et al., 2002) such that only the relationships that are mutually indicated by both parties in a dyad appears as a 1 on the communication matrix. Reciprocation of a tie is commonly used as a verification mechanism, as an indicator of reliability in social network relationships (Perry-Smith, 2006). Therefore, the communication network matrix has higher reliability if only mutual relationships that are indicated by both parties are shown on the matrix. In other words, the symmetrical cells have a value of 1 only if both parties indicated that there is a relationship, and the value will be 0 if one of the parties or both the parties did not indicate a relationship with the other party.

Using the symmetrized communication matrix, ego network constraint is calculated by the UCINET program (Borgatti et al., 2002), using the equation (Burt, 1992):

$$C_{ij} = (p_{ij} + \sum_q p_{iq} p_{qj})^2 \, , \, i \neq q \neq j$$

In this equation, i is the focal actor, and we are evaluating the relationship of i with j, and q is all the other contacts that i has. i's relationships are constrained to the extent that i's other contacts (q) are also tied with contact j (Burt, 1992). Here, p_{qj} is the proportional strength of q's relationships with j, and p_{ij} is the proportional strength of i's relationship with j.[3] According to this equation, the maximum level of ego network constraint is when a person does not bridge over any structural holes, in other words all the contacts (q) are already connected j and to each other.

Relational Social Capital

I used tie strength as the measure of relational social capital. Tie strength components are closeness, duration, and frequency (Granovetter, 1973). The two-stage approach to calculating tie strength has been used very commonly in the literature (e.g. Baer, 2010; Perry-Smith, 2006; Seibert et al., 2001). During the first stage, employees choose the contacts from the roster that they are interacting with as explained above, and during the second stage, they evaluate each of the selected relationships based on the components of tie strength. In my surveys, after the participants selected their coworkers who they have been communicating with, they were asked to answer three questions, developed by Perry-Smith (2006), considering only the selected coworkers. Closeness was measured with the item: "How close are you with each person?" (1- acquaintance; 2- distant coworkers; 3- friendly coworker; 4- close coworker; 5- very close coworker). Regarding duration, the respondents answered: "How many years has each relationship been in existence?" (1- less than 1 year; 2- 1 to 3 years; 3- 4 to 6 years; 4- 7 to 9 years; 5-

[3] While calculating the proportional strength, the number of contacts i has is taken into consideration. Since the network size of i is taken into consideration in the calculation of network constraint, I did not use network size as one of my control variables (Burt, 1992).

10 or more years). Finally, frequency was measured as "On average how frequently do you communicate with each person?" (1- once a year or less; 2- several times a year; 3- once a month; 4- several times a month; 5- several times a week; 6- daily).

The closeness, frequency, and duration of relationships a person has with her contacts can be considered as three separate constructs, or they can be aggregated under one composite measure of tie strength. There have been a number of studies that have used only one of the three components as a measure of tie strength. For instance, Seibert and coworkers (2001) and Zhou and coworkers (2009) operationalized tie strength only as closeness. There are some other studies that examined the effect of all three dimensions separately, because the scale reliability is usually very low to combine these three dimensions. For instance, Perry-Smith (2006) found that the effect of weak ties on creativity is significantly different from the effect of strong ties on creativity only for duration but not for closeness and frequency. More contemporary approaches on the other hand argue that the standardized scores on these three dimensions should be averaged into a composite measure of strength (Baer, 2010; Sosa, 2011). For example, Baer (2010) stated that since these three dimensions are formative indicators of strength, we can aggregate these three dimensions regardless of the insufficient convergence validities and reliabilities.

To evaluate whether I should combine these measures, I evaluated the quadratic assignment procedure (QAP) correlations (Borgatti et al., 2002) between the intensity, duration, and frequency matrices of the organization. The standard statistics packages such as SPSS calculate correlations only between vectors, not matrices. In addition, the significance tests used in standard packages make a number of assumptions, such as

independence of observations. However, this assumption is violated in network studies (Borgatti et al., 2013). Quadratic assignment procedure (QAP) provided by the UCINET program calculates the correlation between two matrices. The problem of dependence of observations is resolved by using a very high number of permutations generated from the observed matrices. Specifically, the program produces new matrices by rearranging the rows and matching columns of the matrices, which generates an independent matrix each time. When the rows and columns are permutated, the autocorrelation problem is controlled, and a more stabilized p-value is calculated (Borgatti et al., 2013). In my sample, the QAP correlations in Organization 1 between intensity and duration was 0.13 ($p<0.05$), between intensity and frequency was 0.68 ($p<0.001$), and between duration and frequency was 0.08 ($p>0.05$). In the second organization, these correlations were 0.31 ($p<0.01$), 0.48 ($p<0.0001$), and 0.50 ($p<0.001$) respectively. The correlation between intensity and duration, and duration and frequency was lower in the first organization, perhaps because it was a much newer organization, and the employees have not spent a long amount of time with each other. I also calculated the reliability alpha for employees' average intensity, duration, and frequency of relationships using SPSS, and it was 0.85. Consequently, there is evidence that these measures can be combined in my sample, so I aggregated closeness, duration, and frequency as the measure of relational social capital.

Once I had an asymmetrical communication matrix with the tie strength values (an average of closeness, duration, and frequency), I symmetrized the matrix. As explained above, the relationships for communication networks are expected to be mutual, because if A is communicating with B, this means B should also be communicating with A. In order to symmetrize the communication matrix, I used the average method, by averaging

the responses that A reported for her relationship with B, and B reported for her relationship with A. There are other reciprocation techniques such as using the maximum or the minimum value of each party's responses as an alternative to the average method (Borgatti et al., 2013). However, since reciprocation of a tie is commonly used as a verification mechanism in social network relationships (Perry-Smith, 2006), I preferred the averaging approach which takes the responses of both parties into account.

Earlier studies in the social networks and creativity literature used the count of strong or weak ties as the tie strength measure (e.g. Perry-Smith, 2006; Zhou et al., 2009). However, this approach has been criticized since it confounds two different network parameters: the number of ties (i.e., network size) and the strength of ties (Baer, 2010). In addition, with this approach ties are dichotomized as strong versus weak based on a cut-off point determined by the researcher, therefore information on the closeness, duration, and frequency of the relationship are not considered. In order to address these problems, I used the average tie strength measure rather than the number of strong or weak ties measure, following Baer (2010). Therefore, the values associated with the reciprocated relationships that each participant has with her coworkers were averaged (Baer, 2010).

Control variables

Employee creativity

Supervisors were provided a list of all their subordinates, and they were asked to assess each subordinate's creativity using four items adapted from the 9-item scale developed by Tierney et al., (1999), on a 7-point scale (α=0.95). It has been discussed that a catalyst does not have to be creative in order to contribute to others' creativity.

Therefore, I controlled employee creativity to see whether the learning goal orientation and social capital of the catalyst have an influence on the catalyst's contribution regardless of her creativity.

Demographics

According to the similarity-attraction paradigm (Byrne, 1971), social categorization and social identity theories (Turner, 1985), people are more likely to build relationships with similar others. Therefore, two demographic characteristics, age and gender, are controlled in this dissertation. Domain relevant knowledge is a critical determinant of employee creativity according to Amabile's componential model (1983). Therefore, I collected the data in two different organizations operating in the same industry. One of the organizations that was included in this study is older than the second organization. Therefore, there was a significant difference regarding the duration of relationships the participants had with coworkers. Accordingly, in order to avoid any alternative explanations, organizational membership was controlled.

Cognitive Social Capital

It has been suggested that social capital has a third dimension, cognitive social capital (Nahapiet & Ghoshal, 1998). Cognitive social capital is the common values and shared vision among actors in a social network structure (Tsai & Ghoshal, 1998). Although both relational and structural social capital has been found to have direct effects on information exchange and integration, the cognitive dimension only has an indirect effect through the relational dimensions (Tsai & Ghoshal, 1998). Therefore, this dimension will not be emphasized and no specific hypothesis will be developed on this dimension in this dissertation. However, following Levin and colleagues (2014), this

dimension will be controlled during analysis in order to avoid any alternative explanations. I used the two item 7-point scale developed by Tsai and Ghosal (1998) to measure cognitive social capital (r=0.75).

Performance Avoid And Performance Prove Orientations

There are two types of goal orientation: learning goal orientation and performance goal orientation (Elliot & Church, 1997). These two are independent and non-mutually exclusive characteristics. Hence, they are not on a single continuum (Button et al., 1996; Kanfer & Ackerman, 2000). Individuals with a high learning goal orientation believe that their abilities are malleable (Dweck & Leggett, 1988; VandeWalle et al., 2001; VandeWalle & Cummings, 1997). Therefore, these people perceive failure and mistakes as natural, try improving themselves when they are faced with challenging situations (Dweck & Leggett, 1988), and are motivated to improve their skills due to their high intrinsic interest in the task (Hirst et al., 2009). On the other hand, people with a high performance goal orientation believe that their skills are fixed and uncontrollable (Dweck & Leggett, 1988). Thus, these people feel helpless when they face challenging situations, and they do not show enhanced effort as a means for improving their performance (VandeWalle et al., 2001). Furthermore, Elliot and Church (1997) suggested that there are actually two types of performance goal orientation: performance prove goal orientation and performance avoid goal orientation. Individuals with a performance prove orientation compete with others in order to get rewarded and seek to demonstrate their competence and skills (VandeWalle et al., 2001). On the other hand, performance avoiding goal orientation is based on fear of failure (Elliot & Church, 1997), so people high on this orientation focus on avoiding all the negative feedback and judgments of

other parties (VandeWalle et al., 2001). One of the main predictors in this dissertation is learning goal orientation. In order to avoid any alternative explanations, the other goal orientations (i.e performance prove and performance avoid orientations) were controlled. I used the 5-item 7-point scale developed by VandeWalle (1997) for performance prove (α=0.75) and performance avoid (α=0.85) orientations.

Intrinsic Motivation

Intrinsic motivation is one of the key domains of employee creativity, such that employees with higher levels of intrinsic motivation are more eager to participate in the creative process and eventually can reach higher creative outcomes (Amabile, 1983; Grant & Berry, 2011). Similarly, a catalyst with a higher intrinsic motivation can be more motivated to be involved in the creative process with her coworkers and more motivated to help others in this process. Therefore, intrinsic motivation can have an effect on the intensity and the span of a catalyst's contribution. In order to eliminate an alternative explanation, intrinsic motivation was controlled in this study. Following Shalley and colleagues (2009), intrinsic motivation was measured with a 3-item scale developed by Warr, Cook, and Wall (1979) on a 7-point scale (α=0.78).

Prosocial Motivation

Prosocial behaviors are those behaviors such as helping, comforting, and cooperating, that are performed for the benefit of others rather than oneself (Batson & Powell, 2003). Accordingly, prosocial motivation is defined as the "desire to expend effort based on a concern for helping or contributing to other people" (Grant, 2008, p. 49). As explained before, LGO corresponds to the self-serving motives (i.e., developmental motives) of creativity catalysts. Prosocial motivation on the other hand

highlights the other-directed motives that drive the social responsibility goals of the catalysts (Penner et al., 2005). In other words, people with a high prosocial motivation are willing to help others (Grant & Mayer, 2009; Grant, 2007, 2008). Consequently, they are more inclined to perform extra role behaviors such as OCB-Is, since these types of behaviors are not necessarily rewarded in the organization. Therefore, a prosocial motivation can complement the other-directed motives of creativity catalysts.

As an other-directed motive, the prosocial motivation of a catalyst can influence the intensity and span of her contribution. For instance, employees with a high prosocial motivation possess the goal of benefiting others (Grant & Rothbard, 2013; Grant, 2007). If they see their coworkers in need of creative help, they would invest more of their time and cognitive resources by giving social support and feedback, asking questions, bringing up their own perspective, and doing research for their coworkers for the sake of the other party's welfare, which can increase the catalyst's intensity of contribution compared to catalysts with a low prosocial motivation. Also, people with a high prosocial motivation are more likely to follow the generalized norm of reciprocity in helping those coworkers (Penner et al., 2005). In other words, they do not expect immediate reciprocation of their help, but instead they focus on benefiting others in the organization in general (Constant et al., 1996). In addition, they help because they may genuinely feel better about themselves by doing so (Grant & Berry, 2011). Therefore, catalysts with a high prosocial motivation can be more eager to help a large circle of acquaintances in the organization, which can lead to a higher span of contribution. To eliminate any alternative explanation, I control for prosocial motivation in this dissertation. I used a four item prosocial motivation scale developed by Grant (2008), with a 7-point scale (α=0.84).

Analysis and Results

I used only well-established widely used scales in my study, therefore an exploratory factor analysis on the self-report items was not necessary. However, since I tested my hypothesis in Turkey and the majority of the scales I used have been developed in the United States, I still conducted an exploratory factor analysis on all the self-report items including the controls (i.e. learning goal orientation, performance prove orientation, performance avoid orientation, intrinsic motivation, prosocial motivation, and intrinsic motivation), with Variamax rotation. The items successfully loaded on six factors (See Table 3). The six factors with eigen values great than 1 explained 70.66% of the variance.

Only one of the study variables (i.e. LGO) was self-reported, and the rest of the study variables were coworker-rated (i.e. intensity and span of contribution) or based on the combination of self-report and coworker responses (i.e. relational social capital and structural social capital). Therefore, a confirmatory factor analysis was not seen necessary. This decision is consistent with the argument that confirmatory factor analysis with sample sizes smaller than 200 can produce unstable estimates (Hu & Bentler, 1995). I first examined the correlations among the study variables (See Table 4). There was a significant but small correlation between the two dependent variables, intensity and span of contribution ($r=0.27$, $p<0.01$). Relational social capital ($r=0.05$, $p>0.05$) and structural social capital ($r=0.07$, $p>0.05$) did not have a significant correlation with intensity of contribution. As I argued in my theoretical model, since the relational dimension provides the motivation aspect and the structural dimension provides the ability aspect, their interaction is necessary for enhanced intensity of contribution. Therefore, I was not

Table 3: Principal Component Analysis

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
I often look for opportunities to develop new skills and knowledge.	**0.75**	-0.14	0.13	0.01	0.33	-0.04
I am willing to select a challenging work assignment that I can learn a lot from.	**0.84**	-0.24	0.15	0.14	0.12	0.17
I enjoy challenging and difficult tasks at work where I will learn new skills.	**0.83**	-0.16	0.13	0.11	0.10	0.21
I prefer to work in situations that require a high level of ability and talent.	**0.78**	-0.25	0.24	0.16	0.22	0.04
I often read materials related to my work to improve my ability.	**0.62**	0.08	0.19	0.12	0.05	-0.07
I would avoid taking on a new task if there was a chance that I would appear rather incompetent to others.	-0.06	**0.79**	-0.13	0.08	-0.02	0.00
Avoiding a show of low ability is more important to me than learning a new skill.	-0.22	**0.79**	0.00	0.03	-0.13	0.04
I am concerned about taking on a task at work if my performance would reveal that I had low ability.	-0.15	**0.81**	-0.01	0.22	-0.02	-0.02
I prefer to avoid situations at work where I might perform poorly.	0.05	**0.60**	0.19	0.42	0.36	-0.13
When I don't understand something at work, I prefer to avoid asking what might appear to others to be "dumb questions" that I should know the answer already.	-0.08	**0.78**	0.01	0.09	-0.12	0.22
Because I care about benefiting others through my work.	0.12	-0.08	**0.88**	0.05	0.06	0.05
Because I want to help others through my work.	0.24	0.05	**0.87**	0.06	0.08	0.10
Because I want to have positive impact on others.	0.41	0.04	**0.57**	0.26	-0.33	0.05
Because it is important to me to do good for others through my work.	0.24	-0.06	**0.82**	0.05	0.15	0.08
I would rather prove my ability on a task that I can do well at than to try a new task.	-0.07	0.22	-0.05	**0.73**	0.15	0.25
I am concerned with showing that I can perform better than my coworkers.	0.07	0.12	0.06	**0.69**	0.16	0.11
I try to figure out what it takes to prove my ability to others at work.	-0.03	-0.02	0.03	**0.66**	0.34	0.30
I enjoy it when others at work are aware of how well I am doing.	0.25	0.33	0.13	**0.65**	-0.10	-0.16
I prefer to work on projects where I can prove my ability to others	0.20	0.20	0.07	**0.78**	0.12	0.02
I take pride in doing my job as well as I can.	0.05	-0.09	-0.01	0.40	**0.72**	0.22
I feel a sense of personal satisfaction when I do my job well	0.27	-0.27	0.11	0.19	**0.74**	0.08
I feel unhappy when my work is not up to my usual standard.	0.28	0.06	0.09	0.06	**0.79**	-0.03
Our unit shares the same ambitions and vision with other units at work	0.34	-0.02	0.30	-0.01	0.04	**0.70**
People in our unit are enthusiastic about pursuing the collective goals and missions of the whole organization	0.27	-0.04	0.25	-0.08	-0.06	**0.53**
NOTE: Factors 1-6 correspond to learning goal orientation, performance avoid orientation, prosocial motivation, performance prove orientation, intrinsic motivation, and cognitive social capital respectively.						

necessarily expecting to see a high correlation. With span, both relational social capital ($r=0.22$, $p<0.05$) and structural social capital ($r=0.30$, $p<0.01$) have a significant relationship. The non-significant and negative correlation between catalysts' creativity and the intensity of their contribution is noticeable. As I argued, being creative may not be a necessary condition to intensely contribute to other's creativity. As Muller & Kamdar (2011) argued, giving help by contributing to other's creativity might even have a diminishing influence on the catalyst's own creativity. As opposed to intensity, catalysts' creativity has a strong and significant correlation with their span of contribution ($r=0.46$, $p<0.01$). This could mean that a higher number of coworkers perceive creative employees as a creativity catalyst (i.e., span of contribution), but this does not mean that the catalysts' own levels creativity would reflect the intensity of their contribution to others' creativity. Finally, unexpectedly, I found negligible correlations between catalysts' learning goal orientations and their intensity ($r=-0.03$, $p>0.05$) and span (0.10, $p>0.05$) of contribution.

In order to reduce potential problems associated with multi-collinearity, I centered all the independent variables prior to analysis (Aiken & West, 1991). In order to test the hypothesis on intensity of contribution, I used ordinary least square (OLS) regression in a hierarchical fashion. Therefore, first the control variables (i.e., company, sex, age, creativity, cognitive social capital, performance prove orientation, performance avoid orientation, intrinsic motivation, and prosocial motivation) were regressed on intensity of contribution in Model 1, then the independent variables (i.e. relational social capital, structural social capital, and learning goal orientation) were included in Model 2, and finally in Model 3 the interactions (relational social capital * structural social capital, and

relational social capital * learning goal orientation) were added (Cohen, Cohen, Aiken, & West, 2003). I used list-wise deletion for missing cases, and the final usable sample without any missing values included in my analysis was N=100. The results in Table 4 present the findings regarding intensity of contribution (H1a, H2a, H3a). Recently, researchers have suggested excluding insignificant controls in order to have a more parsimonious model (Becker, 2005; Bono & McNamara, 2011). Therefore, I reran the analysis without the insignificant controls for my final set of results. As can be seen in Table 5, the significant controls that were included in my analysis were age and creativity.

Table 4: Main Study Descriptive Statistics and Correlations

		N	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Intensity of contribution	118	4.79	.83													
2	Span of contribution	118	6.39	4.17	.27**												
3	Relational SC (average tie strength)	101	0.03	.80	.05	.22*											
4	Structural SC (opposite of constraint)	95	0.56	.29	.07	.30**	.10										
5	Learning goal orientation	105	5.87	1.01	-.03	.10	.11	.06									
6	Prosocial	105	5.21	1.32	-.02	.01	-.003	.06	.50**								
7	Creativity	118	4.35	1.41	-.09	.46**	.16	.21	.07	.04							
8	Company	118	0.72	.46	-.09	-.26**	.26*	-.03	-.03	-.07	-.23*						
9	Age	105	3.28	1.12	.04	.33**	.03	.14	-.09	-.01	.16						
10	Sex	105	0.80	.40	.02	-.03	.11	-.09	-.02	-.18†	.07	.29**	.08				
11	Cognitive SC	105	5.01	1.53	.09	.16	.03	.02	.46**	.39**	.08	.02	.05	.04			
12	Performance prove orientation	101	4.61	1.20	.00	-.07	-.07	-.17	.25*	.22*	-.01	.14	-.07	.08	.21*		
13	Performance avoid orientation	101	3.18	1.44	-.04	-.32**	-.27**	-.19†	-.17†	.02	-.24*	.05	-.14	.07	.00	.41**	
14	Intrinsic motivation	100	5.94	1.02	-.07	-.004	.19†	-.02	.44**	.16	.02	.27	.03	-.01	.21*	.39**	-.04

† p<.10; * p<.05; ** p<.01

Table 5: OLS Regression on Intensity of Contribution Including All Controls

	DV: Intensity		
	Model 1	Model 2	Model 3
Control variables			
Company	-.23	-.25	-.20
Sex	.17	.24	.08
Age	-.19 **	-.21 **	-.23 **
Creativity	-.08	-.10	-.12 *
Cognitive SC	.08	.11†	.09
Intrinsic motivation	.08	.11	.08
Prosocial motivation	.05	.07	.06
Performance prove orientation	.01	.04	.04
Performance avoid orientation	-.09	-.11	-.10
Predictors			
Relational SC		-.11	.09
Constraint (opposite of Structural SC)		-.48	-.38
Learning goal orientation (LGO)		-.12	-.14
Interactions			
Relational SC X Constraint			-1.15 *
Relational SC x LGO			.27 †
F value	1.99	1.95	2.37
R^2	.19	.24	.31
R^2 change		.05	.07 *

† p<.10, * p<.05, ** p<.01

Table 6: OLS Regression on Intensity of Contribution Excluding Insignificant Controls

	DV: Intensity		
	Model 4	Model 5	Model 6
Control variables			
Age	-.18**	-.18**	-.20 **
Creativity	-.04	-.05	-.09 †
Predictors			
Relational SC		-.05	.13
Constraint (opposite of Structural SC)		-.45 †	-.38
Learning goal orientation (LGO)		.06	-.01
Interactions			
Relational SC X Constraint			-1.25 **
Relational SC x LGO			.32 *
F value	4.83	2.81	3.79
R2	.32	.38	.50
R2 change		.04	.10 **

† p<0.10, * p<0.05, ** p<0.01

Result in Table 5 for Model 6 show that the model significantly improved upon the inclusion of the two interaction terms (R^2 change = 0.074, p<0.05). First, model 6

shows that the interaction effect between relational social capital and structural social capital on a catalyst's creativity contribution was significant (β=-1.25, $p<0.01$). The interaction effect for high and low values of structural social capital was plotted in Figure 7. Simple slopes test (Aiken & West, 1991) indicated that the relationship between catalysts' intensity of contribution and their relational social capital was significant at high levels of structural social capital (t=-3.526, $p<0.001$) while this relationship became insignificant at low levels of structural social capital (t=1.4, $p>0.05$). Hence, Hypothesis 1a was fully supported. Unfortunately, I did not find a significant main effect of learning goal orientation on intensity of contribution (β=-0.01, $p>0.05$), so Hypothesis 2a is rejected. Finally, there was a significant interaction between relational social capital and learning goal orientation (β=0.32, $p<0.05$). Figure 8 presents this interaction. According to the simple slopes analysis, the relationship between intensity of contribution and relational social capital was stronger at higher levels of learning goal orientation (t=2.23, $p<0.05$), but became insignificant at low levels of learning goal orientation (t=-0.83, $p>0.05$). Consequently, I found full support for Hypothesis 3a.

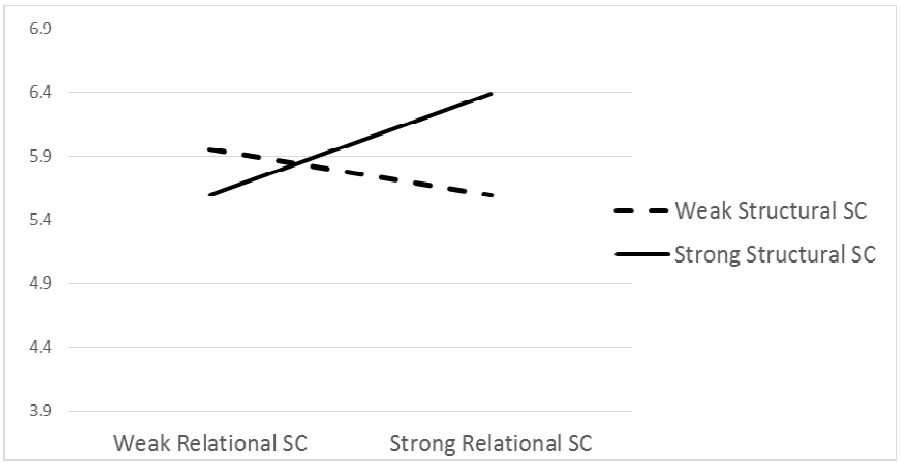


Figure 7: Interaction between Relational Social Capital and Structural Social Capital on Intensity of Contribution

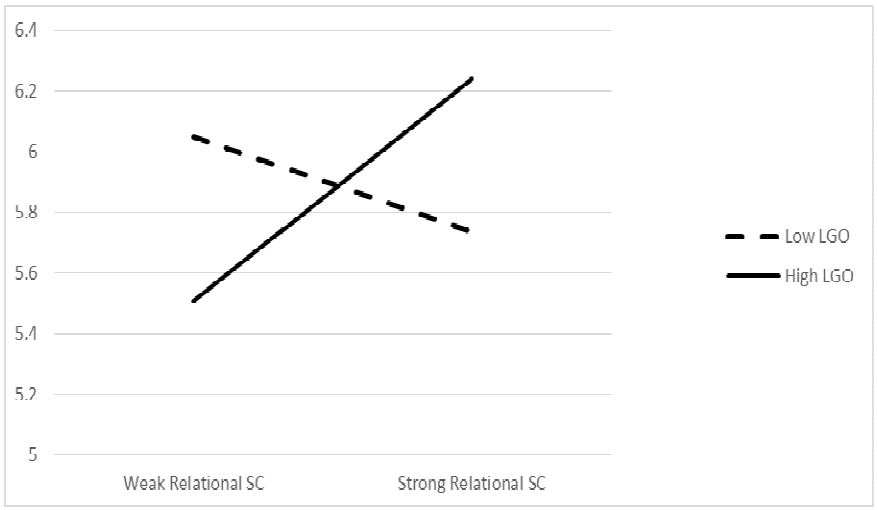


Figure 8: Interaction between Relational Social Capital and Learning Goal Orientation on Intensity of Contribution

Since span of contribution is a count variable, instead of using OLS regression, I used general linear models (GLM) which is found to be appropriate when the dependent variable is a count variable (Cohen, et al., 2003) to test the hypotheses that predict the catalysts' span of contribution (e.g., H1b, H2b, H3b). The simplest form of GLM for count variables is Poisson regression. However, Poisson regression is based on a very

restrictive assumption that the variance and mean of the population are equal to each other. In my sample, the mean of span was 6.39 while the variance was 17.58. This signals the possibility of having over-dispersion, which makes the Poisson distribution inappropriate for my data analysis (Cohen et al., 2003). In addition, the Pearson Goodness of Fit statistic for the Poisson regression revealed significant results (χ^2 (95.75, 73), $p<0.05$), which showed that we had enough evidence to reject the null hypothesis that the dataset fits the Poisson regression. Since the main assumption of Poisson regression is not met, I used negative binomial regression, which is a variant of Poisson regression but can be used when the variance exceeds the mean (e.g. Dietz, Robinson, Folger, Baron, & Schulz, 2003; McFadyen & Cannella, 2004). The Pearson Goodness of Fit statistic for the negative binomial distribution on the other hand was insignificant χ^2 (13.15, 73), $p<0.05$, providing evidence that this model fits the data well.

Similar to the OLS regression described above, I tested the negative binomial regression in a hierarchical fashion, by first entering the controls, than the independent variables, and finally the interactions (See Table 5). Again, for the sake of parsimony, I dropped the insignificant controls from my model to test the hypotheses (See Table 6). Consequently, only company, creativity, and performance avoid orientation are controlled for hypotheses testing.

Table 7: Negative Binomial Regression on Span of Contribution Including All Controls

	DV: Span		
	Model 7	Model 8	Model 9
Control variables			
Company	0.25 *	0.42 **	0.41 **
Sex	-0.01	-0.03	0.06
Age	0.08	0.06	0.04
Creativity	0.15 **	0.11 **	0.09 *
Cognitive SC	0.05	0.06	0.05
Intrinsic motivation	0.01	0.01	0.00
Prosocial motivation	-0.05	-0.05	-0.06
Performance prove orientation	0.05	0.07	0.06
Performance avoid orientation	-0.12**	-0.10 *	-0.09 *
Predictors			
Relational SC		0.27 **	0.40 **
Constraint (opposite of Structural SC)		-0.41*	-0.39 *
Learning goal orientation (LGO)		0.01	0.02
Interactions			
Relational SC X Constraint			-0.84 **
Relational SC x LGO			0.26 *
Log likelihood	-270.53	-254.69	-253.87
Change in log likelihood		15.84 †	0.82
Change in *df*		9	2

† p<0.10, * p<0.05, ** p<0.01

Table 8: Negative Binomial Regression on Span of Contribution Excluding Insignificant Controls

	DV: Span		
	Model 10	Model 11	Model 12
Control variables			
Company	0.23	0.38 **	0.40 **
Creativity	0.17 **	0.12 **	0.09 *
Performance avoid orientation	-0.11 **	-0.06 †	-0.06
Predictors			
Relational SC		0.27 *	0.40 **
Constraint (opposite of Structural SC)		-0.41 *	-0.41 *
Learning goal orientation (LGO)		0.05	0.03
Interactions			
Relational SC X Constraint			-0.84 **
Relational SC x LGO			0.29 *
Log likelihood	-279.03	-258.89	-257.92
Change in log likelihood		20.14†	0.97
Change in *df*		13	2

† p<0.10, * p<0.05, ** p<0.01

Model 12 on Table 6 shows that the addition of the interaction variables did not significantly improve the model (Change in log-likelihood=0.97, $p>0.05$), however the interaction effects were significant. First, there was a significant interaction between relational social capital and structural social capital ($\beta=-0.84$, $p<0.01$). Since negative binomial regression was not a linear function, running a simple slopes test was not appropriate. However, examining Figure 9 shows that there was a steeper increase in span as relational social capital increases when structural social capital is high. Thus, Hypothesis 1b is fully supported. Unexpectedly learning goal orientation did not have a significant main effect on the span of contribution ($\beta=0.03$, $p>0.05$) Therefore Hypothesis 2b is rejected. Finally, the interaction between relational social capital and learning goal orientation was also significant ($\beta=0.29$, $p<0.05$). Figure 10 shows that span of contribution has a stronger increase as relational social capital increases at higher levels of learning goal orientation. On the other hand, their relationship becomes almost flat at lower levels of LGO.

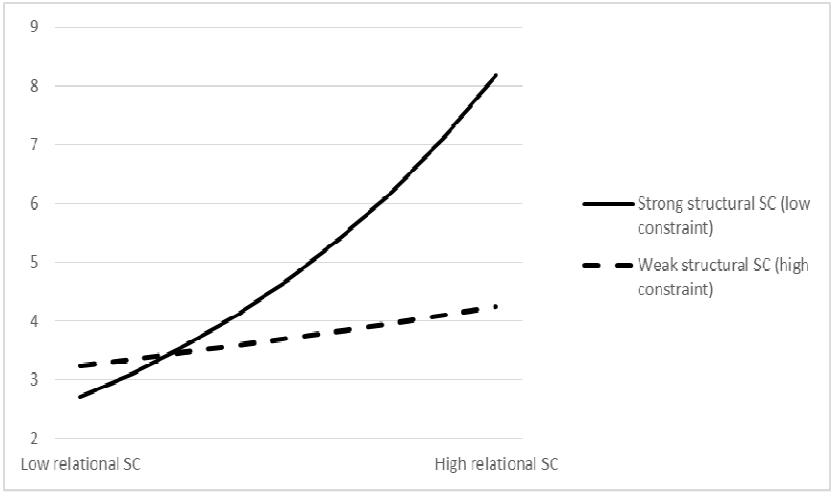


Figure 9: Interaction between Relational Social Capital and Structural Social Capital on Span of Contribution

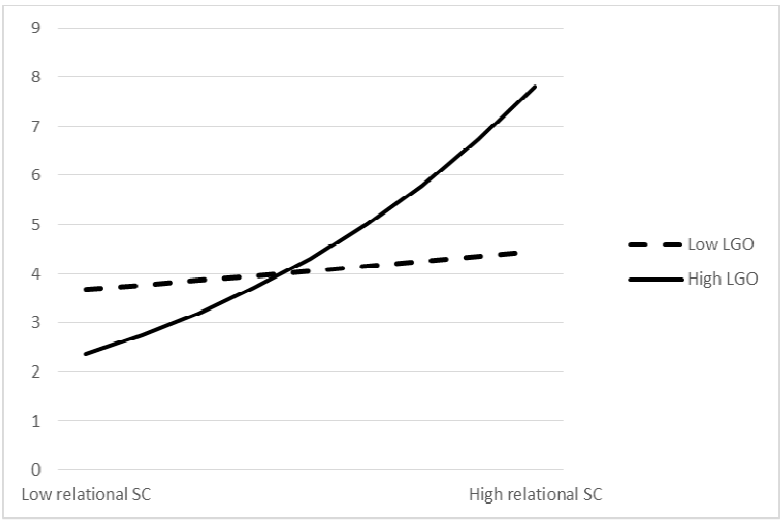


Figure 10: Interaction between Relational Social Capital and Learning Goal Orientation on Span of Contribution

An Alternative Approach: Dyadic Level Analysis

Overview

Up to this point, the intensity of the contribution of a catalyst and her interaction with the creators, have been studied at the *individual level*. In other words, I operationalized intensity of contribution as the average contribution of the catalyst to all the creators who nominated her as their creativity catalyst. Similarly, relational social capital was operationalized as the average tie strength she has with her contacts in the organizational communication network, and structural social capital of an individual is operationalized as ego network constraint, which measures the extent of structural holes one bridges over in her network.

An alternative approach can be focusing on the theoretical model at a *dyadic level*. Specifically, rather than examining a catalyst overall contribution to all her contacts, we can emphasize her extent of contribution to each contact. Similarly, rather than studying the average strength of ties one has with all her contacts as a measure of an

individual's relational social capital, at the dyadic level we can look at the strength of the relationship between a catalyst and each of the creators in her communication network (Sosa, 2011). Finally, instead of focusing on the extent to which an actor can play a bridge role between two disconnected contacts as a measure of structural social capital of the actor (i.e., ego network constraint), we can focus on the extent to which a *dyad* is surrounded by common third parties (i.e., dyadic network constraint; Sosa, 2011). In other words, carrying the arguments from an individual level to a dyadic level, we can infer that the strength of the dyadic relationship between the catalyst and a creator underlies the motivational aspect of a catalyst to contribute to this specific creator's creativity. At the same time, the dyadic network constraint of the catalyst-creator relationship underlies the ability of the catalyst to contribute to the creator. For instance, if both actors of a dyad are strongly connected to the same third party contacts (i.e. high dyadic network constraint), the catalyst would have a lower ability to contribute to the creator, since the information the catalyst brings to the creator would be redundant for the creator. On the other hand, if the catalyst and the creator does not share any common party connections (i.e., low dyadic network constraint), the ability of the catalyst to bring non-redundant information to the creator increases. Consequently, when we carry Hypothesis 1a to the interaction between average tie strength (i.e., relational social capital) and network constraint (i.e., structural social capital) of a catalyst on her contribution to coworkers' creativity from an individual level to a dyadic level, the hypothesis becomes:

> *Alternative Hypothesis 1: The dyadic network constraint of a catalyst-creator relationship moderates the positive relationship between the strength of their*

*relationship and the **intensity*** of the catalyst's *contribution to this specific creator, such that this relationship is **stronger** when there is **low** dyadic network constraint.*

The interaction between learning goal orientation and the relational social capital of the catalyst can be considered in a multi-level fashion. The strength of each relationship an individual has with each of her contacts can be considered at a dyadic level, while the characteristics of the catalysts (i.e., learning goal orientation, creativity, prosocial motivation, cognitive social capital, performance avoid orientation, performance prove orientation, intrinsic motivation, and demographics) can be considered at the individual level. Rephrasing Hypothesis 3a at the dyadic level leads to the second alternative hypothesis:

*Alternative Hypothesis 2: The learning goal orientation of a catalyst moderates the positive relationship between the strength of the relation between the catalyst and the creator and the **intensity*** of the catalyst's *contribution to this specific creator, such that their relationship is **stronger** when the catalyst has higher rather than lower LGO.*

Dyadic Level Measures

To calculate the network variables at a dyadic level, I followed the same steps used by Sosa (2011). I transformed the non-symmetrized NXN communication network matrix into a dyadic form to calculate tie strength and constraint at the dyadic level. Then I also transformed the creativity contribution matrix into a dyadic form. For analysis, I included all the dyads with complete information on intensity of contribution, dyadic tie

strength, and dyadic network constraint, and as a result I ended up with sample of 569 dyads.

Intensity of Contribution

At the individual level, I operationalized intensity of a catalyst's contribution to coworkers' creativity as the average degree of contribution to the parties who nominated them as creativity catalysts. Therefore, it was calculated as the total contribution of each individual on the N X N matrix (i.e., the row total) divided by the number of times this individual is nominated as a contributor. As a dyadic variable, instead of taking the average, I used each entry on the NXN creativity contribution matrix as the catalyst's contribution to her coworkers. In other words, the intensity of the dyadic contribution of a catalyst is evaluated by her coworker, who nominated her as their creativity catalyst.

Strength of a Dyadic Relationship

Following the same steps with Sosa (2011), I used the non-symmetrized NXN communication network matrix to calculate the dyadic strength of relationship. I preferred to use the non-symmetrized communication matrix, because in dyadic analysis it is widely accepted to use the perspective of the recipients (Reagans & Mc Evily, 2003; Sosa, 2011) Following Sosa (2011), I calculated tie strength between actor i and j (p_{ij}) as the proportion of i's total interactions invested in j compared to i's interactions with all the actors in the network (q). Therefore, it is calculated as:

$$Pij = \frac{z_{ij} + z_{ji}}{\sum_q (z_{iq} + z_{qi})} \quad ; i \neq q$$

Here, zij is the tie strength between actors i and j on the communication network matrix, which I calculated as the mean of intensity, closeness, and duration of their relationship as explained above (Baer, 2010). Using a proportional measure of tie strength is consistent with previous work (Gargiulo & Benassi, 2000; Reagans & McEvily, 2003; Sosa, 2011), which emphasizes the amount of time and energy a person i spends on a specific contact j, in comparison to all the contacts of i, which is indicated as q (i.e., z_{iq} and z_{iq}).

Dyadic Network Constraint[4]

When testing the hypotheses at the individual level, I used ego network constraint as a measure of structural holes (i.e., structural social capital). At the dyadic level, I used dyadic network constraint instead. Sosa (2011) defines it as: "a function that depends on the number and strength if third-party connections surrounding the focal relationship (ij)" (p. 9). In other words, network constraint of the dyad between i and j is the extent of having strong connections with the same common parties q. Dyadic network constraint is calculated using the proportional tie strength measure with the common third parties that the contacts share (i.e., p_{iq} and p_{qj}) as explained above (Reagans & McEvily, 2003; Sosa, 2011):

$$C_{ij} = \sum_q p_{iq} * p_{qj};\ i \neq j$$

According to this equation, q represent the third parties between i and j. As the number of common parties between i and j increase, and as the strength of i's or j's relationship with q gets stronger, dyadic network cohesion increases. Therefore, similar

[4] While Burt (1992) uses the concept of "dyadic network constraint", Sosa (2011) refers to the same phenomenon as "dyadic network cohesion", although he followed the exact same steps of measurement with Burt (1992). To be consistent with the individual level analysis presented here, I preferred to use the concept "dyadic network constraint" rather than "*dyadic network cohesion*".

to the constraint variable, network cohesion also represents lack of structural holes between i and j.

Analysis and Results

Testing dyadic level data with ordinary least square regression is not appropriate, since observations are not independent from each other, which violates one of the main assumptions of most regression models (Cohen et al., 2013). A number of alternatives have been suggested so far to overcome this problem. For instance, some scholars included dummy variables for every actor in the data to include the fixed effects (e.g. Reagans & McEvily, 2003; Sosa, 2011). Some other scholars used the quadratic assignment procedure and looked at the relationship between NxN relationships matrices (e.g. Krackhardt, 1988; Labianca et al., 1998; Sosa, 2011). I did not find these two methods appropriate, because while some of my variables were at the dyadic level (i.e. relational social capital, structural social capital, and intensity of contribution), some variables were at the individual level (i.e., learning goal orientation and the control variables). Considering all these issues, I decided to use hierarchical linear modeling to test the dyadic hypotheses, since it takes into consideration the dependency of observations (Raudenbush, Bryk, Cheong, & Congdon, 2004). Since each individual has relationships with multiple parties at a time, I preferred a design where relationships are nested in each individual. Hence, individual characteristics are Level 2, while characteristics of the dyadic relationships that an individual have with her contacts are Level 1.

Prior to testing the hypotheses, I normalized the dyadic tie strength and dyadic constraint variables, as their scale was different from all other 7-point scales used in this

study. The hypotheses are tested using the HLM 6 program, developed by Raudenbush and colleagues (2004), using a hierarchical fashion. The descriptive statistics at the dyadic level can be seen in Table 9, and the results can be seen in Table 10[5]. As Model 15 on Table 10 shows, the interaction between dyadic tie strength and dyadic constraint (γ=0.00, $p>0.05$) and the interaction between dyadic tie strength and catalyst's learning goal orientation (γ=0.02, $p>0.05$) were both insignificant. Therefore, both of the interaction hypotheses did not receive support at the dyadic level. Among the main effects, I only found a main effect between dyadic tie strength and intensity of a catalyst's contribution to a coworker's creativity (γ=0.13, $p<0.01$).

[5] All the control variables were insignificant. I ran the model without any controls to gain power and increase parsimony (Becker, 2005). However, the significance levels of the main effects and the interaction effects did not change. Hence, here I presented only the findings including the control variables for a more detailed presentation.

Table 9: Dyadic Level Descriptive Statistics and Correlations

		N	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	Dyadic intensity of contribution	737	4.92	1.75												
2	Dyadic tie strength	2019	.02	0.03	.13**											
3	Dyadic network constraint	2019	.02	0.01	.10*	.48**										
4	Learning goal orientation	2112	5.96	0.77	.00	-.05*	-.05*									
5	Prosocial	2112	5.12	1.44	-.01	.13**	.13**	.29**								
6	Creativity	2199	4.33	1.43	.02	-.02	.19**	.14**	-.06**							
7	Company	2199	.70	0.46	-.04	-.11**	-.48**	-.03	-.20**	-.25**						
8	Age	2099	3.45	1.24	.01	-.14**	-.07**	.02	.07**	.13**	.02					
9	Sex	2099	.78	0.41	-.03	.02	-.12**	.02	-.25**	.10**	.42**	.09**				
10	Cognitive SC	2112	5.09	1.45	-.03	-.02	-.04	.35**	.45**	.04 †	.02	.13**	.00			
11	Performance prove orientation	2096	4.52	1.09	.00	.08**	-.09**	.10**	.18**	-.10**	.13**	-.03	.06*	.12**		
12	Performance avoid orientation	2096	3.06	1.38	-.05	.07**	-.06*	-.20**	.17**	-.29**	.04 †	-.07**	.04	.06**	.49**	
13	Intrinsic motivation	2071	5.98	0.95	-.04	-.07**	-.19**	.19**	-.02	.07**	.34**	.03	.02	.07**	.27**	-.02

† p<.10; * p<.05; ** p<.01

Table 10: HLM Test for Alternative Dyadic Analysis on the Intensity of Dyadic Contribution

	DV: Intensity		
	Model 13	Model 14	Model 15
Level 2 Control variables			
Company	-.02	.01	.02
Sex	-.01	-.02	-.03
Age	-.07	-.01	-.01
Creativity	.01	.01	.01
Cognitive SC	-.03	-.03	-.03
Intrinsic motivation	-.002	.00	-.01
Prosocial motivation	-.002	.03	.03
Performance prove orientation	.05	.05	.05
Performance avoid orientation	-.05 †	-.05	-.06
Level 1 Predictors			
Dyadic tie strength		.12**	.13**
Dyadic network constraint		.04	.04
Level 2 Predictors			
Learning goal orientation (LGO)		.05	.02
Interactions			
Dyadic tie strength X Dyadic network constraint			.00
Relational SC x LGO			.03
Deviance	1745.83	1332.67	1341.38
Number of estimated parameters	2	4	7

† p<0.10
* p<0.05
** p<0.01

Discussion of the Study 2 Findings

Analyzing the data reveal that the interaction of relational social capital and structural social capital was significant in predicting both the intensity and span of a catalyst's contribution to her coworkers' creativity. There was no main effect of relational or structural social capital on intensity of the catalyst's contribution. In other words, having the motivation to take the initiative to contribute to others' creativity by having close relationships with the coworkers (i.e., relational social capital) was not enough for a high intensity contribution if the catalyst does not have the skill set to contribute (i.e. structural social capital). A catalyst would have a stronger structural social capital if she can connect the disconnected others. By this way, the catalysts can bring

non-redundant information and perspectives to the table when contributing to others' creativity (Burt, 1992). Accordingly, I found that catalysts' relational social capital and her intensity of contribution has a positive and significant relationship only if the catalyst also has higher structural social capital, yet this relationship becomes insignificant if they have weaker structural social capital.

I found similar results on span of contribution. The relational social capital of a creativity catalyst has a positive main effect on the span of her contribution. In other words, those catalysts with strong relationships with their coworkers are more invested in their organization (Mossholder et al., 2005; Labianca & Brass, 2006) and hence are more motivated to contribute to the creativity of a higher number of coworkers, compared to those who have weaker relationships with their coworkers. In addition to the motivational component, the ability component (i.e., structural social capital) has a significant main effect on the span of contribution. The interaction of the two dimensions of social capital reveal that the relationship between relational social capital and span of contribution is positive and significant only when the catalyst has higher structural social capital (i.e., has the ability to bring non-redundant information to the disconnected contacts). These results provide support to Locke and his colleague's argument (1978) that suggest that ability and motivation together predicts performance.

I did not find a significant main effect of learning goal orientation on the intensity and span of a catalyst's contribution. However, there was a significant interaction with the catalyst's relational social capital on both of these dependent variables such that the effect of relational social capital on both the intensity and span of the catalyst's contribution was stronger when the catalyst has higher levels of LGO. This suggests that

having a stable motivational orientation toward learning new skills and information (Hirst et al., 2009) was not sufficient to perform as a better creativity catalyst without the situation dependent motivation mechanism of relational social capital (Oldham & Cummings, 1996). Put differently, a catalyst with a high LGO may not invest her time and resources to intensely contribute to her coworkers if she does not have strong relationships with them. Similarly, the stable motivational orientation to learn and improve oneself was not found sufficient to contribute to a higher number of coworkers' creativity. Even though the catalysts might see each coworker as a source of new knowledge and perspectives, they still need to have strong relationships with their coworkers to take the role of a creativity catalyst for a high number of coworkers.

Even though the interaction hypotheses were supported at the individual level, unfortunately they were not supported at the dyadic level. Perhaps, this may show that the theoretical arguments behind the hypotheses were more appropriate at the individual level. It can be concluded that the overall relational and structural social capital of a catalyst is more effective in determining her contribution to her coworkers' creativity than the dyadic characteristics of the catalyst-creator relationships. In addition, we can also infer that the network constructs at the individual level are not isomorphic with the constructs at the dyadic level (Chen, Mathieu, & Bliese, 2004). Examining the correlations also provide some evidence for this argument due to two reasons. First, although ego network constraint (opposite of structural social capital) and intensity of a catalyst's contribution to her coworkers has a significant and negative relationship ($r=-.30$, $p<0.01$) at the individual level, the role of dyadic network constraint of the catalyst-creator relationship on catalyst's intensity of contribution to the creator is positive and

significant ($r=0.10$, $p<0.05$). This means that at the individual level, the actors that can bridge over structural holes (low ego network constraint) have higher ability to contribute to the creativity of their coworkers. However, when we actually focus on the dyadic relationships, the catalysts not sharing the same contacts with the creator (i.e. low dyadic network constraint) has an inverse effect on the catalyst's intensity of contribution to the creator. When the catalyst and the creator share the same contacts, this closed network creates a trust based environment (Coleman, 1990; Obstfeld, 2005; Uzzi, 1997), which can increase the motivation of a catalyst to invest more time and resources on this specific creator. Second, the role of dyadic tie strength between the catalyst and the creator on the catalyst's contribution to the creators' creativity ($r=0.13$, $p<0.01$) is much stronger than the relationship between a catalyst's relational social capital in the organizational communication network and her overall contribution to the coworkers' creativity ($r=0.05$, $p>0.05$). For these reasons, carrying the arguments at the individual level to a dyadic level was problematic.

CHAPTER 5

DISCUSSION

General Discussion of Findings

In this dissertation, I developed the concept of "creativity catalysts" and defined it as those employees who have the ability and motivation to improve their coworkers' creativity through direct interpersonal interaction. I asked the following research question: Who can become a better creativity catalyst of her coworkers' creativity? I suggested two performance measures of a creativity catalyst: the intensity of her contribution and span of contribution to her coworkers' creativity. To answer the research question, I first ran a pilot study using a student sample to evaluate the discriminant validity of the intensity and span measures, and conducted the main study in two architecture companies in Turkey to test the hypothesized theoretical model.

The results of the pilot study showed that people can perceive some of their coworkers as their creativity catalysts, while some others as the most creative coworkers. This reveals that creativity catalysts and creative employees are distinguishable, and becoming a creativity catalyst can be a distinct role in organizational settings. Hence, the pilot study found some evidence for the discriminant validity of the creativity catalyst measure.

The main study had two important findings. First, as hypothesized, I found that there is significant interaction between the relational social capital and structural social capital of a creativity catalyst for both her intensity and span of contribution. Specifically, the positive relationship between relational social capital and intensity of contribution

was significant only if the catalyst has stronger structural social capital. Similarly, the positive relationship between relational social capital and span of contribution is stronger when the catalyst has stronger structural social capital. As hypothesized, catalysts would be more motivated to invest their time and resources in helping to develop their coworkers' creativity if they have strong, trust-based relationships with them (i.e., relational social capital) (Settoon & Mossholder; Wagner & Rush, 2000), which increases their intensity of contribution. These catalysts with stronger relational social capital are also more likely to have a higher span of contribution, because they are more attached to their organization (Mossholder et al., 2005; Labianca & Brass, 2006). In other words, they would want a higher number of their coworkers and eventually their entire organization to perform better, which increases their motivation to contribute to the creativity of a higher number of coworkers. However, the motivation of a catalyst alone is not enough to increase the intensity and span of her contribution, rather the catalyst has to have some necessary abilities. Specifically, those catalysts who can connect the disconnected others by bridging structural holes (i.e., stronger structural social capital) have higher capability of providing non-redundant information to their coworkers (Burt, 2004; Fleming, Mingo, & Chen, 2006, Kijkuit & van den Ende, 2010). Since these types of individuals can reach out to more coworkers and bring non-redundant information, their ability to intensely contribute to a higher number of coworkers increases. Consequently, I found that the motivation and the ability of a creativity catalyst interact in predicting her performance (Locke et al., 1978) in terms of the intensity and span of contribution.

The second key finding is that as hypothesized the relational social capital and the learning goal orientation (LGO) of a catalyst interact in predicting both the intensity and span of her contribution to her coworkers' creativity. The results showed that the positive relationship between relational social capital and intensity of contribution was significant only when the catalyst had a higher LGO. The relational social capital of catalysts underlies a situation-dependent motivation mechanism behind becoming a creativity catalyst, as it is based on the quality of the catalyst's relationships with their coworkers (Chen et al., 2000; Kanfer, 1992). LGO on the other hand is a stable dispositional orientation of an individual. If a catalyst with strong relationships (i.e., strong relational social capital) has a higher learning goal orientation, the intensity of her contribution to others creativity is stronger. This is because people with a higher LGO are more motivated to be involved in challenging situations, such as the creative process, that they can learn from (Elliot & Church, 1997). Accordingly, catalysts with a higher LGO are more likely to be involved in the creative processes of their coworkers in order to gain new knowledge and improve their information quality during these interactions (Bandura, 1986; Gong et al., 2009; Swift et al., 2010). Having a higher LGO also strengthens the positive relationship between relational social capital and span of contribution. People with a higher LGO have a desire to access novel knowledge (Colquitt & Simmering, 1998), which also motivates them to contribute to as many coworkers as possible, since each coworker they contribute to is a source of new information. Consequently, the findings suggest that the situational motivation mechanism interact with dispositional motivational orientations in predicting the intensity and span of a catalyst's contribution to her coworkers' creativity.

The arguments behind these hypotheses are developed at an individual level, and as explained above when I tested them at the individual level I found support for all the interaction hypotheses. When I used multi-level modeling to test the same relationships at a dyadic level, they were not significant. This might be because the theoretical arguments behind the hypotheses were more appropriate at the individual level, or because the concepts at the individual level are not isomorphic with the concepts at a dyadic level (Chen et al., 2004).

Theoretical Contributions

The main contribution of this dissertation to the organizational behavior literature was the introduction of the construct of creativity catalyst as an important yet overlooked organizational role. The most creative minds of the century, such as Albert Einstein, Vincent Van Gogh, and Frida Kohlo had catalysts in their lives that contributed to their thinking. I also found in talking to research and development employees that they perceive that coworkers that take on the role of a creativity catalyst existed in their organizations contributing to their own creative thinking. The pilot study showed that creative people are distinct and distinguishable from those who take on the role of a creativity catalyst. This suggest that creativity catalysts do not have to be creative, and at the same time creative employees do not necessarily take on a creativity catalyst role for their coworkers. Therefore, becoming a creativity catalyst is a distinct role that employees might prefer to take on, regardless of their levels of creativity, considering that they have the right motivation and ability to do so.

These findings contribute in a number of ways to the creativity literature. It has been found that a creator's contacts such as her role models (Shalley & Perry-Smith,

2001; Zhou, 2003), leaders (e.g. Gong, Huang, & Farh, 2009; Zhang & Bartol, 2010) family members (Madjar, Oldham, & Pratt, 2002), or coworkers (Amabile, Conti, Coon, Lazenby, & Herron, 1996) can play an active role in determining the creator's level of creativity. However, so far the characteristics of these coworkers has not received any attention. By looking at their characteristics, I was able to focus on the underexplored piece of the employee creative process: the role of the characteristics of an employee's contacts. I questioned who these contacts (i.e., creativity catalysts) are, and I was able to show that depending on the catalysts' social capital and stable motivational orientations, the intensity and span of their contribution to coworkers' creativity may vary. I argue that creativity catalysts is an important role in organizations, because when the creators have creativity catalysts, their creative performance can improve, which might eventually lead to enhanced levels of organizational innovation and creativity.

By integrating social capital theories with stable motivational orientations, I contributed to a growing trend in introducing micro level theories to macro level theories in order to truly understand the social structure (Ibarra, Kilduff, & Tsai, 2005). One of the early examples of this approach was introduced by Mehra, Kilduff, and Brass (2001). They suggested that individuals with high self-monitoring end up being at more advantageous positions in organizational networks (i.e., more central positions). Broadening this perspective, Oh and Kilduff (2008) showed that individuals with high self-monitoring tend to broker more structural holes compared to those that have low self-monitoring. Similarly, Kalish and Robins (2006) suggested that people who perceive themselves as vulnerable to situational factors generally have closed networks that have weak ties. However, individualistic people bridge more structural holes, and they have

stronger relationships with their contacts, which are apart from each other. Furthermore, Klein, Lim, Saltz, & Mayer (2004) stated that individuals' personality traits, values, and demographics have an impact on their centrality in a social network. Specifically, individuals with low neuroticism became central in advice and friendship networks after five months of interacting with their contacts. Although individual traits and cognition have been receiving increasing attention in the social networks literature, there are very limited studies on motivational aspects. One example of this is by Anderson (2008), who showed that the relationship between network characteristics and utilizing the information benefits of relationships is moderated by need for cognition. In this dissertation, I found that the stable motivational orientation, LGO, strengthened the role of a situational motivational mechanism, relational social capital, on both the intensity and span of the catalyst's contribution to others' creativity.

There has been a growing interest in examining different dimensions of social capital simultaneously in order to have a more complete understanding of social capital (e.g. Levin et al., 2014; Moran, 2005). This dissertation contributes to the social network literature by bringing the structural and relational dimensions together. I found that while the relational dimension determines the motivation of a creativity catalyst to invest the time and resources in order to improve others' creativity, the structural dimension makes the catalyst more capable in terms of improving other's creativity. I found that the ability and motivation of the catalyst interact in predicting her performance as a creativity catalyst (Locke & Latham, 1978).

Finally, there has been an ongoing debate on the role of having structural holes on employee creativity. On the one hand, Burt (1002) claims that if an individual bridges

over structural holes by connecting disconnected others, this individual will have the chance of collecting a lot of diverse and non-redundant information and have higher creative performance (Fleming, Mingo, & Chen, 2007; Hargadon & Sutton, 1997; Rodan & Galunic, 2004). On the other hand, another group of researchers follow Coleman's (1990) arguments and claim that when all the members are connected to each other (i.e. no structural holes), there would be trust-based relations which enhances information transfer due to enhanced cooperation and collaboration (McFadyen et al., 2009; Uzzi, 1997), and eventually leads to enhanced creative performance (Zhang et al., 2009). Some researchers have tried to resolve this debate by introducing different boundary conditions. For instance, Fleming and colleagues (2007) found that bridging structural holes is advantageous during the creativity process, but when it comes to the diffusion of those ideas, it is better to have network structures without structural holes. Furthermore Gargiulo, Ertug, and Galunic (2009) distinguished between information acquirer and information provider roles of network ties, and claimed that knowledge workers perform better when their information acquirer relationships do not have holes and their information provider relationships have holes. In this dissertation, I found that the level of analysis also play a role in determining the role of structural holes on employee performance. Specifically, I found that at the dyadic level having higher levels of dyadic network constraints in the catalyst-creator relationship is necessary, while at the individual level catalysts with lower ego network constraint were found to be more effective. The role of structural holes on employee creativity should be reconsidered under the light of these findings since the reason there are inconsistent findings might be due to the level of analysis examined.

Managerial Implications

Perhaps the most critical implication of these findings for managerial practitioners was bringing attention to a previously overlooked organizational role of creativity catalysts. Employee creativity is one of the most important determinants of organizational innovation and survival (Oldham & Cumming, 1996), and creativity catalysts can play an active role in developing coworkers' creativity process which eventually can improve employee creativity and organizational creativity. Managers should be aware of the creativity catalysts in their organization, and even though the catalysts may not be creative, their contribution to the creativity of others should be acknowledged and valued. If their contribution to others' is not acknowledged and valued, the effective catalysts might stop spending their own resources on their coworkers' creativity, which in the long run could deter organizational innovation. Therefore, leaders should encourage and support their employees taking a creativity catalyst role for their coworkers. Perhaps leaders should think about providing compensation and rewards to such behaviors in order to create a collaborative organizational climate where all the employees feel comfortable investing their own time and resources as a creativity catalyst with the purpose of improving each other's creativity.

Managers can encourage and support employees to take on a creativity catalyst role through developing an organizational culture, where all employees feel part of each other's creativity process. Pixar Animation Studios is an organization that emphasizes such a peer culture. Ed Catmull, cofounder of Pixar and president of Pixar and Disney Animation Studios, stated that: "If you show your incomplete work (to each other) and everybody does it, then you get used to it, and cease to be embarrassed by it and actually

become more creative. The other thing that happens is, when people see each other's work as it's developing, they all learn from each other, and they inspire each other" (Catmull, 2008). This quote has two relevant points to this dissertation. First, Catmull indicates that Pixar owes its creativity to a culture where all employees contribute to the creativity of each other's incomplete work, which I define as the creativity catalyst role. The Pixar example shows that it is possible to develop a culture that supports and values employees becoming creativity catalysts of their coworkers. Second, Catmull states that contributing to others' creativity helps both parties to learn and inspire each other. This is consistent with my finding that catalysts who have stronger relational social capital are more likely to contribute to others creativity if they have a higher learning goal orientation. Since contributing to others' creativity can be a source of learning and inspiration, we can expect those with higher LGO to be more motivated to engage in such behaviors by taking on a creativity catalyst role.

Limitations and Future Research Directions

Even though in this dissertation I used two-stages of data collection, it is not a longitudinal study in which causality can be inferred. Due to the arrangements I had with the companies, I collected the data on one of the independent variables (i.e., LGO) and the two dependent variables (i.e., intensity and span of contribution) in Survey 1, and the other two independent variables (i.e., relational and structural social capital) in Survey 2, which does not imply a causal order. I did not choose this research design to infer causality but actually to eliminate common method bias that can be due to collecting the data at the same time (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In the future, longitudinal research designs can help to infer causality between the individual

antecedents such as social capital and goal orientations and the intensity and span of a catalyst's contribution.

While studying the antecedents of becoming a creativity catalyst in a longitudinal fashion is important, it is also critical to study the consequences of taking a creativity catalyst role on the creators' and the catalysts' performance. For instance, Mueller & Kamdar (2011) argue that advice giving can diminish the creative performance of the advice giver. This argument can lead us to think that the creativity of a catalyst might also diminish over time since she may not be able to focus on her own performance, but rather spend more of her time and resources on her coworkers' creativity. Actually, I found a negative but insignificant relationship between catalyst's creativity and the intensity of her creativity contribution ($r=-.09$, $p>0.05$). This potential dark side of taking a creativity catalyst role should be further explored in future research. In addition, I measured intensity and span of contribution based on the perceptions of the coworkers. A more objective measure of creativity can be used to show how the creative performance of the creator improves over time as a result of being exposed to a creativity catalyst.

In this dissertation, I mainly focused on who the creativity catalysts are. Therefore, the emphasis was on the catalyst's social capital and motivational orientations. Similar to how individual differences and contextual factors interact in predicting creative performance (Woodman et al., 1993; Shalley et al., 2004), contextual factors such as rewards, leadership styles, and organizational support for the creativity catalysts can influence the performance of a creativity catalyst. In the future, researchers should examine the contextual characteristics that encourage employees to become and continue as creativity catalyst for their coworker's creativity, and to have higher intensity and span

of contribution. One contextual factor that I would like to focus on here is the rewarding mechanism. So far, I have focused on learning goal orientation and relational social capital of the creativity catalysts as motivational mechanisms that lead them to take a creativity catalyst role, and controlled the effects of intrinsic and prosocial motivation. I did not examine the role of extrinsic motivators. Becoming a creativity catalyst, a form of interpersonal organizational behavior, has not been rewarded or acknowledged in an organizational setting. This might have long term effects on the creativity catalysts. Specifically, if a catalyst is expecting rewards or acknowledgement for her contribution and not receiving it, she might feel the reward system is not fair (Adams, 1965) and her motivation to become a creativity catalyst can be reduced due to low expectancy, instrumentality (Vroom, 1964), and perceptions of unfairness (Zapata, Colquitt, Scott, & Livingstone, 2009). The reward system is a double edged sword though. If the rewards the catalysts receive are more controlling than informational, this might again have detrimental effects on the catalyst's intrinsic motivation (Deci, Koestner, & Ryan, 1999; Gagne & Deci, 2005) to become a creativity catalyst. Hence, researchers should evaluate the role of different types of rewards for creativity catalysts. Also, in the future focusing on the role of creativity catalysts in a team context would be necessary. Team processes and the dynamics among team members might interact with the catalyst's behaviors, and contribute to the intensity and span of her contribution to other team members.

Furthermore, studying a new concept in an inductive and qualitative manner provides a thick description of the phenomenon (Gephart, 2004). I had informal meetings with employees and managers of three research labs in order to determine whether the sample behaviors of a creativity catalyst included in the measure were appropriate.

However, to develop the concept further, more detailed inductive studies can be designed. Another limitation of this study was only emphasizing the "who" question, rather than the "how" question since the focus was the outcome aspect of being a creativity catalyst rather than the process aspect, as explained in Chapter 2. Pratt (2009) suggests that inductive qualitative studies provide a detailed picture to answer the "how" question. Hence, researchers should conduct qualitative inductive studies in the field in order to observe actual behaviors behind how the creative catalysts contribute to their coworkers' creativity.

Last but not least, I focused only on the creativity catalysts that are the creators' coworkers and share the same status with the creators. Therefore, I have not considered status differences here. In the future, examining leaders as followers' creativity catalysts is necessary (Koseoglu, Liu, & Shalley, working paper). Consequently, studying the role of certain leader characteristics, leadership styles, and behaviors that make the leaders better creativity catalysts for their followers should be considered. Also, the results show a strong and positive correlation between age and intensity of contribution ($r=.33$, $p<0.01$). In Turkey there is a higher power distance (Kedia & Bhagat, 1988), therefore age and seniority might play a more important role on the informal status of employees than it possibly would in other countries that are lower on power distance. Hence, the role of status differences between the catalyst and creators on the intensity for the catalysts' contribution should be examined.

Conclusion

In this dissertation, I focused on creativity catalysts, who are actors that can improve their coworkers' creativity through direct interpersonal interaction. These

organizational actors can be very effective for their coworkers' creativity, yet they have never been studied. Hence, I have developed the concept of creativity catalysts and established their existence in organizations. Furthermore, I aimed to understand who can be better creativity catalysts for their coworkers. Specifically, I found that catalyst's relational social capital and structural social capital; and their relational social capital and learning goal orientation interact in predicting the intensity and span of their contribution to coworkers' creativity.

APPENDIX A

SCALES USED IN THE PILOT STUDY

Creativity contribution

Please select from the class list on the right at least 10 classmates that you interact with while generating ideas, solving problems, preparing for the class, etc. (it can be more than 10 if applicable). Among the people you have selected, please indicate the extent to which they contribute to your creative thinking\creative problem solving\creative idea generation?

	Name		Contribute very little			Average Contribution			Contribute very strongly
			1	2	3	4	5	6	7
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

Classmate creativity

Again, please go back to the complete class list on the right and nominate the classmates that you think are the most creative/innovative.

APPENDIX B

MAIN STUDY - SURVEY 1

Dependent variable: Creativity contribution

Nomination Question:

"*Please select the coworkers from the roster provided that you interact with while generating ideas or solving problems who contribute to your creative thinking\creative problem solving\creative idea generation. Please consider that your coworkers might be contributing to your creativity in numerous ways, such as providing you with information, giving insightful feedback, asking challenging questions, stimulating your thinking, or encouraging and supporting you while you are coming up with new ideas".*

Probing question:

"Please refer to the list of coworkers again, and add to your list anyone else that contributes to your creative thinking\creative problem solving\creative idea generation, even those that contribute less frequently or less extensively".

Valuation question (intensity of creativity contribution):

"Now please indicate the extent to which your selected coworkers contribute to your creative thinking\creative problem solving\creative idea generation? Again, please consider that your coworkers might be contributing to your creativity in numerous ways such as providing you with information, giving insightful feedback, asking challenging questions, stimulating your thinking, or encouraging and supporting you while you are coming up with new ideas"

Independent variables – individual differences:

Learning goal orientation

Next to each statement indicate the extent to which you agree or disagree with that statement.	**strongly disagree**	**disagree**	**somewhat disagree**	**neither agree nor disagree**	**somewhat agree**	**agree**	**strongly agree**
I often look for opportunities to develop new skills and knowledge.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I am willing to select a challenging work assignment that I can learn a lot from.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I enjoy challenging and difficult tasks at work where I will learn new skills.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
For me, development of my work ability is important enough to take risks.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I prefer to work in situations that require a high level of ability and talent.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I often read materials related to my work to improve my ability.	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Control variables

Cognitive social capital

Next to each statement indicate the extent to which you agree or disagree with that statement.	**strongly disagree**	**disagree**	**somewhat disagree**	**neither agree nor disagree**	**somewhat agree**	**agree**	**strongly agree**
Our unit shares the same ambitions and vision with other units at work	*1*	*2*	*3*	*4*	*5*	*6*	*7*
People in our unit are enthusiastic about pursuing the collective goals and missions of the whole organization	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Prosocial motivation

Why are you motivated to participate in tasks that are not involved in your formal job description?	**strongly disagree**	**disagree**	**somewhat disagree**	**neither agree nor disagree**	**somewhat agree**	**agree**	**strongly agree**
Because I care about benefiting others through my work.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Because I want to help others through my work.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Because I want to have positive impact on others.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Because it is important to me to do good for others through my work.	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Demographics

Age:

1. 19-24
2. 25-39
3. 30-34
4. 35-49
5. 40-44
6. 45-49
7. 50-54
8. 55-59
9. 60+

Sex:

1. Male
2. Female
3. Other

Education:

What is the most current degree you have received?

1. No college degree
2. Bachelors
3. Masters
4. Doctorate

Tenure:

How long have you been working in this organization? (Might be updated depending on the age of the organization)

1. 0-12 months

2. 2-4 years
3. 5-7 years
4. 7-9 years
5. More than 10 years

APPENDIX C

MAIN STUDY - SURVEY 2

Independent variables – social network measures

Stage 1: Communication network measure
"Thinking back over the past two years, with whom do you communicate about work related topics? Please select the coworkers you have communicated with from the company list"

Probing question:
""Please refer to the list of coworkers again, and add to your list anyone else that you communicate with, even those that you interact with less frequently, more informally, or less extensively".

Stage 2: Tie strength dimensions (only the selected names will appear on the survey screen):

- Closeness:
  "How close are you with each person?"
  1- acquaintance;
  2- distant coworkers;
  3- friendly coworker;
  4- close coworker;
  5- very close coworker)

- Duration
  How many years has each relationship been in existence?"
  1. Less than 1 year;
  2. 1 to 3 years;
  3. 4 to 6 years;
  4. 7 to 9 years
  5. 10 or more years).

- Frequency
  "On average how frequently do you communicate with each person?"
  1. Once a year or less;
  2. several times a year;
  3. once a month;
  4. several times a month;
  5. several times a week;
  6. daily

Control variables

Performance prove orientation

Next to each statement indicate the extent to which you agree or disagree with that statement.	**strongly disagree**	**disagree**	**somewhat disagree**	**neither agree nor disagree**	**somewhat agree**	**agree**	**strongly agree**
I would rather prove my ability on a task that I can do well at than to try a new task.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I am concerned with showing that I can perform better than my coworkers.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I try to figure out what it takes to prove my ability to others at work.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I enjoy it when others at work are aware of how well I am doing.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I prefer to work on projects where I can prove my ability to others	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Performance avoid orientation

Next to each statement indicate the extent to which you agree or disagree with that statement.	**strongly disagree**	**disagree**	**somewhat disagree**	**neither agree nor disagree**	**somewhat agree**	**agree**	**strongly agree**
I would avoid taking on a new task if there was a chance that I would appear rather incompetent to others.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Avoiding a show of low ability is more important to me than learning a new skill.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I am concerned about taking on a task at work if my performance would reveal that I had low ability.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I prefer to avoid situations at work where I might perform poorly.	*1*	*2*	*3*	*4*	*5*	*6*	*7*

When I don't understand something at work, I prefer to avoid asking what might appear to others to be "dumb questions" that I should know the answer already.	*1*	*2*	*3*	*4*	*5*	*6*	*7*

Intrinsic motivation

Please indicate to what extent you agree with the statement below.	**strongly disagree**	**disagree**	**somewhat disagree**	**neither agree nor disagree**	**somewhat agree**	**agree**	**strongly agree**
I take pride in doing my job as well as I can.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I feel a sense of personal satisfaction when I do my job well	*1*	*2*	*3*	*4*	*5*	*6*	*7*
I feel unhappy when my work is not up to my usual standard.	*1*	*2*	*3*	*4*	*5*	*6*	*7*

APPENDIX D

MAIN STUDY – SUPERVISOR SURVEY

Employee creativity

Please indicate how often the following statements characterize this employee	**strongly disagree**	**disagree**	**somewhat disagree**	**neither agree nor disagree**	**somewhat agree**	**agree**	**strongly agree**
Suggests many creative ideas that might improve working conditions at the workplace	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Often comes up with creative solutions to problems at work	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Suggests new ways of performing work tasks	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Is a good source of creative ideas	*1*	*2*	*3*	*4*	*5*	*6*	*7*

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