

UC Santa Barbara

UC Santa Barbara Electronic Theses and Dissertations

Title

Examining differences among member satisfaction within a self-organized virtual community of professionals: A model of satisfaction based on the self-selection process participants engage in and their ability to fulfill their basic psychological need...

Permalink

<https://escholarship.org/uc/item/6gg655j9>

Author

Bator, Melissa

Publication Date

2017

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA

Santa Barbara

Examining differences among member satisfaction within a self-organized virtual
community of professionals: A model of satisfaction based on the self-selection process
participants engage in and their ability to fulfill their basic psychological needs

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Communication

by

Melissa Jean Bator

Committee in charge:

Professor Andrew Flanagin, Chair

Professor Noah Friedkin

Professor Cynthia Stohl

June 2017

The dissertation of Melissa Jean Bator is approved.

Cynthia Stohl

Noah Friedkin

Andrew Flanagin, Committee Chair

May 2017

Examining differences among member satisfaction within a self-organized virtual
community of professionals: A model of satisfaction based on the self-selection process
participants engage in and their ability to fulfill their basic psychological needs

Copyright © 2017

by

Melissa Jean Bator

ACKNOWLEDGEMENTS

This project is dedicated to my husband, Mark. It is hard to imagine completing this without you along for the ride. Thank you for being an excellent travel companion.

VITA OF MELISSA J. BATOR

June 2017

EDUCATION

University of California, Santa Barbara, Santa Barbara, CA
Ph.D., Department of Communication, June 2017
Quantitative Methods in the Social Sciences Emphasis

Rutgers, The State University of New Jersey, New Brunswick, NJ
Master of Communication and Information Studies, May 2007
Johnson & Johnson Graduate Fellow (2005-2007)

Northeastern University, Boston, MA
Bachelor of Arts in Communication Studies, Summa Cum Laude, June 2003

PUBLICATIONS

Bator, M. & Weatherly, E. (in press). The evolution of leadership within KM4Dev 2000-2017: How members of KM4Dev understand and enact leadership within a peer produced environment. *Knowledge Management for Development Journal*, 13(2).

Bator, M. & Stohl, C. (2011). New partnerships for a new generation of corporate social responsibility. In O. Ihlen, J. Bartlett, & S. K. May (Eds.), *Handbook of communication and corporate social responsibility*. Wiley-Blackwell.

Flanagin, A. J., & Bator, M. (2011). The utility of information and communication technologies in organizational knowledge management. In H. E. Canary & R. D. McPhee (Eds.), *Communication and organizational knowledge: Contemporary issues for theory and practice*. Mahwah, NJ: Routledge/LEA.

FUNDED RESEARCH

\$1876 Institute for Social, Behavioral and Economic Research Graduate Research Award for Social Science Surveys, "Working on the organization's boundary: Interorganizational knowledge sharing among INGOs" 2009-2010.

AWARDS

The Fiona Goodchild Award for Excellence as a Graduate Student Mentor of Undergraduate Research, 2012

UCSB Dean's Fellowship, 2011-2012

UCSB Graduate Dean's Advancement Fellowship, Summer 2011

InterAction travel grant for Forum 2011, Washington, D.C.

Direct Relief International travel grant for Forum 2011, Washington, D.C.

International Fund for Agricultural Development travel grant for KM4Dev Face-to-Face
2011, Rome, Italy
Johnson & Johnson Fellow, 2005-2007

TEACHING EXPERIENCE

Instructor of Record

Comm 122, *Organizational Communication*, Summer 2012

Teaching Assistant--Lower Division

Comm 1, *Introduction to Communication*, Summer 2010

Comm 87, *Statistics*, Winter 2010 & Winter 2008

Comm 88, *Research Methods*, Spring 2011, Fall 2009, Fall 2007

Geog 20, *Geography of Surfing*, Spring 2010

Teaching Assistant--Upper Division

Comm 116, *The Internet, Communication & Contemporary Society*, Spring 2009

Comm 121, *Communication & Conflict*, Fall 2010

Comm 150, *Group Communication in Multiple Contexts*, Fall 2008

Comm 166, *Marketing Communication*, Winter 2009

Comm 131, *Org. Communication: A Global Perspective*, Spring 2008, Winter 2011

FIELDS OF STUDY

Major Field: Organizational communication/Organizing

Studies in Collective Action with Professor Andrew Flanagin

Studies in Global Organizational Communication with Cynthia Stohl

Studies in Social Networks and Social Influence with Noah Friedkin

ABSTRACT

Examining differences among member satisfaction within a self-organized virtual community of professionals: A model of satisfaction based on the self-selection process participants engage in and their ability to fulfill their basic psychological needs

by

Melissa Jean Bator

The research related to what motivates member participation within peer production enterprises as a whole has not produced a reliable list of motivations present among peer production participants. Instead, motivations are often defined idiosyncratically (e.g., Butler et al., 2007; Oreg & Nov, 2009) and participation is simplified to a dichotomous variable or crudely measured by frequency (e.g., Chen & Hung, 2010). This makes it difficult to compare and contrast peer production efforts or understand the larger theoretical contribution of these studies of motivation. In an effort to rethink how member motivation is understood within peer production enterprises, this research develops and tests a model of member satisfaction within a self-organized virtual community (SVC) of professionals that conceptualizes member satisfaction as being (1) directly connected to person-community and demands-abilities fit and (2) indirectly connected to fit through the fulfillment of members' basic psychological needs for competence, relatedness, and autonomy (Deci & Ryan, 2000). Additionally, individual filtering, a cognitive heuristic members of SVCs may utilize to personalize the information environment within an SVC, is introduced as a moderator in

order to understand how these direct and indirect effects are conditioned on this participation management strategy. One of the main advantages of this theoretical model is that it does not require quantifying the amount or categorizing the type of member participation in order to understand member motivations and satisfaction, making it suitable for use in most peer production contexts (Benkler, 2006), even those scattered across multiple online platforms.

In order to test this model, members of the SVC KM4Dev were solicited to take part in an online survey ($N = 212$) from July – October 2016. KM4Dev (Knowledge Management for Development) is a SVC of international development practitioners and other professionals interested in knowledge management and knowledge sharing issues and approaches, with a membership of over 4000 people from around the world. Path analysis was employed to analyze the model.

Analyses revealed the model explained approximately two-thirds of the variance in satisfaction ($R^2=.65$) and a similarity of importance (i.e., similar sized total effect) placed on PC fit and DA fit by members, in relation to satisfaction. The strongest path to satisfaction within this community is the indirect path from person-community fit through competence fulfillment to satisfaction, even when it is conditioned upon the moderator individual filtering. The need for autonomy had the lowest amount of variance explained in the model ($R^2=.24$). Overall, the statistical support found for this model corroborates the use of a model of satisfaction premised on the assumptions of peer production (i.e., participant self-selection, Benkler, 2006). Furthermore, it simplifies the study of motivation by conceptualizing motivation as members' ability to fulfill their basic psychological needs for autonomy, relatedness, and competence, instead of any want or desire a person may identify. Finally, through the introduction of moderating variables, such as individual filtering, this

model is a tool to more precisely explain differences among members' ability to fulfill their basic psychological needs and be satisfied with their overall community experience within a peer production enterprise.

TABLE OF CONTENTS

Introduction.....	1
Peer Production.....	7
Self-selection as Person-Community and Demands-Abilities Fit	18
Basic Psychological Needs Theory.....	26
Individual Filtering	36
Method	44
Results.....	47
Discussion.....	82
Conclusion	94
Endnotes.....	95
References.....	96
Appendix A: Tables	109
Appendix B: Figures.....	122

Introduction

Benkler (2006) describes the Internet as an environment rife with commons-based production, or content provided by individuals that is based on the creative mixing of publicly available information, which is rereleased via the Internet in its new form for others to enjoy and use. The products of commons-based production online are often understood to be public goods, or information resources considered to be both nonexcludable and nonrivalrous: pure public goods cannot be easily withheld from any one person and the use of the good by an individual does not diminish others' ability to use the good (Samuelson, 1954). A particular form of commons-based production--peer production--results from the coordinated actions of individuals working toward a tangible project or enterprise. For example, Wikipedia is the product of the coordinated efforts of volunteer content contributors who supply information in an effort to build an extensive online repository of information that is freely available to everyone.

Peer production enterprises can produce more than a freely available encyclopedia. There are peer production communities designed to help map space (Benkler, 2006), create the designs for an open sourced vehicle (Müller-Seitz & Reger, 2009), and provide peer support and peer produced learning spaces for people in different professions (Cranefield & Yoong, 2009). These ventures result from the coordination of distributed and varied contributions (e.g., administration, resource contributions, active audience) from people all over the world. There is no hierarchy to assign tasks to individuals and no market system to allocate a value or price to coordinate contributions. Instead, individuals choose for themselves (i.e., self-select) how and when they wish to contribute.

This self-selection mechanism is the basis of organization in peer production communities, leading many to question why people participate in such enterprises in the absence of monetary remuneration. This has produced a list of motives that are potentially relevant to peer production participants, including instrumental (e.g., learn new skills,) (Füller, Jawecki, & Mühlbacher, 2007), expressive (e.g., to contribute to the greater good, enjoy helping) (Yu, Lu, & Liu, 2010), and social (e.g., develop a reputation) (Anthony, Smith, & Williamson, 2009; Raban, 2008) motivations. However, as a whole this body of research has not shown a discernible pattern linking specific motivations with particular forms of participation or unique types of peer production communities. Instead, most studies aggregate members, producing a picture of overall motivations present and the likelihood of different motivations predicting specific outcomes, such as satisfaction or commitment (e.g., Baytiyeh & Pfaffman, 2010; Schroer & Hertel, 2009). Participant satisfaction is important for the long-term survival of peer production enterprises, since individuals are neither obligated to be a part of a peer production nor obliged to remain an active member (Fang & Neufeld, 2009; Markus, Manville, & Agres, 2000; Raymond, 2001). However, asking what motivates people to participate in a peer production may be too specific a question to yield a better understanding of the satisfaction of participants of peer production enterprises.

Therefore, I develop a model of participant satisfaction within a peer production community based on the self-selection process inherent in peer production forms of organizing (Benkler, 2006). This is advantageous for at least two reasons. First, a model grounded in theory relating different forms of member satisfaction to participants' perception of both how well they self-select into the community and the extent that they are able to fulfill their needs for autonomy, relatedness, and competence provides parsimony. Participant

satisfaction is linked to a myriad of motivations, including, a desire to learn from others, stay informed in one's field, improve skills, build a reputation etc. (e.g., Füller, et al., 2007; Oreg & Nov, 2008; Thompson, 2011). When combined, this research provides a list of relevant motivations, often defined in unique ways. Second, the creation of a model provides a uniform tool that serves as a starting point for uncovering meaningful and comparable differences among and between participants in peer production communities. The model of member satisfaction that I propose provides a theoretically grounded way to systematically compare members both within and between peer production communities. In this study, I will use the model to compare members of a specific form of peer production community, a self-organized virtual community (SVC) of professionals, based on members' use of a cognitive heuristic ("individual filtering," or members' knowledge of other specific members within the SVC) to assign priority and to sort through the information stream associated with SVC membership. A SVC of professionals is a social network made up of professionals from different organizations who share a concern, set of problems, and/or passion about their work and voluntarily come together through the use of online tools (e.g., listserv, social network site, wiki) in order to deepen their expertise and knowledge through different forms of interaction (Bohm & Scherf, 2005; Brown & Duguid, 2000; Wenger, McDermott, & Snyder, 2002). Individual filtering refers to leveraging one's knowledge of others within the SVC to sort through the ongoing stream of information produced in SVCs.

Thus, I conceptualize participation in peer production as a more *general fit-finding process* in order to better capture the *self-selection* that members of a peer production community undertake when they choose to join and continue to participate. Fit, in this context, refers both to members sharing values similar to that of the community (i.e., person-

community fit) and to members perceiving that the demands of the community (e.g., tasks, amount to read, social pressure) match the skills and resources they possess (i.e., demands-abilities fit). Fit theories assume that people perform best and experience positive outcomes when they are able to optimize their fit with the external environment (Kristof-Brown, et al., 2005). Similarly, self-selection implies that participants in peer production activities are actively seeking a form of participation that fulfills their reasons for participating; these spaces provide a context within which “individuals who have the best information available about their own fit for a task can self-identify for that task” (Benkler, 2002, p. 376).

I conceptualize the *need-based argument* inherent in research that seeks to understand what motivates individuals to essentially volunteer as participants’ ability to *fulfill* their (three) *basic psychological needs*, autonomy, relatedness, and competence (Deci & Ryan, 2000). Benkler (2006) purports that participants within a peer production choose participation strategies that are “commensurate with their ability, motivation, and availability” (p. 102). While demands-abilities fit addresses self-selection strategies based on ability and availability, motivation is a broad psychological construct that needs to be addressed parsimoniously in a member satisfaction model. Greguras and Diefendorff (2009) suggest that when positive outcomes result from instances of fit, it is not fit that leads to the positive outcomes (e.g., satisfaction), but rather the fulfillment of one’s basic psychological needs that mediates the relationship between fit and satisfaction. Basic psychological needs theory argues that all individuals have innate, essential, and universal psychological needs, which they strive to fulfill in order to experience favorable outcomes, such as increased well-being and satisfaction. More specifically, the theory states that all humans strive to satisfy their needs for autonomy, competence, and relatedness (Deci & Ryan, 1985, 2000).

Basic psychological needs theory assumes, much like Benkler (Benkler, 2006; Benkler & Nissenbaum, 2006), that people are innately growth-oriented and “naturally inclined” to better themselves and actively work to integrate new experiences into a sense of personal and interpersonal coherence (Deci & Ryan, 2000). However, this tendency to better oneself is easily derailed by the external environment (e.g., pressures stemming from the social context) and internal psyche. When psychological needs are thwarted people often develop maladaptive behaviors to cope, which can further frustrate their ability to fulfill their psychological needs. Thus, basic psychological needs theory bases its predictions about human behavior and development on organisms’ interactions with their social context, and assumes that individuals act with agency by influencing internal and external forces, while simultaneously being susceptible to such forces. This organismic dialectical approach offers an alternative perspective from hedonic-based motivation theories, which assume humans are motivated to maximize pleasure and reward and minimize pain and costs. Basic psychological needs theory thus illuminates the cognitive, need-based link behind finding greater satisfaction in one’s participation within a SVC.

Therefore, I will argue that individuals’ satisfaction with a self-organized virtual community (SVC) and with their own participation in it is best understood as, (1) being directly and indirectly associated with person-community fit and demands-abilities fit, and (2) directly associated with the fulfillment of the basic psychological needs of autonomy, relatedness, and competence. However, basic psychological needs theory acknowledges that the context within which people are embedded can disrupt their ability to achieve the fulfillment of their psychological needs. Participants’ direct (i.e., through direct communication) and indirect (i.e., through a third-party, mediated) knowledge of other’s

expertise in the network alters the information context within which a participant experiences the peer production community (Liang et al., 2014). Thus, I will explore how the use of individual filtering moderates members' likelihood of fulfilling their psychological needs and achievement of different satisfactions.

To develop these ideas, first I will review both the peer production literature that describes the participation context and the research connected to understanding why individuals would engage in a SVC. Second, I introduce the fit literature, link the self-selection organizing process inherent in peer production communities to the process of finding fit, and develop hypotheses connecting different forms of fit directly to different forms of satisfaction. Third, I introduce Basic Psychological Needs (BPN) Theory (Deci & Ryan, 2000), explicate how this theory better identifies the needs that are fulfilled by participants within a SVC than current research attempting to match idiosyncratic needs/motivations to participants, and develop hypotheses that 1) link the different forms of fit to the fulfillment of different BPNs and 2) link the different BPNs to the different forms of satisfaction. Fourth, I introduce individual filtering as a moderating variable in order to understand how participants' (lack of) knowledge of other members' expertise affects the relationship between person-community fit and the different BPNs. After laying out the methods for this study, I present my findings. I conclude with a discussion of the results and implications of the research.

Peer Production

Peer production is a form of collective action whereby individuals contribute their human capital (e.g., knowledge, time, interest) toward the production of an information or cultural public good (e.g., creation of an open source encyclopedia or production of open source software) based on what they feel they are able to and wish to contribute. Peer production does not coordinate contributions through price (wage) mechanisms, like the market, or through command structures, such as a hierarchy. Instead, peer production efforts focus on creating a range of possible volunteer efforts that can appeal to the widest audience of interested participants (Benkler, 2006). In this sense, peer production efforts are not concerned with incentivizing people to participate. By opening participation to anyone who chooses (often through the use of communication and information technologies) and by lowering the effort needed to participate (i.e., creating tasks suited to different skills and interests), successful peer production efforts work because enough people participate in the manner that best suits them. In this type of system, self-selection becomes the most efficient mechanism for assigning work because peer production allows individuals to self-identify for tasks that appropriately fit their skill and motivation. For example, the members of Wikipedia have created a variety of ways to volunteer, from one-off anonymous editing of an established wiki entry to more sustained commitment and efforts that go along with becoming an administrator (i.e., greater authority and access within the community). Importantly, this structure is continuously negotiated by those creating it, and it is indicative of the higher level responsibility possible when participating in peer produced communities.

It is important to note that peer production efforts may take a range of forms. Due to the many different ways that tasks of different sizes and commitments can be cobbled

together and administered, Haythornthwaite (2009) describes peer production efforts as ranging from lightweight, or spaces for routinized and independent contributions, to heavyweight, or spaces for emergent and interdependent contributions. However, this does not preclude the existence of dual-weight spaces or peer productions where both lightweight and heavyweight forms of production are possible. Indeed, the model I will describe is relevant for any form of peer production. However, as an initial test I will concentrate on the dual-weight peer production environment where both lightweight and heavyweight forms of participation are present. Having a greater variety of ways to be involved should enable more members to self-select into an appropriate role or task.

Lightweight peer production refers to a crowd-source model, whereby individuals contribute to the collective effort through discrete, routinized contributions that are coordinated through the interaction environment (i.e., the software pools the contributions) rather than through member interaction. Little to no interaction is required among members who are lightweight contributors because lightweight contributions are pooled through a simple aggregation mechanism. Furthermore, lightweight peer production requires little effort to learn how to participate, making this production form an excellent way to leverage the large amounts of distributed knowledge of Internet users. On the extreme end, lightweight peer production resembles NASA's Clickworkers project, a crowd-sourced task that used volunteers to create an accurate map of all of the craters on Mars by routinizing crater identification. Answering questions in an online group (e.g., Google Answers, Usenet listserv) or contributing content to a wiki are less extreme examples of lightweight peer production. Although contributing personal expertise might be more burdensome than identifying craters on Mars, answering others' questions in an online group meant to offer

advice or providing content to a wiki is a routinized means for contributing to an information pool.

Heavyweight peer production refers to collective efforts to build and sustain an online community; “the heavyweight model involves not only contributions to the product, but also attention to the actions and contributions of others, a commitment to maintaining and sustaining the direction and viability of the community” (Haythornthwaite, 2009). These efforts emphasize negotiated outcomes. Participants in a heavyweight peer production effort help to create something greater than the sum of each individual’s contribution by negotiating each other’s contributions. Through interaction aimed not only at the main topic of the group but also at the continued maintenance and sustainability of the group, participants are capable of building strong ties with other members as they contribute to the group through both their know-how and more intense social interaction with other key group members (Qureshi & Fang, 2010). The creation of norms and procedures of equivocal tasks requires members to negotiate outcomes by evaluating member inputs through peer review processes. Thus, heavyweight peer production models require greater learning to meaningfully contribute, and these efforts often involve the creation of social ties.

This research is primarily concerned with dual-weight peer production enterprises where both lightweight and heavyweight participation are possible, resulting in the largest breadth and depth of participation possibilities. Specifically, I will investigate the dual-weight peer production context of self-organized virtual communities (SVCs) of professionals.

Self-organized Virtual Communities of Professionals

A self-organized virtual community (SVC) of professionals is a social network made up of professionals from different organizations who share a concern, set of problems, and/or passion about their work and voluntarily come together through the use of online tools (e.g., listserv, social network site, wiki) in order to deepen their expertise and knowledge through different forms of interaction (Bohm & Scherf, 2005; Brown & Duguid, 2000; Wenger, et al., 2002). This form of interaction among working professionals is increasing as online tools make it easier for individuals to find like-minded professionals to engage in self-directed professional development activities (Fayard & DeSanctis, 2005; Katzy, Bondar, & Mason, 2012). Academics (Hert, 1997) and software professionals, for instance, have a long history of participating in online listservs to discuss their work and/or work on joint projects (Fayard & DeSanctis, 2005; Raymond, 2001). Recently, the diversity of professionals participating in this type of group is expanding, as healthcare professionals (Brooks & Scott, 2006) and international development professionals (e.g., km4dev.org), for example, are now creating and participating in similar online professional networks.

These social networks are anchored through online tools that allow members to interact. Although listservs are a common tool of choice to organize professionals' information sharing efforts (e.g., Ardichvili, Page, & Wertling, 2003; Brooks & Scott, 2006; Posey, Lowry, Roberts, & Ellis, 2010), recent advances in web tools are allowing professionals to assemble multiple online tools to support member interaction in different contexts. For instance, a SVC of professionals may use a wiki to officially log the community's knowledge, a list-serv to enable the community to take advantage of their brain trust through general queries and open discussions among members in an asynchronous environment, and an online social network tool (e.g., Facebook) for members to build

personal relationships with one another and provide members with a space to develop their online identity (e.g., through development of a blog, publication of interests, skills, contact info). The use of these different interaction tools enables SVCs to focus efforts on information exchange and interaction among members for deeper knowledge sharing/creating opportunities (Bohm & Scherf, 2005). For example, in one such complex online professional community educators from New Zealand navigated many online tools including (but not limited to) online forums, instant messaging, Skype, RSS feeds, and Twitter, in an effort to embed effective teaching practices throughout the New Zealand education system (Cranefield & Yoong, 2009). Cranefield and Yoong (2009) found that the mission of the involved educators (i.e., focus on professional change) combined with the complex platform of interaction spaces (i.e., sites for sensemaking) created opportunities for professionals to cross between interaction tools (e.g., interact with a colleague on IM then summarize the enlightening conversation for the group's wiki) and put new knowledge into action in different interaction spaces. This opportunity to recontextualize information from one space to another enabled the personalization of new knowledge.

SVCs, then, are typically not facilitated through a single communication channel. Professionals are more than likely connected through several tools and some may even periodically meet face-to-face (Cranefield & Yoong, 2009; Matzat, 2009a). This offers professionals many different ways to interact within the SVC, one of many choices a professional has to select from when they decide to participate in a SVC. In fact, it is this self-selection process that acts as the main organizing mechanism within a SVC, and sets SVCs apart from traditional organizations that rely on hierarchy to organize production

processes. Instead, SVCs rely upon the principles of peer production, specifically self-selection, to create and maintain a vibrant knowledge base and membership.

Self-selection

Peer production is based on the notion that if you open up enough different ways for people to contribute to the largest possible population of willing participants then it is possible to produce something out of that concerted effort through individual self-allocation of effort. In other words, when the population of possible participants is large and there are many ways for people to be involved (i.e., modularity of task), with varying levels of effort (i.e., granularity of task), in an asynchronous environment people with different motivations and skills will be able to match themselves up to the task that they want to do when they want to do it. In this scenario, there is no information loss (i.e., transaction cost) in the matching process, as when a manager assigns a task to an employee or the market assigns a price to a professional occupation. What makes peer production a more efficient means of matching human creative talent to necessary tasks are the lowered transaction costs created by the self-selection process (Benkler, 2006).

The self-selection coordination mechanism is the key to the efficiency associated with peer production forms of organizing. Benkler (2006) demonstrates that peer production systems generate less information loss, in comparison to hierarchical and market-based systems, when matching human creative labor, a scarce resource in the networked information economy, to useful tasks. In a market-based system, currency is used to indicate value. Currency is a precise measuring unit. In order to efficiently price something, such as human creative labor, the market transaction must be clearly described (e.g., a contract). Yet,

creative work can be difficult to precisely explain before it occurs and a person's creative abilities can be difficult to put a value on before the work is complete. The information that is lost in translating supply and demand into efficiently set prices is associated with the transaction costs incurred in the exchange. A similar loss of information occurs in hierarchical organizations where managers allocate work to their employees based on an idea of "who should be doing what, when, and how, in order to permit the planning and coordination process [of the organization] to be effective" (Benkler, 2006, p. 109). Hierarchical systems use crude job categories to roughly group employees according to their skills and knowledge. However, individual effort and level of focus are difficult to quantify at a group level; one computer scientist is not necessarily as good of a fit for a programming job as another.

Self-selection within SVCs of professionals. In comparison to market and hierarchical-based organizing systems, peer production takes advantage of task modularity and granularity along with human agency to reduce the information loss, and therefore the transaction costs, associated with fitting the right person with a specific role. Within a SVC of professionals, members utilize their information environment to first identify a SVC of interest and then choose which tasks/roles, if any, to take on within the SVC. However, this self-selection process is not without flaws. People may overstate their skills, time, and other relevant factors, resulting in incomplete or poor quality contributions. These are the transaction costs, the costs or efficiency loss associated with operating within a peer production system, which is why peer production processes must also have a robust integration system to combine member contributions into a usable whole for the larger community (Benkler, 2002; 2006).

SVCs use a subset of their membership to perform the integration task. For example, the Open Source Software (OSS) groups studied by Qureshi and Fang (2010) are structured with a large membership base who may report coding bugs and participate in the mailing list, but they do not have administrator access to change code. The tasks taken on by the general membership draw on expertise; the tasks do not require high levels of socialization or skill. Instead, this type of work is reserved for a core group of developers who commit greater amounts of time and skill to the group and interact regularly with the other administrators. Furthermore, the general membership is aware of this integration work done by a subset of the community, and they may volunteer to do this work at any time. A similar integration system (augmented by automated bots) occurs on Wikipedia where general editors of pages contribute content, but editorial administration, oversight, and management decisions are made by a subset of peer-approved members: “Editors who believe they can serve the community better by taking on additional administrative responsibility may ask their peers for agreement to undertake such responsibilities” (“Wikipedia:About,” 2016).

Not only do the above examples provide a better understanding of how integration occurs within a SVC, they also point to some of the ways professionals may choose to participate in a SVC. In both examples described above, the general membership provides knowledge and/or skill as resources to the SVC, while a subset of the membership works to sustain the SVC through activities such as management of the tools used by the community and negotiation of the group’s rules of conduct. Thus, the general membership need not interact with one another for the SVC to be successful. However, integration work requires that members interact as they negotiate different administrative tasks, creating an environment where interdependency among members exists. This structure is indicative of

the dual weight peer production model described by Haythornthwaite (2009). In a dual weight peer production context, members can contribute through simple, one-off forms of contribution and through more involved integration tasks.

Dual-weight peer production efforts, such as SVCs, will have the potential for greater task modularity and granularity since both lightweight and heavyweight participation options are present, which means there is a greater range of ways that members may choose (or self-select) to engage with a SVC. Dual-weight peer production efforts, especially those similar to a SVC of professionals where members work in the same industry, should also have the potential for a greater range of social network configurations among members, due to members' ability to create or not create social ties with other members through the different forms of engagement. Thompson (2011) suggests that professionals use online communities in a way that matches their expectations, and not all professionals expect to maintain or develop strong ties to other members when they join a SVC. Matzat (2010) echoes this sentiment in his research, which finds that online communities of academics may be successfully sustained when only a subset of the membership is directly tied to one another. The author suggests that direct ties among members engender trust within the subgroup, a necessary sentiment to sustain member contributions (Lerner & Tirole, 2002), and this allows a sense of trust to permeate the rest of the membership. The trust engendered by the presence of a subset of social ties among a portion of a SVC's population encourages higher rates of participation (Matzat, 2010) and over-time sustainability (Fang & Neufeld, 2009). Members of a SVC, therefore, will have different sized networks of social ties within the community and the ties within members' networks will be tied to one another to varying degrees. For example, some members may be deeply embedded in dense networks where everyone knows

one another, and other members may know a couple of other members who do not know one another.

By joining (i.e., registering) a SVC of professionals or sharing advice with other members, individuals contribute not only their time but also signal to others their interest and expertise. SVCs function to connect distributed groups of professionals in dynamic, collegial learning networks through different online and offline spaces. Hence, participation is more than what a member contributes to the collective good or peer production, it also entails decisions regarding where to focus one's attention/contribution within the group. Furthermore, participation does not happen in a vacuum. Members' participation experience will be differentiated by the social ties they do or do not have with other participants. Yet, most research seeking to understand participation in SVCs focuses on identifying specific motivations of participants rather than acknowledging the flexibility inherent in dual-weight peer production communities, which enables a spectrum of motivations to be fulfilled through various forms of engagement.

Motivations Found within Self-Organized Virtual Communities (SVCs)

Many people have studied the motivations of volunteers in peer production environments. For instance, in their study of an online basketball community, Föller, Jawecki, and Mühlbacher (2007) found creative pleasure drives some members to be highly active. Müller-Seitz and Reger (2009) studied two online communities, a smoking cessation community and a community for Lexus car owners, and found enjoyment in helping others motivates members' participation in each community. Other studies of online peer production have examined other motivations, such as norms of reciprocity (Chen & Hung,

2010), usefulness/relevancy of the peer production (Chen & Hung, 2010; Yu, et al., 2010), tangible gratitude (Raban, 2008), and identity verification (Ma & Agarwal, 2007). While many studies look at motivations for participating in peer production activities in association with how frequently one participates (e.g., Butler, 2001; Raban, 2008), other research attempt to understand participant motivation in relation to how he or she is engaged.

For example, Oreg and Nov (2008) attempted to find motivational distinctions among different peer production contexts by comparing the motivational structure of participants in an open software initiative to those of participants in an open content initiative. The authors found reputation-gaining and self-development motivations ranked most important for software contributors, while content contributors emphasized altruistic motives. Similarly, Budhathoki and Haythornthwaite (2013) compared the motivations of “casual mappers” to those of “serious mappers” in the creation of an open source mapping initiative, openstreetmap.org. Classification of participants was based on the number of nodes contributed, and/or the length of time a contributor stayed active, and/or the number of days a contributor participated during an active mapping period. The authors found casual mappers were mainly motivated by their own commitment to the open access ideal, whereas serious mappers were motivated by community, learning, and professional development.

In each of the studies recounted above members were often motivated by more than one thing, and there is no conclusive evidence to suggest a unifying motivational pattern relates to member participation or their satisfaction with a peer production effort. In fact, the studies suggest the presence of a more general fit-finding process at work. In light of our understanding of the self-selection mechanism directing participation and the plethora of possible motivations present within any given peer production, I suggest that understanding

this more general fit-finding process and how it leads to satisfaction among participants is a more parsimonious research direction than attempting to identify specific motivations directing participation within a SVC. Furthermore, the development of a general model linking participation to satisfaction within peer production enterprises could result in more fruitful comparisons within and between peer production communities than is currently taking place (e.g., Butler, et al., 2001).

Next, I describe the self-selection coordination mechanism utilized in SVCs as the key to the efficiency associated with peer production forms of organizing. When individuals self-select in a SVC they are attempting to find a way to experience the SVC that fits their needs and resources (i.e., time, know-how). Similarly, fit theories within organizational studies understand attitudes and behaviors of organizational actors in terms of the match between a person and an environment (Kristof-Brown, et al., 2005). This alignment is considered positive and likely to lead to positive outcomes for individuals and the organization the individual is working within (Ostroff & Schulte, 2007).

Self-selection as Person-Community and Demands-Abilities Fit

Benkler's (2002, 2006) descriptions of self-selection allude to a fit finding process undertaken directly by individuals whenever they participate in a peer production. For example, when describing the individual experience he depicts members of peer production enterprises as more than consumers; they are also potential producers. These "users," as he terms peer production participants, are more engaged than the typical consumer due to the self-selection process. Peer production participants not only define what they consume and how they consume it, but also the terms of any productive actions they choose to contribute

(Benkler, 2006). Furthermore, the peer production environment is specifically structured for such fit finding processes:

“variability in productivity will be large for different people with any given set of resources and collaborators for any given set of projects. I describe this diversity as a probability that any agent will be a good fit with a set of resources and agents to produce valuable new information or cultural goods” (Benkler, 2002, p. 376).

When peer production participants use their knowledge of the environment (i.e., what they know about a specific peer production enterprise’s goals and ways of contributing) along with their knowledge of their own skills and interests to decide which peer production to participate in and how to contribute, they are attempting to find the community they best “fit” into and a way of contributing that best suits their needs. Hence, self-selection within the SVC environment is largely about participants finding the community that fits their professional values (i.e., person-community fit) and ways of participating that match their skills and interests (i.e., demands-abilities fit).

Fit in organizational research is broadly defined as “the compatibility between an individual and a work environment that occurs when their characteristics are well matched” (Kristof-Brown, Zimmerman, & Johnson, 2005, p. 281). Working from a fit perspective, organizational researchers consider congruency or alignment a desired state that leads to positive outcomes (Clary et al., 1998; Dawis & Lofquist, 1984), such as organizational and job satisfaction. Although the fit perspective is largely applied in traditional organizational settings (e.g., Kristof-Brown, et al., 2005), it has also been applied in volunteer contexts, where work is not contingent upon pay (e.g., Soresi, Nota, & Wehmeyer, 2011; Van Vianen, Nijstad, & Voskuijl, 2008; Kim, Chelladurai, & Trail, 2007). In these volunteer contexts, relevant forms of fit include person-organization (PO) and demands-abilities (DA) fit.

Next, I will argue that PO fit and DA fit, although conceived and studied in traditional organizational settings, are highly relevant within an organization-less setting where larger group or community goals exist alongside individual needs. However, the fit perspective is too broad in its treatment of motivations to be helpful in the creation of a parsimonious model of achieving satisfaction from self-selection processes. Therefore, in later sections I will turn to the theory of basic psychological needs (BPN) as a more fruitful way of conceptualizing the fulfillment of members' needs within a SVC of professionals.

Person-Organization Fit as Person-Community Fit in SVCs

Within the fit literature, PO fit refers to the match between people and an entire organization. In most research, this type of fit is examined in terms of value congruence; do members share the same values as the organization (Kristof-Brown, et al., 2005)? Value congruence is a supplementary form of fit, whereby fit results from individuals sharing similar values as the organization. For example, people who value giving back to their community may choose to work in the public sector instead of a for-profit corporation.

Although SVCs are not typical organizations, these peer productions are designed to produce a public good, which requires the coordination of individual actions and interactions to achieve (Benkler, 2006). Similar to an organization, actors within a SVC work toward the production of this larger goal through their individual contributions. The difference between an organization and an organization-less peer production lies in how individual actions and interactions are coordinated. In organizations, the hierarchy sets the goals and directs individuals' contributions toward it through monetary (i.e., pay) incentives. In SVCs of professionals, the membership sets the goals and members direct their own and each other's

contributions toward them by taking action on their own accord. However, this does not change the presence of a fit finding process related to the value matching that occurs when a participant chooses to become and remain a member of a SVC of professionals. While it may not change the presence of a fit finding process, it is more accurate to denote this form of fit as person-community (PC) fit, as opposed to person-organization (PO) fit. This asserts the voluntary and (likely) compensation-free context of a SVC¹ and also emphasizes the fluid nature of self-selected relationships within it (rather than mandated via organizational structural characteristics).

Benkler (2006) draws our attention to the importance of value congruence in peer production enterprises. He describes the technological environment we currently live in, where most people have access to and many even own the means of production (i.e., computer), as an environment where individuals can disrupt hierarchically organized industries (e.g., newspaper, music industry) through sharing, or choosing to use their excess time, talent, and dreams toward the production of a public good that everyone could use. Benkler (2006) anticipates that peer production enterprises may not align with everyone's sense of how they want to spend their time, and emphasizes the importance of individuals finding peer production enterprises that embrace ideals similar to their own. Essentially, Benkler (2006) is describing person-community (PC) fit for a peer production.

PC fit is a supplementary form of fit whereby community members' personal values match the SVC's culture (Cable & DeRue, 2002). Evidence from studies of peer production contexts supports the importance of PC fit. For example, Cheshire and Antin (2008) suggest that collective identity may act as a retention incentive in peer production environments. Furthermore, Müller-Seitz and Reger (2009) find that a sense of belonging motivates

members of different types of peer productions, including open source software (OSS), Wikipedia, and OSCar. Other evidence that PC fit is a relevant form of fit within a dual-weight peer production includes the significance of a sharing culture among members (Yu, et al., 2010) and the frequency with which altruism and prosocial motivations are found among members of peer production enterprises (Müller-Seitz & Reger, 2009; Yu, et al., 2010), indicating a sense of shared values².

Demands-abilities Fit in SVCs

Demands-abilities (DA) fit describes individuals' attempts to match their abilities, which include skills, time, and resources, to the demands of the environment. DA fit exists when people feel that their skills fill a need in their organization. Demands can be objective (i.e., commute time, length of work week) or socially constructed (e.g., norms, role expectations), while abilities include anything an individual relies upon to meet demands (e.g., skills, energy, time, resources) (Edwards & Rothbard, 1999). Again, DA fit can exist in both organizational and organization-less settings as long as the context provides a larger goal requiring members to contribute their skills and resources toward its achievement.

Benkler (2006) emphasizes the importance of matching one's ability and availability to relevant tasks within a peer production by focusing on individuals' ability to choose participation strategies that are "commensurate with their ability, motivation, and availability" (p. 102). In other words, in SVCs participants are able to choose the tasks they wish to take on and how much time they can devote to their chosen participation strategy. Benkler (2006) advises that the most efficient way to make such a decision is to find the tasks that best fit individuals' skills and interests (i.e., DA fit).

In studies of peer production, DA fit can be inferred when creative pleasure motivates members (Franke & Shah, 2003; Füller, et al., 2007; Müller-Seitz & Reger, 2009). Creative pleasure indicates that members are able to use their skills in creative and interesting ways. Additionally, studies that find that low opportunity costs drive some members to participate indicate the presence of DA fit processes, as some members may determine their best fit based on their time restrictions. Finally, studies that find improving skills drives member participation point to the ability of SVCs to provide professional development as people utilize their skills in service to the larger community (Füller, et al., 2007; Raban, 2008).

Outcomes of PC and DA Fit: Satisfaction with the SVC and Participation Satisfaction

Both within a traditional organization context with paid employees and within organization-less contexts with unpaid volunteers, satisfaction is an ideal and assumed outcome for those able to find high levels of fit. Importantly, different types of satisfaction are often delineated. Since individuals are neither obligated to be a part of a peer production nor obliged to remain an active member within a peer production, it is important for the long-term survival of peer production enterprises to produce participants who are satisfied (Fang & Neufeld, 2009; Markus, Manville, & Agres, 2000; Raymond, 2001), both with their own participation experience and with the SVC itself. Participants who have had a positive experience within a peer production are more likely to continue to participate (Halfaker, Kittur, & Riedl, 2011; Schroer & Hertel, 2009) and to spread the word about their positive experience (Butler, Sproull, Kiesler, & Kraut, 2007). This is important for the long-term survival of peer production enterprises because a sustained network of participants is recognizable to newer participants as a sign of a peer production's over-time sustainability (Matzat, 2009a), and it allows for the creation and use of organizational memory and norms

to guide and further the group's work. Hence, peer production enterprises, such as SVCs of professionals, that endure are able to regularly attract new participants and retain a portion of seasoned participants working toward a joint end (Markus, et al., 2000).

Therefore, when members of a SVC of professionals find PC and DA fit this is directly associated with members' satisfaction with the SVC as a whole and with members' satisfaction with their own participation experience (i.e., participation satisfaction). Following the fit perspective, this direct relationship likely results from the comfort one can feel when around similar others (i.e., PC fit) or when participating at a comfortable level (i.e., DA fit). In fact, the fit perspective suggests that positive outcomes of fit follow a target-similarity pattern (Kristof-Bown, et al., 2005), whereby PC fit is most likely to be associated with satisfaction with the SVC and DA fit is most likely associated with participation satisfaction. The context of the fit aligns with the context of the satisfaction when target similarity occurs. Next, I utilize this fit research to warrant these direct links.

Linking PC Fit Directly to Satisfaction with the SVC and DA Fit Directly to Participation Satisfaction

Satisfaction with the SVC is an affective response that transpires from the cognitive comparison of actual and desired features of the SVC (Locke, 1969); it is similar to the concept of organizational satisfaction. When a professional experiences satisfaction with the SVC they are a member of, they are satisfied with the virtual community in general.

Participation satisfaction represents an individual's affective response toward his or her specific experience as a member of a SVC; it is similar to job satisfaction. When a

professional has high participation satisfaction they are satisfied with their personal use and experience as a participant within the SVC.

Although different forms of fit, such as PC and DA fit, are known to be correlated, they have been found to predict different outcomes and contribute unique variance to the same outcome (Kristof-Brown, 2005). In fact, several studies support the notion that participants themselves consciously distinguish between their own PO fit and DA fit (e.g., Cable & DeRue, 2002), suggesting that participants know the difference between feeling similar to those around them and feeling comfortable with the tasks they undertake. Thus, Kristof-Brown, et al. (2005) find that studies that include more forms of fit are able to explain more outcome variance than studies with only one form. Furthermore, metaanalyses reveal DA fit is most strongly correlated with job satisfaction in comparison to PO fit. Organizational satisfaction, however, is strongly correlated with PO fit, more so than job satisfaction. These target similarity findings are replicated in a cross-cultural meta-analysis of PO fit, DA fit, and work attitudes (Oh et al., 2014). Oh and colleagues (2014) meta-analyzed studies from Asia, Europe, and North America and found PO fit is more important in predicting organizational commitment than DA fit, and DA fit is more important in predicting job satisfaction than PO fit. Therefore, it is expected that people who experience higher levels of value congruence (i.e., person-community fit) with the SVC and therefore greater similarity with other members will experience higher levels of satisfaction with the SVC.

H1: PC fit is positively related to satisfaction with the SVC.

The target similarity argument suggests that DA fit is more likely to relate to participation related satisfaction than a more general satisfaction with the SVC. In a study designed to understand if fit relations precede, follow, or have a reciprocal relationship with affective outcomes such as job satisfaction, Gabriel and colleagues (2014) find that high demands-abilities fit leads directly to job satisfaction. Similarly, I expect demands-abilities fit to be directly associated with participation satisfaction.

H2: DA fit is positively related to participation satisfaction.

However, PC and DA fit only partially explain how self-selection is associated with different forms of satisfaction in a SVC of professionals. Motivation is the other, often studied, element of self-selection. Next, I propose that a self-selection model of satisfaction should include the fulfillment of the basic psychological needs (Deci & Ryan, 2000) as the motivational component for several reasons. First, fit theories conceptualize needs too broadly to create a parsimonious and explanatory model. Second, the organismic dialectical perspective of the theory of BPN is more congruent with the context of a SVC of professionals than the traditional organizational context.

Basic Psychological Needs Theory

Why fit leads to satisfaction within a SVC specifically, and peer production generally, cannot be answered by a fit perspective alone. Basic psychological needs theory, a motivational theory grounded in psychology, offers a more precise definition of fulfilling one's needs within any SVC context. Benkler (2006) describes self-selection as finding the best community to fit your values (i.e., PC fit), your skills and resources (i.e., DA fit), and your motivation. However, research related to motivation within the SVC context has not

produced a reliable pattern of results to draw upon. Instead, I suggest that the parsimony and organismic dialectical approach related to the theory of Basic Psychological Needs (BPN) (Deci & Ryan, 2000) is an appropriate way to conceptualize motivation within a self-selection context.

In the basic psychological needs tradition, simply satisfying one's desires will not necessarily lead to positive outcomes. It is only by satisfying one's innate psychological needs that favorable outcomes may be achieved. In fact, BPN theory argues that favorable outcomes are always associated with the satisfaction of our innate needs (Greguras, et al., 2014). Therefore, in BPN theory, when an individual's desires are fulfilled it will not necessarily result in favorable outcomes. However, when an individual is able to satisfy their psychological needs by satisfying their desires (e.g., finding a high degree of fit), then favorable outcomes will result. For example, basic psychological needs would posit that the satisfaction an employee derives from being able to work at the times that he/she finds convenient (i.e., desires and receives flex scheduling) results from the worker's ability to satisfy his/her need for autonomy. This more precise definition of motivation contrasts with the looser definition applied in studies of organizational fit and job satisfaction. No matter the desire, organizational fit is achieved when what a worker wants matches what the worker receives (i.e., desires and receives flex time) (Kristof-Brown, et al., 2005).

Basic psychological needs theory argues that all individuals have innate, essential, and universal psychological needs, which they strive to fulfill in order to experience favorable outcomes, such as increased well-being and satisfaction. More specifically, BPN theory argues that all humans strive to satisfy their needs for autonomy, competence, and relatedness (Deci & Ryan, 1985, 2000). The *need for autonomy* is a core psychological need

concerned with an individual's felt volition. When individuals are able to self-organize their experiences and behaviors, they have the freedom to create an integrated sense of self that is consistent with their actions. User autonomy, according to Benkler (2006), is one of the structures that enables efficiency within peer production efforts, such as a SVC of professionals. The *need for competence* refers to one's innate desire to feel effective in one's actions, while also mastering new skills along the way. When an individual feels their need for competence is satisfied, then that individual believes that they are able to positively impact their surroundings (Greguras, Diefendorff, Carpenter, & Tröster, 2014). Finally, the *need for relatedness* is associated with a desire to feel connected and close to others. It is important to note that although all people share these same three innate psychological needs, people will satisfy them in different ways and to different degrees.

Relevant to the self-selection context of a SVC of professionals, basic psychological needs theory takes an organismic dialectical approach to understanding human behavior, assuming that humans are "naturally inclined" to better themselves and actively work to integrate new experiences into a sense of personal and interpersonal coherence (Deci & Ryan, 2000). Yet, this approach acknowledges individuals' social context and their own internal psyche can derail this innate tendency to better oneself, leading people to develop coping behaviors that can further frustrate their ability to fulfill their psychological needs (e.g., staying silent out of habit even when having insightful comments within a SVC). Thus, basic psychological needs theory assumes that individuals act with agency by influencing internal and external forces all the while being susceptible to such forces.

Hence, basic psychological needs theory is a valuable perspective for research into peer production processes because it is designed to look at outcomes that hedonic-based

motivation theories -- theories that assume humans are motivated to maximize pleasure and reward and minimize pain and costs (e.g., expectancy theories) -- would not naturally explore. There is a large amount of evidence to suggest that altruism and prosocial processes are consistently present in peer production projects (Müller-Seitz & Reger, 2009; Raban, 2008; Yu, et al., 2010) and motivate participation along with a desire to learn, share knowledge, and take creative pleasure (Chen & Hung, 2010; Franke & Shah, 2003; Füller, et al., 2007; Yu, et al., 2010). Although an argument could be made that such motivations do not preclude the presence of hedonic processes at work, Benkler and Nissenbaum (2006) argue that peer production ideals nurture an environment where organismic dialectical processes can flourish by emphasizing shared values and contributions toward an end that no one actor could accomplish alone with selfish ideals. Specifically, Benkler and Nissenbaum (2006) point out four clusters of virtue that commons-based peer production produce: 1) autonomy, independence, liberation; 2) creativity, productivity, industry; 3) benevolence, charity, generosity, altruism; and 4) sociability, camaraderie, friendship, cooperation, civic virtue. In other words, the self-selection process for participation and the modular design of peer production tasks engender a more autonomous environment where actors can freely create content or assist others in content creation, guided by the cues of the social environment, which enables participants to satisfy their own and others' wants and needs. Thus, the fulfillment of BPNs is possible in all contexts³, but the context of a SVC makes their fulfillment particularly relevant. In fact, the fulfillment of one's basic psychological needs unveils an additional path through which the different forms of fit are connected to the different forms of satisfaction in a peer production effort. Next, I hypothesize that the

relationship between the different forms of fit and the different satisfactions is mediated by the fulfillment of members' basic psychological needs.

Linking PC and DA Fit to the Fulfillment of Basic Psychological Needs

SVCs have different value systems that dictate how the community is run and what is offered to those involved. Similarly, individuals have different value systems that can affect what they desire from an SVC of professionals. BPN theory holds that all people (consciously or unconsciously) pursue the fundamental goal of fulfilling their psychological needs because fulfillment leads to positive affective outcomes, such as satisfaction and greater well-being. Since the psychological needs of individuals may be fulfilled in many different ways (Deci & Ryan, 2000) and different community values will be appealing to different people, it is the degree of correspondence between an community's values and a person's value system that positively relates to the fulfillment of basic psychological needs (Gabriel, et al., 2014).

Therefore, it is expected that people join SVCs in which they fit well or share similar values because the SVC enables them to fulfill their psychological needs. When people perceive that they share similar values with other members of their SVC they are more likely to feel comfortable expressing themselves and using the SVC in the way that best suits their needs. Therefore, it is expected that higher PC fit will lead to higher levels of fulfillment of each of the three basic psychological needs.

H3a: PC fit is positively related to autonomy fulfillment.

H3b: PC fit is positively related to competence fulfillment.

H3c: PC fit is positively related to relatedness fulfillment.

DA fit refers to peoples' beliefs that they have the skills and abilities to perform effectively (Kristof-Brown, et al., 2005), a construct quite similar to self-efficacy. Higher self-efficacy is known to positively relate to mastering challenges (Bandura, 1995) and learning for one's work (Maurer, 2001) because people with higher self-efficacy are less likely to give up easily and they tend to believe in their abilities rather than focus on deficiencies (Bandura, 1991). Similarly, it is expected that people with higher DA fit will be more likely to fulfill their need for competence due to a higher motivation to master challenges and cope better with tasks due to greater propensity for learning.

H4: DA fit is positively related to competence fulfillment.

Linking the Fulfillment of Basic Psychological Needs to Satisfaction

As previously explained, adding the fulfillment of BPN as an additional path to satisfaction creates a more parsimonious understanding of the motivations and goals underlying participation in a dual-weight peer production than most recent research which investigates idiosyncratic motivations. Considering the fulfillment of BPNs sheds light on the social psychological process involved in obtaining a positive attitudinal outcome from finding value and skill congruence with a SVC of professionals. When people operate in a work environment that enables them to fulfill one or more BPNs this should foster well-being and optimal performance (Gagné & Deci, 2005).

How, then, might the fulfillment of each of the three psychological needs relate to the two different forms of satisfaction? The need for autonomy is based on a need to exercise control over one's actions (Deci & Ryan, 2000). Similarly, a SVC bases its membership on

voluntary participation by interested individuals. The underlying organizing mechanism, peer production, used to galvanize participants to produce content for the SVC relies upon task modularity and granularity to attract as many people as possible to produce the content they see fit to produce (Benkler, 2006). In other words, the context within which people operate when participating in a SVC is designed to give participants high levels of autonomy, to participate when they want and how they want. Therefore, it is expected that participants who are able to fulfill their need for autonomy will report high levels of overall satisfaction with the SVC and participation satisfaction.

H5a: Fulfillment of the need for autonomy positively relates to satisfaction with the SVC.

H5b: Fulfillment of the need for autonomy positively relates to participation satisfaction.

The need for relatedness stems from a desire to feel connected to others. Feeling and experiencing a sense of connectedness can come from actual interpersonal ties to other members, but it may also stem from a general feeling of solidarity and trust (i.e., if you needed assistance then members of the peer production would step-up and assist).

Haythornthwaite's (2009) conceptualization of heavy and light weight peer production efforts, which recognizes both the form of actors' contributions and the social context within which those contributions occur, can shed light on the structure of members' social networks in a dual-weight peer production. Her discussion of actor interdependency recognizes that some peer produced environments are designed to aggregate member contributions, creating a pooled interdependency among users. These lightweight peer production efforts do not

require actors to negotiate each other's contribution in order to participate in the peer production effort. Instead, contributions are collected together and the sum of this collection of information is the collective resource for the peer produced group. For example, when members of an open source software initiative report a bug in the software code, the aggregation of these alerts is a bug report for the community (Dahlander & O'Mahony, 2011). Members need not know one another or work with one another to accomplish the creation of this resource. However, the fact that this resource is created and continuously updated indicates a larger sense of community where members support one another. This can create a sense of connectedness from simply observing other members.

Heavyweight peer production, in comparison, is designed such that current users' contributions are influenced by earlier users. This reciprocal influence allows users to negotiate their contributions within the context of other users' contributions. Related to the bug report example above, when this bug report is used to help direct the efforts of those who want to contribute by debugging the software code and members work together to construct the cleanest fix to a particular bug, their contributions to the peer produced effort are reciprocally influenced. These members interact in an environment that is more conducive to creating instrumental ties. Therefore, they are able to experience the feeling of relatedness directly from their participation. Hence, all members have the ability to fulfill their need for relatedness, either through direct connections to other members or by watching the connections develop among members within the dual-weight peer production, and this should be associated with higher levels of participation satisfaction and satisfaction with the SVC.

H6a: Fulfillment of the need for relatedness positively relates to satisfaction with the SVC.

H6b: Fulfillment of the need for relatedness positively relates to participation satisfaction.

The need for competence is based on a desire to feel effective in one's actions. When an individual fulfills their need for competence they should feel that they have positively impacted their environment, which is indicative of experiencing participation satisfaction. Self-development, perceived usefulness for daily work, and creative pleasure are all motivations related to fulfilling a need for competence, which members of peer production communities have experienced (e.g., Föllner, et al., 2007; Müller-Seitz & Reger, 2009). Although most members do not actively contribute to dual-weight peer production enterprises⁴, learning and feelings of competence are not only felt from actively engaging with the community. Learning can also occur from simply watching the actions of the community (Wenger, 1998). Hence, fulfillment of the need for competence will occur to different degrees for different members and should result in higher levels of participation satisfaction.

H7: Fulfillment of the need for competence positively relates to participation satisfaction.

To summarize, much of the current research seeking to understand why people participate in SVCs has produced a list of relevant motivations with no conclusive evidence to suggest a unifying motivational pattern relating to member participation or member satisfaction within a peer production community. Furthermore, studies that examine motivation in relation to how frequently people participate or how people participate (e.g., Oreg & Nov, 2008; Müller-Seitz & Reger, 2009) reveal an organizational/hierarchical bias.

Attempting to understand motivation in relation to how much or in what way a person participates privileges amount of participation and assignment of categories to participants rather than the ideal of self-selection within peer production. This creates an opportunity to conceptualize member satisfaction and motivation in peer production communities differently. Understanding the self-selection process that individuals undergo when choosing to participate in a peer production community as a fit-finding process, and recognizing the potential for participation to fulfill the basic human needs for autonomy, relatedness, and competency, provides such an opportunity. This model of satisfaction privileges the self-selection process that participants undergo as being directly related to members' ability to fulfill their BPNs and ultimately be satisfied with the SVC. By doing so, a more holistic understanding of member motivations and membership experience within a peer production enterprise should surface. Consequently, I hypothesize distinct connections between a) two forms of fit (i.e., person-community fit and demands-abilities fit) and the fulfillment of the three basic psychological needs; b) between the fulfillment of the three psychological needs and two forms of satisfaction (i.e., participation satisfaction and satisfaction with the SVC); and c) between the two forms of fit and the two forms of satisfaction to create an overall model of how participation in a peer production community is associated with satisfaction from the experience. This overall structural model is illustrated in Figure 1. In order to assess the self-selection process participants engage in, their ability to fulfill their basic psychological needs, and participants' satisfaction with the SVC and their own participation, Research Question 1 asks:

RQ1: Does the structural model show a satisfactory degree of fit to the observed data?

Incorporating BPN theory into such a model invokes an organismic dialectical approach, which allows for human agency and assumes that actors will influence and be influenced by internal forces within the peer production community. One way that individuals attempt to influence the social context of a peer production community is by creating strategies to cope with the deluge of information often encountered in these spaces (Benkler, 2006). Therefore, in order to understand how this model might be impacted by individuals' attempts to modify the environment to fit their needs, I introduce the concept of individual filtering.

Individual Filtering

The copious amount of information that can come through a SVC in a day can be overwhelming and a source of frustration for some members of a SVC, especially those people who do not have a lot of time to devote to the group (Benkler, 2006). Some people may choose to handle this information deluge (e.g., member posts, community updates) by only devoting their attention to contributions that they are interested in. However, it can be difficult to determine which contributions will be relevant without investing time to discover for oneself how interesting a contribution is. Hence, some participants will rely upon their knowledge of who knows what within the SVC to filter through the large amount of information SVCs can produce. This use of individual filtering can be observed in many online communities.

Within unbounded online social networks, such as Twitter and Facebook, the use of tools that enable members to follow one another's online activities, such as personal network maps or joining specific groups within a larger network, allow people to electronically filter

through the “noise” within the network by singling out specific people or groups of people who may provide the individual with relevant content. Within each of these online social networks, utilizing a form of individual filtering helps the user to customize the information that they pay attention to when they visit the social network. In a SVC of professionals, individual filtering requires the user to create a personal, cognitive network of others who are worthwhile to follow.

Similar to tracking the activities of friends on information sharing networks such as Facebook or Instagram, individual filtering occurs when a member of a SVC chooses to attend to messages, resources, etc., posted by other members he or she has previously determined to be a “person of interest” or someone whose participation within the SVC is worth following. When members engage in individual filtering they create their own personal individual filtering network, or mental list (i.e., ego network) of other members of relevance, which they use to shape the SVC to better suit their needs (i.e., filter the information so that only the information perceived as most relevant is read). Members who become part of others’ individual filtering networks act as information sources for those members, when the amount of information within the network is too much to pay attention to members who use individual filtering can filter the information by reading posts by his or her information sources rather than other, unknown members.

Individual filtering draws on members’ knowledge of who knows what in the network, which is likely developed over time, through participation in a SVC. Awareness of the level of involvement and the expertise of other members in online communities often occurs over time as members work to integrate themselves into the community (Borzillo, et al., 2011). Individual filtering may even reflect a more mature use of a SVC, as greater time

within the community enables a member to develop more personal contacts and find subgroups within the larger community to join (Nov, Naamaan, & Ye, 2010). However, this does not mean that a minority of well-connected members controls the flow of information within a SVC. In fact, Faraq and Johnson (2011) show a norm of welcoming behavior to new participants in online communities as evidenced by members responding to messages by new and unconnected members. Instead, it is more likely that the ability of members to engage in individual filtering helps to create a sense of a critical mass of interconnected members (e.g., Ridings & Wasko, 2005), which can help a SVC thrive through the sense of trust and stability this lends (Matzat, 2010).

Although SVCs are unbounded social networks where different people join and exit on a daily basis, individual filtering is possible because (1) direct connections between members in a SVC do exist (Matzat, 2009) and (2) online communities archive member interactions and postings, allowing members to develop an indirect understanding of who other members are. Therefore, choosing who may be relevant to follow likely occurs differently for those people who are directly connected to others in the network and for those people with no direct ties to others (Matzat, 2009). When a participant has no contacts within the network to begin with, realizing who is relevant to follow is possible due to the archiving nature of the online platforms the community uses to interact. The social networks of users of social networking technologies, such as those used by SVCs, are said to be translucent or able to be determined in general but not in detail (Leonardi & Meyer, 2015). For example, who likely knows whom within the SVC and what they may know about might be inferred from members' profile pages where interests and verified friends are listed, current and archived posts to a listserv where conversation partners are visible, and subgroup

membership (e.g., joining a short-term project or interest group within the SVC) is displayed. Since online peer production communities archive user contributions anyone in the network may browse through old content to build a rough understanding of who the other members are. Furthermore, participants are able to watch interactions unfold within the network creating an updated understanding of not only who is active but also who knows what within the network. Even without electronic tools, such as feed filters based on who one knows, to aid participants in sifting through the ongoing posts within a SVC, keeping tabs on specific others within the network is a helpful routine for members of SVCs who must read through a stream of information and identify what is relevant to them. In fact, users who are able to identify specific others within a social network that are relevant to their information needs, or who are simply interesting to follow, are more likely to stay involved in the larger community (Liang, et al., 2014; Wang, Chen, Ren, & Riedl, 2012).

The Moderating Role of Individual Filtering

Individual filtering involves identifying other members whose knowledge is relevant to one's needs when participating in a SVC and using that knowledge of who knows what to filter through the information within the SVC. It is a behavioral choice that can set users apart because the social context of a SVC participant influences what information participants have access to within the SVC (Wesler et al., 2011). Taking the time to identify other members a user knows or knows of within the network who are worthy of "keeping tabs on" creates an individual filtering tool for the user, which enables greater personalization of the SVC space. Since information can be a primary output of SVCs, those participants whose social context enables access to more and even potentially better filtered information,

are likely to get more out of their participation within a SVC (Francke & Sundin, 2010), such as finding better fit and being able to better fulfill some or all of their psychological needs.

A member that engages in individual filtering creates their own personalized individual filtering network for the SVC by mentally compiling a list of specific others within the SVC who can behave as personal indicators of useful information or information sources. The SVC member may use his/her individual filtering network as a heuristic for deciding which threads to follow in an online discussion board, whose blogs to bookmark, or whom to friend (Shriver, Nair, & Hofstetter, 2013). The ability to find (like-minded) others worthy of following should increase the positive influence PC fit has on fulfilling the need for autonomy by increasing a member's perceived value congruence with the community. The use of individual filtering should result in higher information relevance from the SVC, which should solidify feelings of value congruence (i.e., PC Fit), leading to increased fulfillment of the need for autonomy.

H8: Individual filtering enhances the positive relationship between PC fit and autonomy fulfillment.

In addition to the greater information relevance noted above, the ability to find others worthy of following should increase a member's feelings of connectedness to the SVC and specific others within the community. When a member evaluates who to follow in an online social network site they are often basing their judgments on other members' profiles and posts, which can potentially reveal shared interests, a member's level of activity within the network, where a member works and who else they are connected to within the network (Cook & Wiebrands, 2010). This identity verification process (Ma & Agarwal, 2007) also

helps to build webs of trust through the network as members begin to discover the layers of interest overlap and visible connections among those they choose to follow (Fang & Neufeld, 2009; Matzat, 2009b). Utilizing individual filtering within a SVC, then, should also increase the influence that PC fit has on fulfilling one's need for relatedness.

H9: Individual filtering enhances the positive relationship between PC fit and relatedness fulfillment.

The use of individual filtering may also moderate the relationship between PC fit and competence fulfillment. Knowledge of other members with similar skills can increase a member's perceptions of his or her own PC fit within the community due to a sense of homophily and belonging. This interaction likely increases the strength of the relationship between PC fit and professional competence. Knowing or knowing of other members who share similar professional ethos and/or reputational status within the profession may help the professional gain greater self-confidence in his/her own professional competence. SVCs enable members to observe other people's posts and profile information, which can include a range of information depending on the topic of interest within a SVC, such as likes and dislikes, skills, and other organizations they belong to. This information helps members judge the appropriateness of the SVC for their own needs, including learning from their peers (Thompson, 2011). Hence sharing similar values is important, as is sharing similar vocabulary and work contexts, which can greatly improve a person's ability to learn from others within the SVC (Iverson & McPhee, 2008). Feelings of competence fulfillment, then, should be reinforced by the interaction of individual filtering and PC fit.

H10: Individual filtering enhances the positive relationship between PC fit and competence fulfillment.

In summary, I suggest that individual filtering is a moderator that positively impacts the proposed positive relationships between 1) PC fit and the fulfillment of the need for autonomy, 2) PC fit and the fulfillment of the need for relatedness, and 3) PC fit and the fulfillment of the need for competence. However, individual filtering likely has an impact beyond the individual level instrumentality of having a cognitive map of who knows what in the network to filter through the information. Considering the SVC membership as a whole, are there members who are named more often as information sources? If so, are these members' ability to fulfill their BPNs affected by this structural position (i.e., observed by others)?

Informal Control and being an Information Source

An interesting question to ask for a peer production context built on an ideal of autonomy is under what conditions might systems of informal control exist? Informal control systems can arise when the environment allows the monitoring and influencing of others (Friedkin, 1983). Within a SVC, monitoring can happen through formal peer review processes (e.g., a moderator rejects a community member's post to the group) or informal activities by members (e.g., watching who edits a wiki page, observing other members' expertise based on their posting behavior). Furthermore, influence might flow directly between members who interact or influence might flow indirectly between members as they begin to share similar norms and expectations within the community (Benkler, 2006).

Related to the individual filtering described above, the information sources named by members are members whose expertise and activities within the SVC are being monitored by others. However, informal monitoring is only the first piece of informal control. Influence must also be able to flow between the person being observed and the person doing the observing, “The likelihood that influence will be transmitted through intermediaries is said to ... increase with the number of channels available for such transmission” (Friedkin, 1983, p. 57). In other words, the more people who monitor a member the more likely informal control processes may occur. Thus, informal control is only successful when the person being monitored is also aware of this monitoring. Within a SVC, the more often a member is named as someone’s information filter the more often that person’s actions and expertise are being monitored by other members. Additionally, awareness of this monitoring should increase (i.e., influence flow) as more people focus their attention on a member. For instance, a member who frequently posts updates to the community about a shared resource (e.g., availability of the newest community newsletter) is likely aware that many people wait for these updates. This awareness may come from direct contact with others who voice their appreciation or dismay to the member, or it may come indirectly through web tools that enable one to know how many people have viewed a resource or word of mouth within the community. Thus, those people who are being observed most often by both direct (i.e., personal) and indirect (i.e., connected through the community or other community members) ties to others, for their expertise within a SVC (i.e., the information sources), will likely feel more informal control within the SVC, which would reduce their ability to fulfill their need for autonomy.

H11: Being named as an information source diminishes the relationship between PC fit and autonomy fulfillment.

Method

This study used a cross-sectional, online survey design to assess the relationships between PC and DA fit; the fulfillment of the needs for autonomy, relatedness, and competence; participation satisfaction and satisfaction with the SVC; and individual filtering and information sources in a sample of participants from the SVC KM4Dev. In the following sections I describe the population of interest in this study and how I collected my data from members of KM4Dev.

Participants

I surveyed the membership of the SVC KM4Dev from July 2016 - October 2016. Km4Dev (Knowledge Management for Development) is a “community of international development practitioners who are interested in knowledge management and knowledge sharing issues and approaches” (Knowledge Management for Development, 2012). This self-organized virtual community has over 4,000 registered members from all over the world who use various online channels (i.e., wiki, Ning network, DGroups listserv) and face-to-face channels (i.e., annual meeting, regional meet-ups) to communicate and organize themselves. This community is self-organized; it has no formal organizational sponsor (e.g., USAID, World Bank) that determines the goals and structure of this group of professionals. Instead, the community utilizes a Core Group of volunteer members who negotiate and carryout the tasks associated with maintaining a mission-oriented and geographically distributed group of professionals.

KM4Dev was created in 2000 by a group of professionals working in the international development sector. Initially, start-up funds and small grants obtained from different organizations allowed for a formal, paid moderator (i.e., a non-governmental organization allowed their employee to devote one day a week to KM4Dev tasks) to maintain the online group's presence and functionality. In 2004, this funding came to an end. In its place, the KM4Dev Core Group was created as a governance group for an ever-growing membership of knowledge management professionals that required ongoing attention in order for the group to maintain its members' desired purpose and activities. Anyone who has the desire and time to devote to the Core Group is encouraged to volunteer. While there is no term limit associated with being a member of the Core Group, the informal policy of the group suggests that members consider being a Core Group member for 1-2 years before deciding to leave or stay (KM4Dev Core Group, 2011). The current Core Group of KM4Dev consists of 14 members. The main form of communication for the Core Group is a private listserv.

The two main interaction spaces for KM4Dev are their Ning network and their Dgroups listserv. The Ning network is the community's landing page, KM4Dev.org. It is a Facebook-like platform that enables members to interact with the SVC in different ways including creating a profile page, posting information to the entire network, following other members, joining interest groups, and sending direct messages to others. There are approximately 4750 registered members on KM4Dev.org. The Dgroups listserv is not as flashy as the Ning network, enabling those with lower bandwidth to easily connect to this platform. It is the main communication tool for the KM4Dev community where most of the interaction, including that of the Core group, takes place. The listserv is a space for

community members to interact with other members both about the community and about the community's focus, knowledge management for development. Messages posted to the listserv are delivered directly to members' inboxes. There are approximately 2400 people registered on the list-serv.

As is typical of SVCs, not all members participate in all of the community's online spaces, while others will participate in multiple spaces (Cranefield & Yoong, 2009). Therefore, it was necessary to draw participants for this study from both of the SVC's main interaction spaces in order to have the entire membership represented.

Procedure

All registered members of the self-organized virtual community, KM4Dev, were eligible to participate. Anyone may register to be a member of this online community by signing up for an account at KM4Dev.org (the Ning Network) and/or their Dgroups listserv. Members of KM4Dev were solicited to participate in the online survey, hosted on the University of California, Santa Barbara's Qualtrics account, either through a post received from the Dgroups listserv or from a personal email sent from the researcher via the Ning Network's administration communication tools. Each of these interaction spaces has distinct terms of service, which impacted how I was able to invite members to participate. The Dgroups platform is controlled by the nonprofit Dgroups Foundation, who does not permit the distribution of member email addresses to third parties. Consequently, I sent invitations out through the listserv, in a blast email fashion, that allowed interested members to participate in the survey by using the link provided. For the Ning network, the KM4Dev Core group granted me permission to use the administration tools within KM4Dev.org to send an

email to each registered member. From July-October 2016, I sent five different email invitations out via the Dgroups listserv and three different email invitations using the KM4Dev.org admin email tools.

Results

Sample

A total of 225 completed surveys were returned (5.6% response rate) to the researcher. Thirteen of these surveys had 85% or more missing data on the variables relevant to this study. These cases were removed, and the remaining 212 member-completed surveys, were used for analysis ($N=212$). Furthermore, none of the measures (i.e., items) used in this analysis had more than six missing observations (2.8%), therefore, the decision was made to replace any missing observations with the mean value of its component variable. This resulted in no more than 2% of all observations warranting replacement ($n=95$).

Although a response rate around 5% appears low, this is not atypical of the KM4Dev Community. For example, the 2012 Learning and Monitoring Survey sent out only through the listserv garnered 144 participants (Camacho, Le Borgne, Staiger, Alvarez, & Bettink, 2013), while a 2011 social network analysis of posts on the listserv revealed 242 people participated on the listserv that year (Durant-Law, 2012). Durant-Law (2012) indicated that approximately 24 (10%) of those members were hyper-contributors (not defined), while the remaining 218 (90%) were occasional contributors. Indicative of peer production processes at work, respondents to this study's survey reported a range of participation patterns. Although 41% of respondents reported being registered on both platforms, 26% reported being registered on KM4Dev.org only and 24% reported being registered on only the listserv (9%

did not report). Furthermore, respondents reported a range of participation styles with 105 (49.5%) members reporting participating silently (i.e., participation not visible to other participants) all of the time, 86 (40.5%) members reporting actively participating (i.e., participation that is visible to other members) at least some of the time they participate, and 21 (10%) members not reporting. Although I am not able to ascertain how representative survey respondents are of the KM4Dev membership, approximately the same number of people registered to the listserv responded to this survey and the 2012 Learning and Monitoring Survey. Furthermore, respondents appear to have a similar participant pattern as the Durant-Law SNA revealed, 19 respondents (9%) reported actively contributing more than 50% of the time (i.e., potential hyper-contributors) they participated in the SVC.

The mean length of membership for respondents was 5.43 years ($SD=4.24$). The majority (60%) of the respondents were between 35-54 years old, with only 15% of the respondents younger than 35 (12 did not report age). Respondents came from 61 different countries, English was not the first language for 11% of respondents, 52% of the respondents were female, and 88% reported being employed (2 did not report). The workplaces represented include a range of governmental and non-governmental organizations, such as the United Nations World Food Programme, International Centre for Integrated Mountain Development (ICIMOD), United States Agency for International Development (USAID), Land O'Lakes International Development, and Pathfinder International.

Measures

The measures used in this study were adapted from validated scales to fit an international, online, volunteer, peer production-based context. Since these measures have

typically been used in paid work contexts with hierarchical organizational structures, the researcher pretested the survey questions through in-depth, one-on-one interviews with three different people who have participated in these online spaces (two people from the United Kingdom, one from Italy). Using feedback from these sessions, a few of the needs satisfaction questions were modified for clarity. The revised survey was then pretested with a volunteer sample in a comparable online community ($N=24$) in order to determine the reliability of the scale measures for each of the variables in the path analysis. All of the scales, except for the fulfillment of the need for autonomy ($\alpha=.687$), achieved Cronbach's alpha reliabilities higher than .8. Minor changes to the satisfaction of autonomy fulfillment scale were undertaken, in a compromise to stay close to the originally validated measures while making the measures relevant to a peer production, online context.

Next, I describe my measures. See Table 1 for the specific items used in the derivation of each variable.

PC fit. PC fit refers to the perceived degree of value congruence between professionals and the value systems of their chosen SVC (Kristof, 1996). This research adapts Cable and DeRue's (2002) measures for PO fit to measure PC fit. I measured person-community fit with four items. An example item for PC fit is, "The things that I value in life are very similar to the things that KM4Dev values." Responses were collected on a 7-point scale (1= disagree strongly; 7= agree strongly) and averaged to form a single measure ($\alpha=.89$).

DA fit. DA fit refers to the perceived correspondence between a professional's skills and abilities and those required to effectively participate in the SVC (Kristof-Brown, et al.,

2005). I measured DA fit with items adapted from Cable and DeRue (2002). I used four items to measure DA Fit. An example item for DA fit is “There is a good match between the demands for participation in KM4Dev and my personal skills.” Responses were collected on a 7-point scale (1= disagree strongly; 7= agree strongly) and averaged to form a single measure ($\alpha=.84$).

I measured needs fulfillment by adapting the reduced version of the Basic Need Satisfaction at work scale (Deci et al., 2001). This scale’s items assess the degree to which individuals experience fulfillment of their three BPNs at work.

Autonomy fulfillment. Autonomy fulfillment is the ability to exercise control over one’s actions (Deci & Ryan, 2000). Three items measured autonomy fulfillment. An example item for autonomy fulfillment is, “I am able to decide for myself how to go about participating in KM4Dev.” Responses were collected on a 7-point scale (1= disagree strongly; 7= agree strongly) and averaged to form a single measure ($\alpha=.72$).

Competence fulfillment. Competence fulfillment is “a propensity to have an effect on the environment as well as to attain valued outcomes within it. (Deci & Ryan, 2000, p. 231)” Four items measured competence fulfillment. An example item for competence fulfillment is, “I continue to learn new things through my participation in KM4Dev.” Responses were collected on a 7-point scale (1= disagree strongly; 7= agree strongly) and averaged to form a single measure ($\alpha=.90$).

Relatedness fulfillment. Relatedness fulfillment is a “desire to feel connected to others—to love and care, and to be loved and cared for” (Deci & Ryan, 2000, p. 231). Relatedness fulfillment was measured with four items. An example item for relatedness

fulfillment is, “I feel supported by the KM4Dev membership.” Responses were collected on a 7-point scale (1= disagree strongly; 7= agree strongly) and averaged to form a single measure ($\alpha=.81$).

Community satisfaction. Community satisfaction represents a combination of members’ participation satisfaction and satisfaction with the community, which were originally proposed as independent constructs. Participation satisfaction represents an affective response members experience toward their specific experience as a member of a SVC. It is similar to job satisfaction. Satisfaction with the SVC represents members’ affective response that transpires from the cognitive comparison of actual and desired features of the SVC, similar to the concept of organizational satisfaction (Locke, 1969). Although these two concepts were originally intended as separate outcome variables in the model, analysis of the data showed these two constructs to share 95% of each other’s variance. This likely occurred because of the similarity of the question construction. Both sets of questions included items created by modifying the same set of questions from the Michigan Organizational Assessment Questionnaire (MOAQ) Job Satisfaction Subscale (JSS).

Five items were ultimately used to measure community satisfaction; items were taken from both the community satisfaction and participation experience satisfaction question sets. An example item is, *All in all, I am satisfied with my experience of participating within KM4Dev*. Responses were collected on a 7-point scale (1= disagree strongly; 7= agree strongly) and averaged to form a single measure ($\alpha=.88$).

Individual filtering. Individual filtering refers to the practice of using one's knowledge of other members to make participation decisions, such as what to read or to whom to respond. Members' knowledge of other members' expertise and subsequent use of that knowledge to customize their information environment within the SVC was originally intended to be assessed by asking members three Likert-style questions, such as *In order to manage the flow of information from KM4Dev, I often prioritize the messages I read based on who authored the post.* Responses were collected on a 7-point scale (1= disagree strongly; 7= agree strongly) and averaged to form a single measure ($\alpha=.85$). However, the assumption checks of this composite revealed a non-normal distribution even after several different transformations were applied. Inclusion of this non-normal, continuous measure as a moderator in the path model did not demonstrate a significant moderation effect.

Therefore, the decision was made to measure individual filtering through a binary moderator. The survey was designed such that participants who answered any of the questions for individual filtering (above) with a score of 3 or higher received this follow-up network question,

“When reading through the information you receive from the KM4Dev community from any platform (e.g., KM4Dev.org, Dgroups) *in a typical week*, you indicated that knowing the author of the post helps you decide to read the message. Thinking about the KM4Dev membership, please identify *those members you regularly read.*”

The new measure for individual filtering categorized members who listed other members' names as 1 ($N=101$) and members who did not list other members' names as 0 ($N=111$).

Information source. When members practice individual filtering they name other members as people who help them to sort through the large amount of information that often comes with being a member of a SVC of professionals. I call these members information

sources because they act as a cognitive heuristic for some members, in order to customize the stream of information that can come with SVC membership. After comparing the names of people identified through the individual filtering question to the names of those people who completed the survey, 27 members were identified as information sources and 152 members were not identified as information sources. Respondents who did not report their names ($N=33$) were excluded from any analyses (H11) using this measure.

Measurement Analysis

Before analyzing the path model, the notion that participants distinguished between different forms of fit, fulfillment of needs, and satisfactions needed to be checked. Therefore, three separate confirmatory factor analyses were performed on each of these sets of measures, respectively, in order to understand if these items clustered as predicted. The confirmatory factor analyses were performed in Mplus version 7.4 (Muthén & Muthén, 2015). A Goemin oblique rotation (Yates, 1987; Browne, 2001) was utilized, which accounts for item indicators that have substantial loadings on more than one factor.

The assumptions were evaluated through IBM SPSS version 24. No univariate or multivariate outliers were found. The data were reasonably normally distributed and exhibited linearity, with the exception of the continuous items used to measure individual filtering. These items were neither normally distributed nor exhibited a linear relationship with the other measures. Therefore, the decision was made to use the binary measure (see above) for this variable, which exhibited a nearly even split of the sample.

Confirmatory factor analysis (CFA) is a structural equation modeling statistical technique that enables researchers to test hypotheses regarding the distinctions between items

and the underlying latent variables or factors that the items are hypothesized to measure (Kline, 2005). Structural equation modeling techniques, such as CFAs and path modeling, utilize covariances⁵ as their basic statistic in order to “understand patterns of correlations among a set of variables, and to explain as much of their variance as possible” (Kline, 2005, p. 13). Based on the current state of practice, I report the following four fit indices to assess model fit here and later when analyzing the path model, 1) the model Chi-square, 2) the Steiger-Lind root mean square error of approximation (RMSEA; Steiger, 1990), 3) the Bentler comparative fit index (CFI; Bentler, 1990), and 4) the standardized root mean square residual (SRMR).

Each of these statistics has different cut-off points for determining model fit. The Chi-square fit statistic⁶ tests the hypothesis that the model’s implied variance/covariance matrix equals the population’s variance/covariance matrix. If the model implied fits the observed covariance matrix there will be no error or residual. Therefore, this is a “badness of fit” index, where a non-significant p-value implies support for a good fit. The lower the Chi square fit statistic the better the model corresponds to the data (Maruyama, 1998). This is a sample sensitive fit statistic, when the sample is small poor models may fit well and when the sample is large any trivial difference may be detected. Hence, care must be taken in interpretation.

The root mean square error of approximation, unlike the Chi square index, does not assume that the model is perfect. Instead, using a noncentral chi-square distribution, this “badness of fit” index corrects for model complexity in order to favor more parsimonious models in the face of competing models with similar explanatory power. The RMSEA measures the error of approximation, which is related to the lack of fit of the model to the

population covariance matrix. The error of approximation is not affected by sample size, therefore the RMSEA is not sample sensitive. I will utilize the following guidelines for assessing model fit with the RMSEA: $RMSEA > .10$ indicates the model fits poorly, $.05 < RMSEA < .08$ indicates a reasonable error of approximation, and $RMSEA \leq .05$ indicates a close approximate fit. In addition, the RMSEA is typically computed with a 90% confidence interval, which must be taken into account. (i.e., if .1 is in the confidence interval I would not reject the hypothesis of poor fit; Steiger, 1990).

The comparative fit index (CFI; Bentler, 1990), is a relative fit index because it assesses fit by comparing the researcher's model to a baseline mode. The CFI uses the Chi square fit statistic and answers the question, does the model reduce the lack of fit observed in the null model? The CFI ranges between 0 and 1.0. Hu and Bentler (1999) suggest the following guidelines, $CFI \geq .90$ indicates acceptable fit and $CFI \geq .95$ indicates good fit.

The standardized root mean square residual (SRMR) is a measure of the mean absolute value of the correlation residuals, obtained by transforming the sample and predicted covariance matrices into correlation matrices. The lower the value of the SRMR the better; values less than .10 are considered favorable (Kline, 2005). The SRMR is also useful when examining the distributions of the residuals. Higher standardized residuals (i.e., greater than 2) suggest that the model does not adequately explain the correlation between two variables.

Finally, the maximum likelihood (ML) estimator will be utilized to estimate parameters in both the CFA and path models. Maximum likelihood (ML) is the preferred method of estimation for structural equation models (Kline, 2005) and it is fairly robust to

violations of multivariate normality (Kline, 2005). ML estimators maximize the likelihood that the data collected and the model come from the same population, by minimizing the differences between matrix summaries of observed and estimated variances/covariances, through a substitution process of iteratively changing parameter estimates (Winer, Brown, & Michels, 1991).

Fit CFA. The results of the CFA of fit are summarized in Tables 1 and 2. The hypothesized two-factor CFA showed adequate, but not good, fit to the data with $\chi^2(19, N=212) = 111.37, p=.000, RMSEA=.15, CFI=.91, SRMR=.05$. In order to further test the validity of the two-factor model, I tested it against an alternative one factor CFA. In the alternative one-factor model, all of the items load onto a global fit variable, representing the idea that participants in SVCs do not distinguish between demands-abilities and person-community fit. The alternative one-factor model fit the data significantly less well, χ^2 . $Difference(1, N=212) = 131.57, p=.000$.

Since the original two-factor model did not demonstrate good fit, model fit indices were explored. Model fit indices suggested correlating the residuals of several of the indicators. However, this suggestion did not make sense in the context of creating composite variables. Therefore, reliability analyses were run on the four item measures for each fit factor to determine how well the items “hung together” or purported to measure the same construct. Both the person-community fit ($\alpha=.89$) and demands-abilities fit ($\alpha=.84$) scales showed good internal consistency.

The evidence above suggested keeping a two-factor structure with each factor measured by four items. The literature supports this decision. For example, Kline (2005)

explains that it is not best practice to remove parameters simply to improve model fit because this risks overfitting the model to the data. I was able to achieve model fit by removing two items from the two-factor CFA, the measure that explained the least amount of variance for each factor. However, this did not demonstrably improve the reliability of the scales ($\alpha_{PC\ Fit} = .90$, $\alpha_{DA\ Fit} = .84$). Additionally, face validity did not lead me to believe that I should remove any items. Finally, Kristof-Brown's (2005) meta analysis found different forms of fit (e.g., person-job and person-organization) to be highly correlated, but still form distinct relationships of different strengths to the same and different variables. This could be the case here, as PC Fit and DA Fit are highly correlated ($r = .73$). Hence the decision was made to create composite variables by averaging the four respective indicators of PC Fit and DA Fit.

Needs Fulfillment CFA. The results of the CFA of needs fulfillment are summarized in Tables 1 and 3. Originally, each needs fulfillment construct was measured by five different items. Although the hypothesized three-factor model showed poor fit to the data with $X^2(87, N=212)=405.47$, $p=.000$, $RMSEA=.13$, $CFI=.81$, $SRMR=.12$, it fit significantly better than the one-factor model, $X^2_{Difference}(3, N=212)=45.11$, $p=.000$. Therefore, the decision was made to explore model modification. An exploratory factor analysis showed several factors either loaded onto an unintended factor or cross-loaded onto more than one factor. Sequential removal of four items that either did not measure the intended factor or adequately distinguish between different factors showed significant improvement to the model. The final three-factor structural model ($X^2(41, N=212)=70.88$, $p=.001$, $RMSEA=.059$ (n.s.), $CFI=.97$, $SRMR=.04$) had the following measurement model: fulfillment of the need for autonomy measured by three items, fulfillment of the need for relatedness measured by four items, and fulfillment of the need for competence measured by four items (see Table 1).

Reliability analyses were run to understand if these sets of measures reliably measured the three different psychological needs. These analyses revealed adequate to good reliability for each factor ($\alpha_{Autonomy}=.72$, $\alpha_{Relatedness}=.81$, $\alpha_{Competence}=.90$). These reliabilities, with the exception of autonomy, are similar to the reliabilities reported by Van den Broeck, et al (2010) ($\alpha_{Autonomy}=.81$, $\alpha_{Relatedness}=.85$, $\alpha_{Competence}=.82$). Although the reliability of the fulfillment of the need for autonomy is not ideal, since the removal of items was justified based on face validity and item loading issues, and the resulting model fits well and produces factors with reasonably reliable measures, the decision was made to create composite measures by averaging the items reported in Table 1.

Satisfactions CFA. The results of the CFA of satisfactions are summarized in Tables 1 and 4. The hypothesized two-factor structure showed poor fit to the data, $X^2(54, N=212) = 251.02$, $p=.000$, $RMSEA=.13$, $CFI=.89$, $SRMR= .08$). Closer inspection of the two satisfaction factors showed these two constructs shared 95% of each other's variance, $r=.95$. Therefore, the alternative, one-factor model, representing a global community satisfaction that encompassed both overall satisfaction with the community and one's own participation within it, was tested. Comparison of these nested models showed the two-factor model did not fit the data significantly better than the one-factor model ($X^2_{Difference}(1, N=212)=18.08$, n.s). Therefore, the decision was made to continue analyses on the one factor model.

An exploratory factor analysis revealed a four-factor model fit the data well ($X^2(17, N=212) = 16.36$, $p=.499$; $RMSEA=.00$, $90\% CI[0.00, 0.06]$; $CFI=1.00$; $SRMR= .01$), and all of the reverse coded items measuring satisfaction loading onto their own factor. Removal of these items produced a model that still did not reasonably approximate the data, $X^2(27, N=212) = 107.50$, $p=.000$; $RMSEA=.12$, $90\% CI[0.10, 0.14]$, $CFI=.95$, $SRMR= .04$), even

though the items showed good reliability, $\alpha_{9\text{-item satisfaction}}=.94$. Examining the correlations among the composite variables revealed this nine-item measure of satisfaction and four-item fulfillment of the need for competence to share 83% of each other's variance, $r=.83$. In order to test the model with the most distinct/conservative data as possible, the decision was made to create a community satisfaction measure based on item face validity and the goal of creating a measure as distinct as possible from the fulfillment of the need for competence.

Further examination of the other three factors from the four-factor EFA containing all of the items used to measure satisfaction showed one factor with a set of items with face validity that appeared to measure global community satisfaction. This factor contained items from both the participation experience question set and the satisfaction with the community question set. A one-factor CFA of these five items (see Table 1) revealed an adequate fit to the model ($\chi^2(5, N=212) = 16.35, p=.006; RMSEA=.10, 90\% CI[0.05, 0.16]; CFI=.98; SRMR=.03$), good internal consistency ($\alpha_{5\text{-item satisfaction}}=.83$), and a smaller correlation with competence fulfillment ($r=.74$). Therefore, the decision was made to continue analyses with this five-item composite of global community satisfaction. Table 5 lists the correlations for the single item measures used in the structural analyses.

Structural Analyses

In order to understand why finding fit within a SVC (i.e., self-selection) would lead to higher satisfaction with the overall membership experience, the mediating variables of Basic Psychological Needs Theory (i.e., motivations) were hypothesized. Figure 2 shows the theoretical paths and overall model that I analyze below. Cumulatively, I hypothesized two direct paths from fit (i.e., demands-abilities and person-community) to satisfaction and four

indirect paths through the fulfillment of the three BPNs (i.e., autonomy fulfillment, relatedness fulfillment, and competence fulfillment). First, I present results from analyzing the four mediated paths individually. This will allow initial understanding of how/if the basic psychological needs mediate the hypothesized relationships between fit and satisfaction, and how those paths function independent of the other psychological needs. Next, I present results that combine the hypothesized mediated paths into a larger path model in order to examine the fit of the data to the model and to better understand how fit, the fulfillment of BPNs and satisfaction function together. Finally, I present the results from analyzing the hypothesized moderated mediations, and I present model test results (i.e., fit indices, parameter estimates) with the moderated paths added.

Mediation testing. I conducted mediation analyses in Mplus 7.4 (Muthén & Muthén, 2015). Each of the individual paths was found to be significant before testing the mediated models. I report unstandardized coefficients. Unstandardized and standardized results from these initial, separate mediation analyses are depicted in Figures 3a-d. Tests of indirect effects are summarized in Table 11.

Person-community fit to satisfaction through autonomy fulfillment. The outcome variable overall satisfaction is significantly influenced by the mediator variable autonomy fulfillment controlling for the independent variable person-community fit (H5), $\beta=.33(.06)$, $p=.000$. The mediator variable autonomy fulfillment is significantly influenced by the independent variable PC fit (H3a) $\beta=.46(.06)$, $p=.000$. The direct effect of person-community fit on satisfaction is also significant (H1), $\beta=.53(.06)$, $p=.000$. Thus, person-community fit has a medium sized direct relationship to satisfaction that is further explained by the indirect

relationship through autonomy fulfillment (see Figure 3a). These findings support H1, H3a, and H5.

The indirect effect from PC fit to satisfaction through autonomy fulfillment is significant, but small and bordering on trivial, $\beta=.15(.04)$, $95\%CI[.08, .23]$, while total effects are medium in size, $\beta=.68(.06)$, $95\%CI[.57, .80]$. Finally, this mediated model explains approximately 20% of the variance in autonomy fulfillment ($R^2=.20$) and approximately 50% of the variance in satisfaction ($R^2=.49$).

Person-community fit to satisfaction through relatedness fulfillment. The outcome variable overall satisfaction is significantly influenced by the mediator variable relatedness fulfillment controlling for the independent variable person-community fit (H6), $\beta=.20(.05)$, $p=.000$. The mediator variable relatedness fulfillment is significantly influenced by the independent variable PC fit (H3c) $\beta=.60(.08)$, $p=.000$. The direct effect of person-community fit on satisfaction is also significant (H1), $\beta=.57(.06)$, $p=.000$. Thus, person-community fit has a medium sized direct relationship to satisfaction that is further explained by the indirect relationship through relatedness fulfillment (see Figure 3b). These findings support H1, H3c, and H5.

The indirect effect from PC fit to satisfaction through relatedness fulfillment is significant, but small and bordering on trivial, $\beta=.12(.04)$, $95\%CI[.05, .19]$, while total effects are medium in size, $\beta=.68(.06)$, $95\%CI[.57, .80]$. Finally, this mediated model explains approximately 20% of the variance in relatedness fulfillment ($R^2=.21$) and approximately 45% of the variance in satisfaction ($R^2=.46$).

Person-community fit to satisfaction through competence fulfillment. The outcome variable overall satisfaction is significantly influenced by the mediator variable competence fulfillment controlling for the independent variable person-community fit (H7), $\beta=.50(.06)$, $p=.000$. This path, of medium size effect, is the strongest of the paths from the BPNs to satisfaction. The mediator variable competence fulfillment is significantly influenced by the independent variable PC fit (H3b) $\beta=.78(.07)$, $p=.000$. The direct effect of person-community fit on satisfaction is also significant (H1), $\beta=.30(.06)$, $p=.000$. However, its small effect size is smaller than the effect size of the same path from relatedness and autonomy fulfillment to satisfaction. Thus, the person-community fit has a small direct relationship to satisfaction that is further explained by the indirect relationship through competence fulfillment (see Figure 3c). These findings support H1, H3b, and H7.

The indirect effect from PC fit to satisfaction through competence fulfillment is significant and small, $\beta=.39(.06)$, $95\%CI[.28, .50]$. It indicates that the independent variable PC fit increases the outcome variable satisfaction indirectly via the mediator competence fulfillment by .39 of a satisfaction unit of measurement. The total effects are medium in size, $\beta=.68(.06)$, $95\%CI[.57, .80]$, and the same as the previously reported mediation analyses with PC fit. Finally, this mediated model explains approximately 40% of the variance in competence fulfillment ($R^2=.41$), twice as much as the variance explained in autonomy and relatedness. It also explains approximately 60% of the variance in satisfaction ($R^2=.60$). The most amount of variance explained for overall satisfaction thus far.

Demands-abilities fit to satisfaction through competence fulfillment. The outcome variable overall satisfaction is significantly influenced by the mediator variable competence fulfillment controlling for the independent variable demands-abilities fit (H7), $\beta=.55(.05)$,

$p=.000$. The mediator variable competence fulfillment is significantly influenced by the independent variable DA fit (H4) $\beta=.61(.07)$, $p=.000$. The direct effect of demands-abilities fit on satisfaction is also significant (H2), $\beta=.22(.06)$, $p=.000$. Thus, demands-abilities fit has a small direct relationship to satisfaction that is further explained by the indirect relationship through competence (see Figure 3d). These findings support H2, H4, and H7.

The total indirect effect from DA fit to satisfaction through competence fulfillment is significant, $\beta=.34(.05)$, $95\%CI[.23, .44]$, and similar in size to the total indirect effects of PC fit to satisfaction through competence fulfillment. In other words, the independent variable DA fit increases the outcome variable satisfaction indirectly via the mediator competence fulfillment by .34 of a satisfaction unit of measurement. The total effects are medium in size, $\beta=.53(.07)$, $95\%CI[.42, .69]$. Finally, this mediated model explains approximately 25% of the variance in competence fulfillment ($R^2=.26$) and approximately 60% of the variance in satisfaction ($R^2=.59$).

These analyses suggest that hypotheses 1-7 are confirmed. However, this research also asks, can these paths be combined to form a more complete understanding of how satisfaction occurs and how needs are fulfilled within a SVC (RQ1). How much unique variance is each variable contributing while controlling for the other variables within the model? Therefore, I now report model fit indices for the hypothesized model (RQ1, see Table 6) and path estimates for the modified model (i.e., the model that is the most theoretically sound and fit the data the best, see Table 7).

Model fit and parameter estimates for the path model without moderation. I conducted path analyses in Mplus 7.4 (Muthén & Muthén, 2015) to test (1) the hypothesized

unmoderated structural model and its individual paths and (2) the hypothesized structural model with moderation and its individual paths. The purpose of performing a path analysis is to determine the adequacy of fit between the hypothesized model and the collected data. When the model achieves good fit the hypothesized relations are considered plausible, while a bad fitting model indicates a rejection of the theorized relations (Kline, 2005).

The hypothesized, unmoderated path model contained twenty estimated parameters (i.e., 11 paths, 2 variances of exogenous variables, 5 disturbances of endogenous variables, and 2 covariances estimated by the model) and twenty-eight free observations, $df_M=8$. However, measurement analyses revealed a single satisfaction outcome variable. The hypotheses reported on, after describing model fit, reflect this change from two outcome variables to one (i.e., a model with 9 paths, 2 variances, 4 disturbances, 1 covariance estimated by the model, and 21 free observations). Furthermore, model modification, when satisfactory fit was not found, was undertaken in order to report upon path coefficients and to identify the most theoretically accurate fit to the data. Later, I report on analyses with the moderator individual filtering, a practice members of SVCs may use to gain better control over their own participation experience within a SVC.

Model fit. Table 6 summarizes the fit indices reported below. In order to understand if the hypothesized structural model showed a satisfactory degree of fit to the data (RQ1), fit indices were examined. Overall, the hypothesized path model demonstrated poor fit with the data, $\chi^2(5, N=212) = 126.39, p=.000, RMSEA=.39, CFI=.78, SRMR= .12$). Four theoretically justified model modifications were undertaken in order to obtain satisfactory model fit. Two additional paths were added, a path from demands-abilities fit to autonomy fulfillment and a path from demands-abilities fit to relatedness fulfillment. Within a self-selection context a

sense that one's abilities fit well with the demands of a SVC environment has connections to the idea of self-efficacy. Although having perceptions that one's abilities match the demands of a SVC does not guarantee that a person believes that he or she will "succeed" in their membership (Bandura, 1977), it does instill greater confidence and belief in one's actions independent of other members. Therefore, it is plausible that demands-abilities fit is positively associated with fulfillment of the need for autonomy. Furthermore, the social nature of a SVC suggests that one of the abilities members may need is the ability to communicate and form relationships with others in an online context (Matzat, 2010). Therefore, people who feel that their abilities fit well with the demands of the SVC are likely to feel greater relatedness fulfillment.

In addition to adding two paths, the residual errors of competence fulfillment and relatedness fulfillment were correlated, as well as the residual errors of competence fulfillment and autonomy fulfillment. Correlating residuals of endogenous variables in the path model indicates that those variables share common error variance. In other words, it is likely that covariates unintentionally left out of the model would help explain the shared residual variance between the needs fulfillment variables. Correlating the residuals of the three needs fulfillment variables is often done in empirical research concerning the satisfaction of basic psychological needs (e.g., Greguras & Diefendorff, 2009; Bozeman & Ellemers, 2009). Since these three needs make up the latent variable, basic psychological needs, and the theory of BPN states that all humans are born with three and only three BPNs, then correlating residuals may also be seen as a way to contain any error associated with the three psychological needs to the overarching latent variable. In this model, the residuals of autonomy needs fulfillment and relatedness needs fulfillment were not significantly

associated. Exclusion of this parameter from the model did not change any of the point estimates of the paths (Cole, Ciesla, & Steiger, 2007). Therefore, in order to free a degree of freedom, the decision was made to only correlate the residuals for the psychological needs that significantly correlated. This resulted in a path model with satisfactory fit, $\chi^2(1, N=212) = 3.90, p=.048, RMSEA=.12, p=.11, CFI=.995, SRMR=.02$ ⁷ (RQ1).

This unmoderated model represents a plausible way to understand motivation and satisfaction within a SVC irrespective of peoples' participation pattern. Next, I continue reporting unstandardized coefficients, and I use non-symmetric bootstrap confidence intervals for significance tests of the indirect effects (see Table 11). Table 7 summarizes the unstandardized path coefficients and significance of the paths in the model, while Figure 4 summarizes the amount of variance explained for each of the endogenous variables. This unmoderated path model (i.e., a model whereby all three paths from person-community fit and demands-abilities fit to the fulfillment of each of the three psychological needs, the direct paths from fit to satisfaction, and all of the paths from each of the needs fulfillment to satisfaction are possible) is meant to guide initial theorizing about motivation within a particular peer production space. In this SVC context, it appears that the indirect path from PC fit to satisfaction through competence fulfillment has the most influence on explaining how members find satisfaction, $\beta=.36(.07), 95\%CI [.23, .50]$. In fact, the PC fit to competence fulfillment (H3b) is the strongest path in this model, $\beta=.65(.09), p=.000$. The next strongest path, from DA fit to relatedness fulfillment, $\beta=.49(.09), p=.000$, was not hypothesized. Interestingly, neither the once significant path from relatedness fulfillment to satisfaction (H6) was significant $\beta=-.07(.05), p=.000$, as revealed by its $95\%CI [-.18, .03]$, nor was the direct relationship from DA fit to satisfaction (H2), $\beta=.12(.07), p=.000, 95\%CI$

[-.01, .26]. The non-significance of the relatedness fulfillment to satisfaction path may be attributable to the high correlation between relatedness fulfillment and competence fulfillment ($r=.68$), as well as the correlating of the residuals between these two endogenous variables ($r=.52$). In other words, competence may be subsuming all of the explained variance, which would affect the path from relatedness fulfillment to overall satisfaction, making it non-significant.

While this unmoderated model is enlightening because it can tell us how needs fulfillment facilitates the impact of different forms of fit on satisfaction, the inclusion of additional variables based on research and theory should lead to a better fitting model and better understanding of motivation processes within SVCs. I suggested that individual filtering moderated the mediated paths from PC fit, to overall community satisfaction, through each of the three needs fulfillment variables. Next, I test the moderated mediation for each of the indirect effects of PC fit to satisfaction through the BPNs. Then, I present model fit indices and parameter estimates for the model with moderation, in order to better understand the unique variance being contributed to the endogenous variables, while controlling for the other variables in the model.

Moderated mediation. The index of moderated mediation is a parameter used to estimate the significance of a moderated mediation. It is the slope of the relationship between the interaction and the moderator and the relationship between the moderator and the outcome. It enables us to understand if the indirect relationship of the exogenous variable to the outcome through a mediator is dependent upon the moderator (Hayes, 2015). Since the index is estimated by the data, it is prone to sampling variability. Therefore, a 95% bootstrap confidence interval is used to determine the significance of the moderation, plus further

probing of the moderation at each of its levels (0=individual filtering not used and 1=use individual filtering), is performed to understand when the indirect effects from person-community fit to satisfaction are moderated by individual filtering. Person-community fit was centered prior to all moderated mediation analyses in order to aid in interpretation of the conditional indirect effects. When person-community fit is centered in the analyses (individual filtering is dichotomous and meaningful, so it was not centered) the probing of the moderated mediation at different levels of the moderator, individual filtering, estimates the conditional effects of individual filtering when PC fit is at the sample mean. Unstandardized effects are reported.

Hypothesis 8 posited that individual filtering would positively moderate the PC fit to autonomy fulfillment path of the indirect effect connecting PC fit to satisfaction through autonomy fulfillment. This moderated mediation produced a significant path from PC fit to autonomy fulfillment, $\beta=.48(.08)$, $p=.000$, however, the path from individual filtering to autonomy fulfillment was not significant, $\beta=.10(.06)$, $p=.109$. In addition, the outcome variable overall satisfaction is significantly influenced by the mediator variable autonomy fulfillment controlling for the independent variable person-community fit, $\beta=.33(.06)$, $p=.000$. The direct effect of PC fit on satisfaction is also significant, $\beta=.50(.06)$, $p=.000$.

The index of moderated mediation was negative and not significant, $\beta=-.04(.04)$, $p=.316$. However, inspection of the conditional indirect effect when individual filtering is present, $\beta_{IF1}=.12(.04)$, 95% $CI[.06, .21]$, and when it is not present, $\beta_{IF0}=.17(.05)$, 95% $CI[.09, .27]$, suggests that the indirect effect is dependent upon individual filtering, however, this effect is small and negative (see Figure 5). It dampens the indirect effect of PC fit to satisfaction through autonomy fulfillment both when individual filtering is utilized and when

it is not. That is, both when members use and do not use individual filtering there is a positive indirect effect of PC fit to satisfaction through autonomy fulfillment, conditioned on individual filtering. H8 is not supported due to the negative slope of the moderated mediation. Finally, this moderated mediation model explains approximately 21% of the variance in autonomy fulfillment ($R^2=.21$) and approximately 50% of the variance in satisfaction ($R^2=.50$).

Hypothesis 9 posited that individual filtering would positively moderate the PC fit to relatedness fulfillment path of the indirect effect connecting PC fit to satisfaction through relatedness fulfillment. This moderated mediation produced a significant path from PC fit to relatedness fulfillment, $\beta=.44(.12)$, $p=.000$, and a significant path with a larger effect from individual filtering to relatedness fulfillment, $\beta=.64(.15)$, $p=.000$. In addition, the outcome variable overall satisfaction is significantly influenced by the mediator variable relatedness fulfillment controlling for the independent variable person-community fit, $\beta=.20(.05)$, $p=.000$. The direct effect of PC fit on satisfaction is also significant, $\beta=.57(.06)$, $p=.000$.

The index of moderated mediation was positive but not significant, $\beta=.04(.04)$, $p=.219$. However, inspection of the conditional indirect effect when individual filtering is present, $\beta_{IF1}=.13(.04)$, 95% $CI[.06, .22]$, and when it is not present, $\beta_{IF0}=.09(.03)$, 95% $CI[.03, .16]$, suggests that the indirect effect is conditioned upon individual filtering (see Figure 6). It increases the strength of the relationship of the indirect effect of PC fit to satisfaction through relatedness fulfillment. This effect is strongest for people in the upper part of the confidence interval. This suggests that H9 is supported. Finally, this moderated mediation model explains approximately 28% of the variance in relatedness fulfillment ($R^2=.28$) and approximately 54% of the variance in satisfaction ($R^2=.54$).

Hypothesis 10 posited that individual filtering would positively moderate the PC fit to competence fulfillment path of the indirect effect connecting PC fit to satisfaction through competence fulfillment. This moderated mediation produced a significant path from PC fit to competence fulfillment, $\beta=.86(.09)$, $p=.000$, and a significant path with a smaller effect from individual filtering to competence fulfillment, $\beta=.34(.13)$, $p=.007$. In addition, the outcome variable overall satisfaction is significantly influenced by the mediator variable competence fulfillment controlling for the independent variable person-community fit, $\beta=.50(.06)$, $p=.000$. The direct effect of PC fit on satisfaction is also significant, but approximately half the size, $\beta=.30(.06)$, $p=.000$.

The index of moderated mediation was significant and negative, $\beta=-.13(.06)$, $p=.029$, indicating that the slope of the indirect effect of PC fit to satisfaction through competence fulfillment, as you move from 0 to 1 on individual filtering, decreases by .13. Inspection of the conditional indirect effect when individual filtering is present, $\beta_{IF1}=.29(.06)$, 95% CI [.19, .41], and when it is not present, $\beta_{IF0}=.43(.06)$, 95% CI [.31, .56], reveals both as significant paths (see Figure 7). That is, both when members use and do not use individual filtering the indirect effect of PC fit to satisfaction through competence fulfillment is dependent upon independent filtering. Finally, this moderated mediated model explains approximately 43% of the variance in competence fulfillment ($R^2=.44$) and approximately 60% of the variance in satisfaction ($R^2=.60$).

Hypothesis 11 posited that being named by those using individual filtering as “information sources”, would negatively moderate the PC fit to autonomy fulfillment path of the indirect effect connecting PC fit to satisfaction through autonomy fulfillment. Thirty-three people did not fill in their name on the survey, therefore, these cases were dropped from

this analysis ($N=179$). From the remaining cases, 23 members were identified who were named as information sources and who took the survey. Thus, conditional mediation effects are examined for people not named ($N=156$) and for people named ($N=23$) as information sources.

This moderated mediation produced a significant path from PC fit to autonomy fulfillment, $\beta=.50(.08)$, $p=.000$, and a non-significant path from information source to autonomy fulfillment, $\beta=.07(.22)$, $p=.746$. Being named as an information source does not significantly impact autonomy fulfillment. In addition, the outcome variable overall satisfaction is significantly influenced by the mediator variable autonomy fulfillment controlling for the independent variable person-community fit, $\beta=.30(.07)$, $p=.000$. The direct effect of PC fit on satisfaction is also significant, $\beta=.46(.07)$, $p=.000$.

The index of moderated mediation was non-significant and negative, $\beta=-.10(.07)$, $p=.143$. Inspection of the conditional indirect effect when information source is present reveals a non-significant effect, $\beta_{ISI}=.05(.07)$, 95% CI[-.04, .17], the indirect effect is only dependent upon being named an information source for people in the upper bounds of the confidence interval. When members are not named as information sources a significant effect is found, $\beta_{ISO}=.15(.04)$, 95% CI[.07, .22] (see Figure 8). That is, only when members are not named as information sources is the indirect effect of PC fit to satisfaction through autonomy fulfillment dependent upon being named an information source; and this only impacts people in the upper bound of the confidence interval. However, the impact is trivial. Therefore, this partial support for hypothesis 11 is likely not experienced by members. Finally, this moderated mediated model explains approximately 19% of the variance in autonomy fulfillment ($R^2=.19$) and approximately 43% of the variance in satisfaction ($R^2=.43$).

From these moderated mediation analyses, it appears that the moderator individual filtering helps increase the variance explained the most for the direct and indirect paths connecting person-community fit to satisfaction through relatedness fulfillment ($\Delta R_{RF}^2=.067$, $\Delta R_{Satisfaction}^2=.089$). It was also the only moderation that had a positive slope. Both of the moderated mediations with individual filtering for competence fulfillment and relatedness fulfillment were negative. Being named an information source does not meaningfully impact the indirect path from PC fit to satisfaction through autonomy fulfillment (H11). Therefore, the rest of the analyses will not include this moderator. Next, I finish this results section by presenting the results of the model fit indices for the full model with the moderator individual filtering, in order to understand how the moderated and mediated paths function in conjunction with each other.

Model fit and parameter estimates for the full moderated mediation path analyses. Table 8 summarizes the fit indices for the analyses reported below. Figure 9 shows the statistical depiction of the moderated mediation model, along with path significance and amount of variance explained. The moderated mediation model initially demonstrated poor fit with the data, similar to the unmoderated model previously reported. Performing the same model modifications significantly improved model fit, however, the inclusion of the moderator added a new theoretically justified path that was not previously specified: moderation of the direct path from PC Fit to satisfaction. The use of individual filtering by members of a SVC could plausibly, positively moderate the direct relationship between person-community fit and satisfaction for two reasons. First, people who have a technique to manage the copious amount of information that is sent to members of SVCs may feel themselves a better match for this type of professional development environment. Second,

members of SVCs who are able to mentally note useful contacts within the group may themselves feel better matched to the community due to a sense of familiarity and/or trust. Inclusion of the moderation of this direct path resulted in a model that fit the data well, $X^2(1, N=212) = 2.68, p=.101, RMSEA=.08, p=.190, CFI=1.0, SRMR=.01$). This final model estimated 19 paths, 4 variances of exogenous variables, 6 correlations of the exogenous variables, 2 correlated residuals, and 4 disturbances (see Figure 9). Table 9 summarizes the path coefficients and the 95% confidence intervals for the complete moderated mediation model. Table 12 summarizes the analyses of the moderated mediations tested and the unmoderated indirect effects in the model. Next, I report on the hypothesized relations, as well as the paths added through model modification, using unstandardized coefficients.

Person-community fit and satisfaction. There were three predicted mediated paths from PC fit to satisfaction through each of the three BPNs. Each of these mediated paths is predicted to be moderated by individual filtering. In addition, the direct path from PC fit to satisfaction, is hypothesized as positive and significant.

Mediation through autonomy fulfillment. The hypothesized (H3a) path from PC fit to autonomy fulfillment was significant ($\beta=.36(.11), p=.001$), as was the hypothesized (H5) path from autonomy fulfillment to satisfaction ($\beta=.18(.05), p=.001$). Individual filtering did not significantly predict autonomy fulfillment, ($\beta=.22(.13), p=.085$). The indirect effect through autonomy fulfillment was significant, but trivial, $\beta=.06(.03), 95\%CI[.02, .12]$. These results mimic the earlier findings for this moderated mediation albeit with lower coefficients, which reflects the impact of controlling for the effects of the other variables in the model.

The index of moderated mediation was not significant, $\beta = -.03(.02)$, 95%CI[-.08, .02]. However, inspection of the moderated mediation at both levels of the moderator suggests the indirect effect is conditioned on individual filtering only among members who do not use individual filtering to cope with the stream of information that comes with being a member of a SVC. A significant, though trivial, indirect effect was observed of PC fit on satisfaction, through autonomy fulfillment, conditioned on individual filtering, $\beta = .06(.03)$, 95%CI[.02, .12]. Otherwise, for members who do use individual filtering the indirect effect is not significant, $\beta = .04(.02)$, 95%CI[.00, .09] (see Figure 10).

Mediation through relatedness fulfillment. The hypothesized (H3c) path from PC fit to relatedness fulfillment was not significant, $\beta = .11(.13)$, $p = .399$, while the hypothesized (H6) path from relatedness fulfillment to satisfaction was significant but negative, $\beta = -.11(.05)$, $p = .039$. Individual filtering, though not hypothesized did significantly predict relatedness fulfillment, $\beta = .68(.14)$, $p = .000$. The indirect effect through relatedness fulfillment was not significant, $\beta = -.01(.02)$, 95%CI[-.06, .02]. These results are slightly different from those obtained through the unmoderated mediation model. The path from relatedness fulfillment to satisfaction (H6), which was previously non-significant, is now significant and negative. Furthermore, the path from PC fit to competence fulfillment (H3c), which was previously positive and significant, is now negative and not significant. Explanation for these statistical differences, again, may be explained by the large amount of variance shared with competence fulfillment and the specification of the correlation of relatedness fulfillment's residual error with the residual error of competence fulfillment. Competence fulfillment is claiming all of the explained variance, leaving little explanatory power for relatedness fulfillment. Therefore, it is unlikely that the negative path from

relatedness fulfillment to satisfaction should be interpreted theoretically, instead, it appears to be a statistical byproduct of measurement error.

Given the non-significance of the PC fit to relatedness fulfillment path, it is not surprising that the index of moderated mediation was not significant, $\beta = -.02(.02)$, 95%CI[-.07, .01]. Inspection of the moderated mediation for members who use individual filtering, $\beta = -.03(.02)$, 95%CI[-.09, -.00], and for members who do not use individual filtering, $\beta = -.01(.02)$, 95%CI[-.06, .07], support this finding (see Figure 11).. While this negative moderated mediation is different in sign from the moderated mediation analyzed without the other needs fulfillment and fit variables in the model, its size and the lack of a significant path from PC fit to autonomy fulfillment suggest that its role is minimal. H9 is no longer supported.

Mediation through competence fulfillment. The hypothesized (H3b) path from PC fit to competence fulfillment was significant, $\beta = .72(.11)$, $p = .000$, as was the hypothesized (H7) path from competence fulfillment to satisfaction, $\beta = .50(.07)$, $p = .000$. Individual filtering, though not hypothesized did significantly predict competence fulfillment, $\beta = .36(.16)$, $p = .004$. The indirect effect through competence fulfillment was significant, $\beta = .36(.07)$, 95%CI[.23, .50]. Similar to the unmoderated model, this is the strongest indirect path to satisfaction within the model.

The index of moderated mediation was significant but negative, $\beta = -.14(.06)$, 95%CI[-.27, -.02]. Inspection of the moderated mediation at both levels of the moderator suggests that both among members who use individual filtering, $\beta = .22(.06)$, 95%CI[.12, .33], and among members who do not use individual filtering, $\beta = .36(.07)$, 95%CI[.23, .50], there is a

significant moderation of the indirect relationship between PC fit and satisfaction through competence fulfillment (see Figure 12). Since the index of moderated mediation is negative, it decreases the magnitude of the slope of the indirect effect as members move from 0 to 1 on individual filtering, making the indirect effect from PC fit to satisfaction through competence fulfillment smaller (i.e., flatter slope) for members who use individual filtering.

Moderation of the direct path from PC fit to satisfaction. Although not hypothesized, the direct path connecting PC fit and satisfaction, was significantly moderated by individual filtering when individual filtering was present, $\beta_{IF1}=.29(.09)$, 95% CI [.11, .45]. This direct path was not conditioned on individual filtering when members did not use it, $\beta_{IF0}=.09(.09)$, 95% CI[-.08, .26] (see Figure 12). Neither the direct path from individual filtering $\beta=.15(.10)$, $p=.192$, nor the direct path from PC fit to satisfaction (H1), $\beta=.09(.09)$, $p=.33$, were significant with this moderation added to the model. This modification to the model changed the once significant direct path from PC fit to satisfaction (H1) non-significant, and the once non-significant path from DA fit to satisfaction significant, $\beta=.14(.07)$, $p=.046$. Overall, person-community fit had a total effect on satisfaction of $\beta=.50(.09)$, 95% CI [.33, .66] with an almost as large total indirect effect of $\beta=.41(.06)$, 95% CI [.29, .53]. Next I report on the demands-abilities part of the model.

Demands-abilities fit and overall community satisfaction. Support was found for H2, a positive, direct relationship between DA Fit and Satisfaction ($\beta=.14(.07)$, $p=.046$). The fit-satisfaction path is well established in organizational fit research (Kristof-Brown, et al., 2005), this small effect suggests support for this theoretical link. In addition to being directly related to overall community satisfaction, demands-abilities fit was hypothesized to be indirectly related to satisfaction through competence fulfillment. The hypothesized (H4),

positive path between DA Fit and competence fulfillment was significant ($\beta=.22(.09)$, $p=.01$), as was the hypothesized (H7), positive path between competence fulfillment and satisfaction ($\beta=.50(.07)$, $p=.000$). The indirect effect through competence fulfillment is moderate ($\beta=.11$, 95%CI [.03, .22]).

Although not hypothesized, demands-abilities fit was also found to be indirectly related to satisfaction through (1) relatedness fulfillment ($\beta=-.06(.03)$, 95%CI [-.11, -.01]), and through (2) autonomy fulfillment ($\beta=.04(.02)$, 95%CI [.01, .09]). Both of these indirect effects are small, but significant. Inspection of the direct paths that compose the negative indirect effect through relatedness fulfillment reveals a positive relationship between demands-abilities fit and relatedness fulfillment ($\beta=.51(.09)$, 95%CI [.33, .69]), and a negative relationship between relatedness fulfillment and satisfaction ($\beta=-.11(.05)$, 95%CI [-.22, -.01]). Similar to previous analyses involving this path from relatedness fulfillment to satisfaction, the negative relationship is likely a statistical consequence of the large amount of variance shared with competence fulfillment. In addition, the small, positive indirect effect through autonomy fulfillment is composed of two positive direct paths from demands-abilities fit to autonomy fulfillment ($\beta=.22(.08)$, 95%CI [.04, .41]) and from autonomy fulfillment from satisfaction ($\beta=.18(.05)$, 95%CI [.08, .28]). Overall, demands-abilities fit has a total effect on satisfaction of $\beta=.23(.07)$, 95% CI [.10, .36], with a smaller total indirect effect, $\beta=.09(.05)$, 95% CI [.00, .18].

Individual filtering and overall community satisfaction. Individual filtering was only hypothesized as an interaction, moderating the relationship between person-community fit and each of the three psychological needs. However, analyses revealed individual filtering had a significant direct relationship with relatedness fulfillment ($\beta=.68(.14)$, $p=.000$) and

competence fulfillment ($\beta=.36(.12)$, $p=.004$). Individual filtering, in fact, has a total effect, $\beta=.27(.11)$, 95% CI [.06, .48] similar in size to that of demands-abilities fit, with total indirect effects, $\beta=.14(.07)$, 95% CI [.01, .28].

Summary of structural analyses. The statistical analyses above reveal the modified versions of both the unmoderated mediation and moderated mediation models as a plausible way to explore the process or relationships associated with a satisfied SVC membership, without privileging how much or how a member chooses to participate/contribute to the peer production effort. Instead, these models frame member satisfaction as being directly associated with members' ability to fulfill their three basic psychological needs of autonomy, relatedness, and competence (i.e., the motivation behind their membership) and as being indirectly (and directly) related to members' ability to "fit-in" or self-select into the community that best meets the members' needs and skills. Overall, the final moderated mediation model accounted for nearly two-thirds of the variance in satisfaction with the community experience ($R^2=.65$), and almost half of the variance in competence fulfillment ($R^2=.46$). Autonomy fulfillment ($R^2=.24$) and relatedness fulfillment ($R^2=.37$) had smaller, but still meaningful amounts of variance explained. While the amount of variance explained throughout the statistical analyses above remained fairly stable, there were a few paths within the model that changed significance and or direction of effect throughout the analyses: (1) paths involving RF and (2) the direct paths from fit to satisfaction.

The paths involving relatedness fulfillment-- including the path from PC fit to relatedness fulfillment (H3c), relatedness fulfillment to satisfaction (H6), and the conditional indirect effect through relatedness fulfillment (H9)-- both show significant path effects when tested separately, but these paths become non-significant (H3c) or non-significant and

negative (H6, H9) when analyzed in a full model with the rest of the variables under study. This is likely occurring because of the high correlation between relatedness fulfillment and competence fulfillment and the correlated residuals of these variables in the overall moderated mediation model. Competence fulfillment is subsuming most of the variance explained by relatedness fulfillment when these variables are analyzed simultaneously, leaving little remaining for relatedness fulfillment to explain satisfaction. Hence, indirect paths through relatedness fulfillment are unstable and interpretation of these paths within the larger moderated mediation model must bear this in mind.

The direct effects from PC fit and DA fit to satisfaction are also unstable when tested within the full path models with all variables of interest. The moderation of the direct path from PC fit to satisfaction (H1) changes the direct path to non-significant. The direct path is conditioned on individual filtering when members use individual filtering, but not when members do not use individual filtering. This means that the path from PC fit to satisfaction, when members use individual filtering, is completely moderated by individual filtering, as the path from individual filtering to satisfaction is also non-significant.

The direct path from DA fit to satisfaction (H2), becomes non-significant in the overall mediation model, likely due to the addition of paths from DA fit to both autonomy fulfillment and relatedness fulfillment (i.e., these new paths subsume the explained variance from the direct path). Then, when individual filtering is introduced in the overall mediation model it re-enables the significance of this direct path by contributing its own variance to the paths to the BPNs. Thus, interpretation of the direct paths from PC and DA fit to satisfaction should bear in mind the ease with which covariates appear to impact these effects. Although

these paths were unstable throughout the analyses, there were some paths that consistently explained members' satisfaction within this SVC of professionals.

Within the overall moderated mediation model, the strongest direct and indirect path to satisfaction was through competence fulfillment. Even when the indirect path from PC fit to satisfaction through competence fulfillment is conditioned on individual filtering, a negative moderation, the conditional indirect effects are larger than any other indirect effects in the model (see Table 12). In fact, this moderated mediation is the only one in the model with any meaningful effect. The conditional indirect path through autonomy fulfillment from PC fit to satisfaction is only significant for people who do not use individual filtering, and it is of trivial size. The conditional indirect path through relatedness fulfillment from PC fit to satisfaction is not significant for people who use or for people who do not use individual filtering.

The strongest path from DA fit to satisfaction is also through competence fulfillment (see Table 12), However, DA fit has the strongest relationship with relatedness fulfillment (see Table 9). Thus, it is possible that this indirect effect would have been larger if relatedness fulfillment had a more reliable measure with higher divergent validity from competence fulfillment. The same may be said about individual filtering.

The strongest path from individual filtering to satisfaction is also through competence fulfillment. In fact, this effect is slightly larger than the indirect effect from DA fit (see Table 12). Individual filtering also has its strongest relationship with relatedness fulfillment. Hence, individual filtering acts as an exogenous variable and as a moderator in this model, and it is not (significantly) directly related to satisfaction.

Finally, there are noteworthy relations involving autonomy fulfillment. The residuals of autonomy fulfillment did not significantly correlate with the residuals of relatedness fulfillment, and the correlation of the residuals with competence fulfillment was much smaller than the correlation of the residuals with competence fulfillment. Thus, while relatedness fulfillment and competence fulfillment are highly related, autonomy fulfillment is operating as a more distinct psychological need. However, autonomy fulfillment had the smallest amount of variance explained ($R^2=.29$), and it had the lowest measurement reliability ($\alpha=.72$). Still, the path coefficients leading into and out of autonomy fulfillment were consistently significant, if small. The strongest predictor of autonomy fulfillment was PC fit, individual filtering did not significantly predict autonomy fulfillment, and it only conditioned the indirect relationship from PC fit for those who did not use individual filtering.

Discussion

SVCs, this research has shown, are not single platform interaction spaces with a discrete set of desires motivating members to actively contribute. Instead, most SVCs are a collection of online and offline interaction spaces that members of varying tenure and experience piece together to personalize the SVC environment to their needs (e.g., Cranfield & Yoong, 2009; Thompson, 2011). Yet, a good deal of research regarding SVCs, in particular, or peer production, more generally, still attempt to isolate participation based on type (e.g., Budhathoki & Haythornthwaite, 2009) or location (e.g., Müller-Seitz & Reger, 2009; Oh & Syn, 2015) and associate these with specific motivations. However, the over-time impact of this type of research is limited in a communication and information environment that is constantly evolving. For example, when KM4Dev began in 2000 professionals interested in joining had one online platform to consider. Today, professionals interested in joining may choose to register on more than six different online platforms. Therefore, this research developed and tested a model of member satisfaction within SVCs of professionals (in particular, which may also be applied to peer productions enterprises in general) based on the member self-selection process that does not rely upon idiosyncratic definitions of participation or motivation. Next, I discuss the major practical and theoretical implications of this research.

Practical Implications

Practically speaking, this model provides a relevant way of interpreting member satisfaction, participation, and motivation within a SVC no matter the current social media environment. Foregrounding member self-management and conceptualizing participation as

a fit finding process alleviates the need to define specific tasks or roles members may or may not take on with in a model of satisfaction. This is especially helpful in an ever-evolving technological environment that enables new and different ways to contribute all of the time. By foregrounding the self-management members undertake when they choose to join a SVC, this model offers members a way to understand how their own self-selection is connected to the fulfillment of their BPNs, which can assist members as they actively manage an ever-changing SVC environment.

At the same time, the model offers SVCs, as a whole, a way to understand the self-selection, needs fulfillment, and satisfaction of its membership, conditioned on specific contexts. For example, within KM4Dev, we learned that satisfaction obtained directly from person-community fit is facilitated by individual filtering and satisfaction obtained indirectly from person-community fit through competence fulfillment is dampened by individual filtering. It would appear that the use of individual filtering within a SVC primes participants to think about themselves through a social comparison lens. Creating a cognitive map of valued information sources could cause participants to (sub)consciously compare their own competence to their valued information sources, which might lead them to judge their own competence as deficient (Laut, Cappa, Nov, & Porfiri, 2017), thereby decreasing their sense that their need for competence was fulfilled through membership in the SVC.

For participants within SVCs who take on organizing roles it is important not to think of this effect as bad or negative. Many professionals choose to join a SVC for professional development (Cranefield & Yoong, 2009), and overall this moderation does not stifle people's ability to fulfill their need for competence. In other words, being part of a group where expertise varies can enable practitioners to better understand their own professional

aptitude within a larger pool of similarly skilled people, whether or not they actively engage in individual filtering. Although this effect is larger for members who actively use this information sorting technique, this does not mean that those who use individual filtering are unable to fulfill their need for competence. In fact, individual filtering directly and positively relates to competence fulfillment, and it has a significant, but small, indirect effect on satisfaction. Furthermore, the use of individual filtering could be interpreted as giving professionals a more global understanding of their own competence in relation to those they respect within their field.

Therefore, this practice need not be discouraged. Having a general sense of who knows what within a network can offer benefits beyond a healthy self-awareness, such as a direct and positive impact on members' ability to fulfill their needs for relatedness. In other words, it is useful for people who willingly work to maintain and grow a SVC, as well as the general membership, to know that the use of individual filtering significantly impacts members' ability to fulfill their basic psychological needs, especially their need for relatedness. Using a practice that highlights one's depth of knowledge of the SVC membership appears to enhance a member's feelings of relatedness and satisfaction. This participation management technique can personalize how a member relates to the information produced from the SVC (e.g., Cook & Wiebrands, 2010; Liang et al., 2014).

Furthermore, the ability to tailor the model through the addition of conditional effects or predictors turns a primarily descriptive model into a tool that communities might use to track change over time or change in relation to a specific intervention. At the community level, the model enables SVCs to understand over-time member satisfaction in relation to the predominant needs fulfilled by engaging with the community. The ability to examine

conditional indirect effects enables the interrogation of some of the assumptions research related to motivation within peer production enterprises can make.

For instance, the research looking at motivations and participation within peer productions often privilege amount of participation, assuming that more participation is better or that people who participate more often are different from people who do not (e.g., Budhathoki & Haythornthwaite, 2009; Raban, 2008). This model can directly test this assumption by posing frequency of participation as a moderator of the fit-needs fulfillment link and/or fit-satisfaction link. If frequency of participation does matter for satisfaction then, this conditional indirect effect should produce statistically significant differences in member satisfaction between highly active and highly inactive participants. In addition, communities can use the model to track change over time. Over time, if frequency of participation does impact members' ability to fulfill their needs and ultimately their satisfaction, then as members' amount of participation changes the model should show demonstrable differences in the effect from fit to member satisfaction when conditioned directly and indirectly on frequency of participation.

In fact, communities might further exploit the conditional knowledge offered by this model by studying change over time in response to a specific member-organized intervention. For example, when considering members' dissatisfaction with their self-selection and/or their ability to self-select at all, Robles Morales, Antino, De Marco, and Lobera (2016) find the participatory divide a worthwhile construct to consider. In a global community of practitioners involved in international development, one can imagine a potential divide due to digital skill differences, access, and importance placed on this form of professional connection by co-located peers. Thus, using this model to measure member fit,

BPN fulfillment, and satisfaction before and after an intervention, designed to make the self-selection process viable for members typically disenfranchised by their ICT and/or organizational environment, allows community members to look for measurable differences to assist them with designing a space that maximizes all members' ability to participate when/how they choose.

Thus, by explaining member satisfaction with the community experience through members' own self-selection process this model seeks to privilege the study of those who actively manage what they consume, how they consume it, and the terms of any productive action they choose to take (Benkler, 2006). By focusing on professionals who call themselves members of a SVC, people who have formally registered, Benkler's (2006) "users" or potential producers, assumptions of activity or inactivity of members is not as important. Instead, by recognizing that users are people who actively manage their participation questions regarding motivation can shift from a focus on understanding what motivates participation to an understanding of how actively managing one's participation, for example, impacts members' ability to fulfill their motivations (defined here as members' basic psychological needs). The analyses above support this approach, as this model is able to explain almost two-thirds of the variance in satisfaction for the KM4Dev community. For members of KM4Dev, much of that satisfaction is explained by their ability to fulfill their need for competence, the final practical implication.

Studying member motivation in terms of the fulfillment of members' three basic psychological needs offers SVCs a way of understanding member satisfaction and fit in relation to the fundamental needs driving human action (Deci & Ryan, 2000). In fact, by embedding the fulfillment of the three psychological needs within a larger model of

satisfaction, members of SVCs are able to understand needs fulfillment in relation to one another. Thus, Thompson's (2011) assertion that professionals involved in SVCs participate in ways they expect will fulfill their needs, and that not all professionals enter SVCs with the same needs is addressed by this model. By studying the fulfillment of needs simultaneously, members of SVCs can gain a deeper understanding of how fulfillment of member needs function in relation to one another (e.g., which needs are most likely to be fulfilled, how members utilize the fit finding process for different ends). Hence, the analyses reveal that members of KM4Dev are less likely to fulfill their need for autonomy than their need for competence. However, there are members whose fit finding process enables the fulfillment of the need for autonomy. Given that the peer production organizing context is based on user autonomy (Benkler, 2001, 2006), it is interesting that members don't appear to strive for greater autonomy. Instead, the SVC environment, the interaction spaces that can provide rich learning experiences (i.e., enable the fulfillment of the need for competence), appear to override users' need for autonomy in favor of connections that could limit autonomy but enable deeper learning (e.g., reading posts as they are pushed to one's inbox). Still, there are users who are able to fulfill their need for autonomy, and by identifying those people, members of KM4dev can probe this model's findings through member interviews and/or scrutinize traces of member participation (i.e., log-in information, contributions over-time) to better understand the revealed fulfillment of the need for autonomy (or relatedness or competence).

Therefore, in order for members of SVCs to better understand how the peer production environment they are co-creating produces satisfied participants, a connection often associated with SVC longevity or sustainability (e.g., Dahlander & O'Mahony, 2011;

Fang & Neufield, 2009), this model emphasizes members' self-management of their own participation, and the possibility that this management can fulfill more than one basic psychological need. This, in turn, enables participants to scrutinize the design of their peer production (e.g., where people participate, in what ways members contribute) and the social norms (e.g., frequency of contribution among members, cognitive heuristics used by members to manage their involvement) that have developed in relation to the model's findings through the addition of a moderator to the model. These practical implications also touch upon the model's theoretical implications.

Theoretical Implications

The findings from this study reveal initial support for the explanatory power this moderated mediation model of satisfaction can provide. By conceptualizing member self-selection as finding person-community and demands-abilities fit and motivation as the fulfillment of ones' basic psychological needs, this model is able to explain approximately two thirds of the variance in satisfaction. Statistical support of this model legitimates the premise that when studying social psychological constructs such as fit and motivation within a SVC, embedding peer production organizing principles within the assumptions of the research can help provide greater explanatory power.

For example, the choice to include the fulfillment of members BPNs as the motivational component of this model stemmed directly from the organismic dialectical approach from which it was based. Theoretically, by including the fulfillment of BPNs in this model, members' tendency to better themselves and actively work to integrate new experiences into a sense of personal and interpersonal coherence (Deci & Ryan, 2000) is

evident. In contrast, studies that ask what motivates members to contribute in specific ways to a SVC belie this sensibility in favor of a more hedonic-based motivational approach (i.e., minimize pain, increase gain) (e.g., Anthony, Smith, & Williamson, 2009), deemphasizing the peer production ethos embedded within community organizing processes.

Therefore, this model adds to the literature actively thinking about the nuances that a peer production ethos brings to organizing. For instance, Halfaker, et al. (2011) study the influence the revision of newcomer edits to Wikipedia articles has on newcomer contributions over time. They find revision by reputable, experienced editors to newcomer edits to be the most damaging (as opposed to revision by bot or less experienced editors). Newcomers whose edits were reverted by these folks were far less likely to contribute again. In terms of the model tested here, revision of edits could be thwarting the newcomer's ability to fulfill their need for competence, or it could indicate a certain alienation (i.e., inability to fulfill the need for relatedness) as the member is unable to solidify his/her own edit history within an articles' web of authors. However, the practice of reverting edits over time had the larger effect of increasing the quality of contributions to the encyclopedia. Hence, the authors argue that one way to improve newcomer retention is to actively consider the effect of the revision process on newcomer contributions, sacrificing immediate article consistency for over-time learning processes that more heavyweight contributions to a SVC can require. In other words, efficiency in peer production cannot be conceptualized the same as in a top-down organizing structure because efficiency within a peer production is grounded in user autonomy (i.e., self-selection) (Benkler, 2006), which occurs on a different timeline than the efficiency dictated by top-down mandates.

Furthermore, the use of the BPNs to understand member motivation and the conceptualization of participation as PC and DA fit does not render the question what motivates members to participate obsolete. It does, however, alter its focus. The inclusion of the BPNs requires that researchers more precisely label “motivations” other than the BPNs as wants or desires, not needs or motivations. These wants and desires may be fulfilled through the fit finding process, such as when creative pleasure drives a member to be involved in co-creation processes (i.e., DA fit; Füller, Jawecki, & Mühlbacher, 2007) or a sense of belonging drives member involvement (i.e., PC fit; Müller-Seitz & Reger, 2009). Additionally, the inclusion of wants or desires may be examined as a moderator, conditioning the indirect effect of fit on satisfaction. Finally, defining participation as a more general fit finding process moves the question away from directly connecting specific forms of motivation to specific forms of participation or a simple dichotomy of participation. Instead of asking what motivates a person to participate, a more precise question might be when or why do professionals begin managing their involvement (i.e., actively work to find fit) within a SVC?

Related to these conceptual choices of defining self-selection as fit and motivation as fulfillment of the three BPNs, the initial support found for this model may also signify support for the parsimony that this allows. This model structures the comparison of different peer production enterprises based on a peer production ethos, which could benefit studies similar to Müller-Seitz and Reger’s (2009) comparison of the motivations present in different open source environments. Additionally, over-time use of this model in peer production research, such as comparing both members within the same SVC or comparing members of different SVCs, would enable a more systematic understanding of the self-selection,

motivational, and satisfaction-based similarities and differences present in diverse forms of peer production (e.g., heavyweight v lightweight).

Structurally, this model has one additional, theoretical implication. The ability of the model to integrate conditional effects into our understanding of member satisfaction expands upon the model's explanatory power. Theoretically, this should allow researchers to explore how contextual factors within a SVC, such as socialization tactics (Shriver, Nair, & Hofstetter, 2013) aspects of member social networks (Liang, et al., 2014) or location of participation (Oh & Syn, 2015) do or do not differentiate members' ability to fulfill their BPNs and feel satisfied. In this study, the role of individual filtering and the impact of being named by someone as a valued information source were explored in this way. Although, the sample size of valued information sources was small and its role as a moderator was non-significant, the use of individual filtering, a participation management tool, did significantly condition some of the effects of PC fit on satisfaction. It also uncovered an un-hypothesized relation between individual filtering and both relatedness and competence fulfillment. Hence, the model initially supported here may be expanded upon to better account for member differences within different peer production environments. Plus, over-time investigation of different moderating factors would build a compendium of conditional effects relevant (and not relevant) to finding satisfaction within peer production contexts.

Limitations and Directions for Future Research

This research is based on the collection of survey responses from a volunteer sample at one point in time. Choices such as these were made in order to overcome the challenges

associated with collecting data from a SVC, yet consideration of how these choices might affect the study findings is important. I outline these below.

Although studying online communities through one-off surveys is not ideal (Butler, 2001), and reliance upon a voluntary sample is less ideal, it is often the case that it is difficult (if not impossible) to piece together an accurate demographic understanding of who comprises a SVC. Thus, this research sought to overcome the deficiencies of this data collection method by analyzing a correlational model and framing requests for participation in different ways over the course of three months to attract the largest breadth of members possible.

Another limitation involved our understanding of the fulfillment of our BPNs within a peer production context. Conceptualizing motivation within SVCs as the quest to fulfill ones' basic psychological needs deserves greater research attention. It is a parsimonious conceptualization that embeds the peer production ethos into our understanding of motivation. Still, the amount of residual error in the analysis of these constructs and the need to correlate the residual errors of both autonomy fulfillment with competence fulfillment and competence fulfillment with relatedness fulfillment in order to produce a model that fits the data suggests the need to explore the BPNs through a structural equation model with measurement analysis. This could afford a better understanding of this residual error and how it is tied to measurement or structural deficiencies. Additionally, this research revealed the lack of our understanding of how autonomy fulfillment operates within a peer production, further supporting the need to better refine measures written for organizational contexts with the spirit of the peer production context in mind.

Related to this, the interconnection of the relatedness and competence fulfillment constructs within this sample limited our ability to understand the true effects of relatedness fulfillment within the model. The ability to fulfill one's need for relatedness through membership in a SVC, where some members may never meet other members in a face-to-face setting, is an impressive need to be able to fulfill in such a setting. Since it is unlikely that everyone who self-selects into a SVC is looking to fulfill this need, research that is able to isolate who is most likely fulfilling this need (e.g., people who attend face-to-face events, people who actively listen to the conversation) and why could uncover meaningful differences in how members utilize their membership within their SVC.

Finally, this research only explored two forms of fit as independent variables and the role of individual filtering as a moderator to better explain the indirect effects of fit on member satisfaction. The addition of relevant covariates could reduce the significance of the residual error correlation between the BPNs. Also, the uncovering of the use of individual filtering as an additional independent variable that directly impacts the fulfillment of the needs for competence and relatedness begs the question, could individual filtering be a proxy for some other form of fit that was not measured? For instance, person-group fit is broadly defined as compatibility among group members (e.g., work-group, team) (Adkins, Ravlin, & Meglino, 1996). An adaptation of this form of fit to the peer production context may better explain constructs like relatedness fulfillment in the theoretical language (i.e., fit) of this model, as opposed to the presence of a specific practice (i.e., individual filtering) claiming this explained variance. Similarly, exploration of other moderators, beyond individual filtering, could help bolster theoretical and practical understanding of how the indirect relationships from fit to satisfaction operate when conditioned on anything from participation

management practices to the role of external stimuli (e.g., support from one's supervisor in active participation during work hours, role of life events such as having a child). Thus, future research that seeks to (dis)confirm this model should also consider including other covariates that are relevant to the particular peer production context under study.

Conclusion

When people become members of a SVC, the different ways of contributing and personalizing the collection of online interaction spaces and stream of information associated with these spaces is typically not immediately apparent. In addition to learning the technical nuances of contributing, members are also faced with decoding the social norms. For these reasons, new members often contribute less than longer tenured members (Choi et al., 2010). Yet, the plethora of interaction platforms, and ways of participating is not only confusing for newcomers to SVCs (or peer productions more generally), treating these different spaces and ways of participating as discrete choices connected to specific motivations or actions (Füller, Jawecki, Mühlbacher, 2007; Müller-Seitz & Reger, 2009) can also muddle our understanding of the larger social and psychological processes occurring within the SVC, as members navigate the community as a whole. Thus, a model of member satisfaction that is not tied to specific forms of participating or idiosyncratic motivations seems particularly relevant, especially when considering the range of member experience and the constantly evolving communication and information technology infrastructure available for professionals to coordinate actions.

One way to accomplish this is by modeling the member self-management process and how it is connected to member satisfaction. Thus, similar to the way hierarchically structured

organizations attempt to manage employees in order to achieve the highest return on investment (ROI), the model tested examined how members of a SVC manage their own involvement in order to achieve the highest return on their own personal investment (i.e., fulfillment of needs and ultimately satisfaction). This model gives practitioners a tool for studying members' self-selection process in relation to member satisfaction and it offers a perspective on member satisfaction within SVCs that embeds the peer production ethos (i.e., self-selection) into our understanding of motivation and satisfaction. Finally, statistical support of the model supports the idea that successful SVCs are able to integrate members' diffuse self-management of their personal engagement with the SVC into a coherent public good (Benkler, 2006).

Endnotes

¹ This lack of compensation within a SVC is a key difference between traditional organizations and peer production contexts. However, compensation is more likely to affect participant motivations than value or skill congruence, which is why I address this difference in the section related to motivations and the fulfillment of basic psychological needs.

² Thus, I will rely on studies of value congruence, even those done in traditional organizations, when drawing conclusions related to PC fit.

³ Therefore, I will draw on research from organizational contexts, which are more prevalent, in order to draw conclusions regarding the fulfillment of BPNs and satisfaction both with the SVC itself and with one's participation.

⁴ Evidence suggests that as many as eighty percent of a SVCs population are silent, inactive participants (Dahlander & O'Mahony, 2011; Wang, et al., 2009).

⁵ The covariance of two variables X and Y, is $\text{cov}_{xy} = r_{XY} SD_X SD_Y$, where r_{XY} is the Pearson correlation between X and Y, SD_X is the standard deviation of X, and SD_Y is the standard deviation of Y.

⁶ "The Chi square fit statistic is the product $(N-1)F_{ML}$, where N-1 represents the overall degrees of freedom in the sample and F_{ML} is the value of the statistical criterion minimized in the ML estimation" (Kline, 2005, p. 135).

⁷ This model was tested against an alternative, theoretically plausible, model. The case where needs fulfillment completely mediates the relationship between fit and satisfaction. However, this alternative model was ruled out because the data fit the model significantly worse (see Table 5).

References

- Adkins, C. L., Ravlin, E. C., & Meglino, B. M. (1996). Value congruence between co-workers and its relationship to work outcomes. *Group & Organization Management*, 21(4), 439-460.
- Aiken, L. S., Stein, J. A., & Bentler, P. M. (1994). Structural equation analyses of clinical subpopulation differences and comparative treatment outcomes: Characterizing the daily lives of drug addicts. *Journal of Consulting and Clinical Psychology*, 62(3), 488-499. doi: doi:http://dx.doi.org/10.1037/0022-006X.62.3.488
- Anthony, D., Smith, S. W., & Williamson, T. (2009). Reputation and reliability in collective goods: The case of the online encyclopedia Wikipedia. *Rationality and Society*, 21, 283-306.
- Ardichvili, A., Page, V., & Wertling, T. (2003). Motivation and barriers to participate in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, 7, 64-77.
- Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, 50, 248-287.
- Bandura, A. (1995). Exercise of personal and collective efficacy in changing societies. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 1-45). Cambridge, UK: Cambridge University Press.
- Baytiyeh, H., & Pfaffman, J. (2010). Open source software: A community of altruists. *Comput. Hum. Behav.*, 26(6), 1345-1354. doi: 10.1016/j.chb.2010.04.008
- Benkler, Y. (2002). Coase's penguin, or, Linux and "The Nature of the Firm". *The Yale Law Journal*, 112, 369-446.

- Benkler, Y. (2006). *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven, CT: Yale University Press.
- Benkler, Y., & Nissenbaum, H. (2006). Commons-based Peer Production and Virtue*. *Journal of Political Philosophy*, 14(4), 394-419. doi: 10.1111/j.1467-9760.2006.00235.x
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107(2), 238-246. doi: doi:http://dx.doi.org/10.1037/0033-2909.107.2.238
- Boezeman, E. J., & Ellemers, N. (2009). Intrinsic need satisfaction and the job attitudes of volunteers versus employees working in a charitable volunteer organization. *Journal of Occupational and Organizational Psychology*, 82(4), 897- 914.
- Bohm, K., & Scherf, A. (2005). Using digital communication structures to support knowledge management *Professional Knowledge Management* (Vol. 3782, pp. 530-541). Berlin: Springer-Verlag Berlin.
- Bowling, N. A., & Hammond, G. D. (2008). A meta-analytic examination of the construct validity of the Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale. *Journal of Vocational Behavior*, 73(1), 63-77. doi: 10.1016/j.jvb.2008.01.004
- Brooks, F., & Scott, P. (2006). Exploring knowledge work and leadership in online midwifery communication. *Journal of Advanced Nursing*, 55(4), 510-520. doi: 10.1111/j.1365-2648.2006.03937.x
- Brown, J. S., & Duguid, P. (2000). *The social life of information*. Boston, MA: Harvard Business School.

- Browne. (2001). An Overview of Analytic Rotation in Exploratory Factor Analysis. *Multivariate Behavioral Research*, 36(1), 111-150.
- Budhathoki, N. R., & Haythornthwaite, C. (2013). Motivation for Open Collaboration: Crowd and Community Models and the Case of OpenStreetMap. *American Behavioral Scientist*, 57(5), 548-575. doi: 10.1177/0002764212469364
- Butler, B. (2001). Membership size, communication activity, and sustainability: A resource-based model of online social structures. *Information Systems Research*, 12(4), 346-362.
- Butler, B., Sproull, L., Kiesler, S., & Kraut, R. (2007). Community effort in online groups: Who does the work and why? *Human-Computer Interaction Institute, Paper 90*. Retrieved from <http://repository.cmu.edu/hcii/90>
- Cable, D. M., & DeRue, D. S. (2002). The Convergent and Discriminant Validity of Subjective Fit Perceptions. *Journal of Applied Psychology*, 87(5), 875-884. doi: 10.1037//0021-9010.87.5.875
- Camacho, B., Le Borgne, E., Staiger, S., Alvarez, S., & Bettink, W. (2013). Results Knowledge Management for Development baseline survey for learning and monitoring 2012-2013. Retrieved from http://wiki.km4dev.org/images/KM4Dev_Learning_and_Monitoring_final_baseline_report.pdf
- Chen, C.-J., & Hung, S.-W. (2010). To give or to receive? Factors influencing members' knowledge sharing and community promotion in professional virtual communities. *Information & Management*, 47, 226-236.

- Cheshire, C., & Antin, J. (2008). The social psychological effects of feedback on the production of internet information pools. *Journal of Computer Mediated Communication, 13*, 705-727.
- Choi, B., Alexander, K., Kraut, R. E., & Levine, J. M. (2010, February). Socialization tactics in wikipedia and their effects. In *Proceedings of the 2010 ACM conference on Computer supported cooperative work* (pp. 107-116). ACM.
- Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J., et al. (1998). Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology, 74*(6), 1516-1530. doi: <http://dx.doi.org/10.1037/0022-3514.74.6.1516>
- Cole, D. A., Ciesla, J. A., & Steiger, J. H. (2007). The insidious effects of failing to include design-driven correlated residuals in latent-variable covariance structure analysis. *Psychological Methods, 12*(4), 381-398.
- Cook, S., & Wiebrands, C. (2010, February 9-11). *Keeping up: strategic use of online social networks for librarian current awareness*. Paper presented at the VALA 15th Biennial Conference and Exhibition, Melbourne Convention and Exhibition Centre.
- Cranefield, J., & Yoong, P. (2009). Embedding personal professional knowledge in a complex online community environment. *Online Information Review, 33*, 257-275.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297-334. doi: 10.1007/BF02310555
- Dahlander, L., & O'Mahony, S. (2011). Progressing to the center: Coordinating project work. *Organization Science, 22*, 961-979

- Dawis, R. V., & Lofquist, L. H. (1984). *Psychological theory of work adjustment. An individual-differences model and its applications*. Minneapolis: University of Minnesota Press.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Inquiry*, 11(4), 227-268. doi: 10.1207/s15327965pli1104_01
- Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need Satisfaction, Motivation, and Well-Being in the Work Organizations of a Former Eastern Bloc Country: A Cross-Cultural Study of Self-Determination. *Personality and Social Psychology Bulletin*, 27(8), 930-942. doi: 10.1177/0146167201278002
- Durant-Law, G. (2012). Partitioning the Network: HyperEdge.
- Edwards, J. R., & Rothbard, N. P. (1999). Work and family stress and well-Being: An examination of person-environment fit in the work and family domains. *Organizational Behavior and Human Decision Processes*, 77(2), 85-129. doi: <http://dx.doi.org/10.1006/obhd.1998.2813>
- Fang, Y., & Neufeld, D. (2009). Understanding sustained participation in open source software projects. *Journal Of Management Information Systems*, 25, 9-50.
- Fayard, A.-L., & DeSanctis, G. (2005). Evolution of an online forum for knowledge management professionals: A language game analysis. *Journal of Computer Mediated Communication*, 10. doi: 10.1111/j.1083-6101.2005.tb00265.x

- Francke, H., & Sundin, O. (2010). An inside view: Credibility in Wikipedia from the perspective of editors. *Information Research*, 15(3), paper colis702. Retrieved from <http://InformationR.net/ir/15-3/colis7/colis702.html>
- Franke, N., & Shah, S. (2003). How communities support innovative activities: An exploration of assistance and sharing among end-users. *Research Policy*, 32, 157-178.
- Füller, J., Jawecki, G., & Mühlbacher, H. (2007). Innovation creation by online basketball communities. *Journal of Business Research*, 60, 60-71.
- Gabriel, A. S., Diefendorff, J. M., Chandler, M. M., Moran, C. M., & Greguras, G. J. (2014). The dynamic relationships of work affect and job satisfaction with perceptions of fit. *Personnel Psychology*, 67(2), 389-420. doi: 10.1111/peps.12042
- Gagné, M., & Deci, E. L. (2005). Self-Determination Theory and Work Motivation. *Journal of Organizational Behavior*, 26(4), 331-362. doi: 10.2307/4093832
- Greguras, G., & Diefendorff, J. (2009). Different fits satisfy different needs: Linking person-environment fit to employee commitment and performance using self-determination theory. *Journal of Applied Psychology*, 94(2), 465.
- Greguras, G., Diefendorff, J., Carpenter, J., & Tröster, C. (2014). Person-Environment Fit and Self-Determination Theory. In M. Gagné (Ed.), *The Oxford handbook of work engagement, motivation, and self-determination theory* (pp. 143-164): Oxford University Press.
- Halfaker, A., Kittur, A., & Riedl, J. (2011). *Don't Bite the Newbies: How reverts affect the quantity and quality of Wikipedia work*. Paper presented at the WikiSym ACM, New York, NY.

- Hayes, A. F. (2015). An Index and Test of Linear Moderated Mediation. *Multivariate Behavioral Research*, 50(1), 1-22.
- Haythornthwaite, C. (2009, January 5-8). *Crowds and communities: Light and heavyweight models of peer production*. Paper presented at the Hawaii International Conference on Systems Sciences, Big Island, HI.
- Hert, P. (1997). Social dynamics of an on-line scholarly debate. *The Information Society: An International Journal*, 13(4), 329-360.
- Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55. doi: 10.1080/10705519909540118
- Iverson, J. O., & McPhee, R. (2008). Communicating knowing through communities of practice: Exploring internal communicative processes and differences among communities of practice. *Journal of Applied Communication*, 36(2), 176-199.
- Jackson, D. L. (2003). Revisiting Sample Size and Number of Parameter Estimates: Some Support for the N:q Hypothesis. *Structural Equation Modeling: A Multidisciplinary Journal*, 10(1), 128-141. doi: 10.1207/s15328007sem1001_6
- Katzy, B. R., Bondar, K., & Mason, R. M. (2012). *Knowledge-based theory of the firm: Challenges by social media*. Paper presented at the 2012 45th Hawaii International Conference on System Sciences, Hawaii.
- Kline, R. B. (2005). *Principles and Practice of Structural Equation Modeling*: Guilford Press.
- KM4Dev Core Group. (2011). Draft Terms of Reference (TORs) for Core Group Members Retrieved from

http://wiki.km4dev.org/Draft_Terms_of_Reference_%28TORs%29_for_Core_Group_Members

Knowledge Management for Development. (2012). Home Retrieved May 5, 2012, from www.km4dev.org

Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals' fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit. *Personnel Psychology, 58*(2), 281-342. doi: 10.1111/j.1744-6570.2005.00672.x

Kristof, A. L. (1996). Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology, 49*(1), 1-49. doi: 10.1111/j.1744-6570.1996.tb01790.x

Laut, J., Cappa, F., Nov, O., & Porfiri, M. (2017). Increasing citizen science contribution using a virtual peer. *Journal of the Association for Information Science and Technology, 68*(3), 583-593.

Leonardi, P. M., & Meyer, S. R. (2015). Social Media as Social Lubricant: How Ambient Awareness Eases Knowledge Transfer. *American Behavioral Scientist, 59*(1), 10-34. doi: 10.1177/0002764214540509

Lerner, J., & Tirole, J. (2002). Some simple economics of open source. *The Journal of Industrial Economics, 50*(2), 197-234.

Liang, B., Liu, Y. Q., Zhang, M., Ma, S. P., Ru, L. Y., & Zhang, K. (2014). Searching for people to follow in social networks. *Expert systems with applications, 41*(16), 7455-7465. doi: 10.1016/j.eswa.2014.05.050

- Locke, E. (1969). What is job satisfaction? *Organizational Behavior and Human Decision Processes*, 4, 309-336.
- Ma, M., & Agarwal, R. (2007). Through a glass darkly: Information technology design, identity verification, and knowledge contribution in online communities. *Information Systems Research*, 18, 42-67.
- Markus, M. L., Manville, B., & Agres, C. E. (2000). What Makes a Virtual Organization Work? *Sloan Management Review*, 42(1), 13-26.
- Maruyama, G. M. (1998). *Basics of structural equation modeling*. Thousand Oaks: SAGE.
- Matzat, U. (2009a). The embeddedness of academic online groups in offline social networks: Reputation gain as a stimulus for online discussion participation? *International Sociology*, 24, 6392.
- Matzat, U. (2009b). A Theory of Relational Signals in Online Groups. *New Media & Society*, 11, 375-394.
- Matzat, U. (2010). Reducing problems of sociability in online communities: Integrating online communication with offline communication. *American Behavioral Scientist*, 53, 1170-1193.
- Maurer, T. J. (2001). Career-relevant learning and development, worker age, and beliefs about self-efficacy for development. *Journal of Management*, 27(2), 123-140. doi: 10.1177/014920630102700201
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27, 415-444.
- Millar, M. M., & Dillman, D. A. (2011). Improving Response To Web and Mixed-Mode Surveys. *Public Opinion Quarterly*. doi: 10.1093/poq/nfr003

- Mitchell, T. R., Holtom, B. C., Lee, T. W., Sablinski, C. J., & Erez, M. (2001). Why people stay: Using job embeddedness to predict voluntary turnover. *Academy of Management Journal*, 44(6), 1102-1121. doi: 10.2307/3069391
- Muthén, L. K., & Muthén, B. O. (2012). *Mplus. The comprehensive modeling program for applied researchers: User's guide*, 5.
- Müller-Seitz, G., & Reger, G. (2009). Is open source software living up to its promises? Insights for open innovation management from two open source software-inspired projects. *R&D Management*, 39(4), 372-381.
- Nov, O., Naaman, M., & Ye, C. (2010). Analysis of Participation in an Online Photo-Sharing Community: A Multidimensional Perspective. *Journal of the American Society for Information Science and Technology*, 61(3), 555-566.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Oh, I.-S., Guay, R. P., Kim, K., Harold, C. M., Lee, J.-H., Heo, C.-G., et al. (2014). Fit Happens Globally: A Meta-Analytic Comparison of the Relationships of Person-Environment Fit Dimensions with Work Attitudes and Performance Across East Asia, Europe, and North America. *Personnel Psychology*, 67(1), 99-152. doi: 10.1111/peps.12026
- Oh, S., & Syn, S. Y. (2015). Motivations for sharing information and social support in social media: A comparative analysis of Facebook, Twitter, Delicious, YouTube, and Flickr. *Journal of the Association for Information Science and Technology*, 66(10), 2045-2060.

- Oreg, S., & Nov, O. (2008). Exploring motivations for contributing to open source initiatives: The roles of contribution context and personal values. [Article]. *Computers in Human Behavior*, 24(5), 2055-2073. doi: 10.1016/j.chb.2007.09.007
- Ostroff, C., & Schulte, M. (2007). Multiple perspectives of fit in organizations across levels of analysis. In C. Ostroff & T. A. Judge (Eds.), *Perspectives on organizational fit. The organizational frontiers series* (pp. 3-69). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.
- Posey, C., Lowry, P. B., Roberts, T. L., & Ellis, T. S. (2010). Proposing the online community self-disclosure model: The case of working professionals in France and the U.K. who use online communities. *European Journal of Information Systems*, 19, 181-195.
- Qureshi, I., & Fang, Y. (2010). Socialization in open source software projects: A growth mixture modeling approach. *Organizational Research Methods*, 14, 208-238.
- Raban, D. (2008). The incentive structure in an online information market. *Journal of the American Society for Information and Science Technology*, 59, 2284-2295.
- Raymond, E. S. (2001). *The cathedral and the bazaar: Musings on Linux and open source by an accidental revolutionary*. Cambridge, MA: O'Reilly.
- Robles Morales, J. M., Antino, M., De Marco, S., & Lobera, J. A. (2016). The New Frontier of Digital Inequality. The Participatory Divide. *Revista Española de Investigaciones Sociológicas*, 156, 97-116.
- Samuelson, P. A. (1954). The Pure Theory of Public Expenditure. *The Review of Economics and Statistics*, 36(4), 387-389. doi: 10.2307/1925895

- Schroer, J., & Hertel, G. (2009). Voluntary Engagement in an Open Web-Based Encyclopedia: Wikipedians and Why They Do It. *Media Psychology, 12*(1), 96-120. doi: 10.1080/15213260802669466
- Schumacker, R. E., & Lomax, R. G. (1996). *A beginner's guide to structural equation modeling*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Shriver, S. K., Nair, H. S., & Hofstetter, R. (2013). Social ties and user-generated content: Evidence from an online social network. *Management Science, 59*(6), 1425-1443. doi:10.1287/mnsc.1110.1648
- Steiger, J. H. (1990). Structural Model Evaluation and Modification: An Interval Estimation Approach. *Multivariate Behavioral Research, 25*(2), 173-180. doi: 10.1207/s15327906mbr2502_4
- Thompson, T. L. (2011). Work-learning in informal online communities: Evolving spaces. *Information Technology & People, 24*(2), 184-196.
- Van den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale. *Journal of Occupational and Organizational Psychology, 83*(4), 981-1002. doi: 10.1348/096317909x481382
- Wang, L. S., Chen, J., Ren, Y., & Riedl, J. (2012, February). *Searching for the goldilocks zone: trade-offs in managing online volunteer groups*. Paper presented at the ACM 2012 conference on Computer Supported Cooperative Work, Seattle, WA.
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University Press.

- Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Boston: Harvard Business School Press.
- Wesler, H. T., Cosley, D., Kossinets, G., Lin, A., Dokshin, F., Gay, G., et al. (2011, February 8-11, 2011). *Finding social roles in Wikipedia*. Paper presented at the iConference 2011, Seattle, WA.
- Wikipedia:About. (2016) Retrieved January 26, 2016, from <https://en.wikipedia.org/wiki/Wikipedia:About>
- Winer, B. J., Brown, D. R., & Michels, K. M. (1991). *Statistical principles in experimental design* (3rd ed.). Boston: McGraw Hill.
- Wu, F., Wilkinson, D. M., & Huberman, B. A. (2009, 29-31 August). *Feedback loops of attention in peer production* Paper presented at the International Conference on Computational Science and Engineering, Vancouver, BC.
- Yates, A. (1987). *Multivariate exploratory data analysis: A perspective on exploratory factor analysis*. Albany, NY: State University of New York Press.
- Yu, T.-K., Lu, L.-C., & Liu, T.-F. (2010). Exploring factors that influence knowledge sharing behaviors via weblogs. *Computers in Human Behavior*, 26, 32-41.

Appendix A: Tables

Table 1

Standardized Parameter Estimates of Factor Loadings, R^2 , and Item Means

(N=212) Questionnaire Items	Factor Loading	R^2	Item Means
PCFit1: The things that I value in my professional life are very similar to the things that KM4Dev values.	0.68	0.46	5.41
PCFit2: My professional values match KM4Dev's culture.	0.84	0.71	5.64
PCFit3: KM4Dev's values fit well with the things that I value and hope for in my professional life.	0.86	0.74	5.52
PCFit4: The values associated with KM4Dev are similar to my own professional values.	0.90	0.81	5.47
DAFit1: There is a good match between the demands for participation in KM4Dev and my personal skills.	0.67	0.44	4.77
DAFit2: My abilities are relevant for the ways I choose to participate in KM4Dev.	0.71	0.50	5.10
DAFit3: My personal abilities provide a good match with the demands associated with participating in KM4Dev.	0.84	0.70	4.89
DAFit4: The demands of how I participate in KM4Dev fit well with my own abilities and training.	0.85	0.72	5.01
AF1: I participate how I want to within the KM4Dev community.	0.83	0.69	5.41
AF3: I am able to decide for myself how to go about participating in KM4Dev.	0.68	0.47	5.64
AF5: I feel like I can do what I want to do within KM4Dev.	0.56	0.32	5.52
RF2: My personal life has benefitted from my participation in KM4Dev.	0.64	0.40	5.47
RF3: I have been able to develop connections to other members of KM4Dev.	0.67	0.44	4.77
RF4: I feel connected to the other members of KM4Dev.	0.86	0.74	5.10
RF5: I feel supported by the KM4Dev membership.	0.74	0.55	4.89

CF1: I have been able to learn interesting new skills as a result of my participation in the KM4Dev community.	0.79	0.63	5.41
CF3: I continue to learn new things through my participation in KM4Dev.	0.81	0.66	5.64
CF4: For me, the KM4Dev community is a source of professional development.	0.85	0.72	5.52
CF5: My professional life has benefited from my participation in KM4Dev.	0.85	0.72	5.47
PS1: All in all I am satisfied with my participation experience within KM4Dev.	0.72	0.51	5.02
PS5: Based on my experience, I believe I will continue participating in KM4Dev.	0.81	0.66	5.72
S1: All in all I am satisfied with KM4Dev.	0.91	0.83	5.74
S3: In general, I like KM4Dev.	0.94	0.88	5.83
S6: Several changes need to be made to make KM4Dev function better. (R)	0.31	0.10	3.85]

Table 2

Confirmatory Factor Analysis Results for Fit

Table 2
Confirmatory Factor Analysis Results for Fit

Model	χ^2	<i>df</i>	χ^2_{diff}	RMSEA	CFI	SRMR
Single Factor Model	242.94***	20		.23***	.79	.09
Hypothesized Two Factor Model	111.37***	19	131.57***	.15***	.91	.05
Modifications						
Removal of PC Fit 1	65.98***	13		.14***	.94	.04
Removal of DAFit 1 ^a	25.22**	8		.10 ^b <i>n.s.</i>	.98	.03

*** $p < .001$, ^b 90% CI [.06, .15], *n.s.* – non-significant, ^a Final Model

Table 3

Confirmatory Factor Analysis Results for Needs Fulfillment

Table 3

Confirmatory Factor Analysis Results for Needs Fulfillment

Model	χ^2	<i>df</i>	χ^2_{diff}	RMSEA	CFI	SRMR
Single Factor Model	454.58***	90		.14***	.78	.09
Hypothesized Two Factor Model	405.47***	87	49.11***	.13***	.81	.12
Modifications						
Removal of AF4	286.81***	74		.12***	.86	.10
Removal of CF4	187.64***	62		.10***	.91	.09
Removal of AF2	124.04***	51		.08***	.94	.06
Removal of RF1 ^a	70.88***	41		.06 ⁺ <i>n.s.</i>	.97	.04

*** $p < .001$, ⁺ 90% CI [.04, .08], *n.s.* – non-significant, ^a Final Model

Table 4

Confirmatory Factor Analysis Results for Satisfaction with the Community Experience

Model	χ^2	<i>df</i>	χ^2_{diff}	RMSEA	CFI	SRMR
Single Factor Model: All 12 Items	251.02***	54		.13***	.89	.08
Hypothesized Two Factor Model	232.93***	53	18.08	.13***	.90	.08
Single Factor Model Reverse Coded Removed: 9 Items	107.5***	27		.12***	.95	.04
Final Single Factor Model: 5 items	16.35	5		.10*+	.98	.03

*** $p < .001$, * $p < .05$, +90% CI [.05, .16]

Table 5

Correlation of Single Item Measures

Table 5

Correlation of Single Item Measures

	Autonomy Fulfillment	Relatedness Fulfillment	Competence Fulfillment	Community Satisfaction	Person- Community Fit	Demands- Abilities Fit	Individual Filtering	Interaction
Autonomy Fulfillment	1							
Relatedness Fulfillment	.35	1						
Competence Fulfillment	.50	.68	1					
Community Satisfaction	.55	.48	.75	1				
Person- Community Fit	.45	.46	.64	.64	1			
Demands- Abilities Fit	.41	.52	.51	.54	.65	1		
Individual Filtering	.18	.33	.26	.24	.20	.09	1	
Interaction	.25	.37	.35	.44	.66	.45	.16	1

Table 6

Fit Indices for the Path Analysis of the Un-Moderated Model

Model	χ^2	df	χ^2_{diff}	RMSEA	CFI	SRMR
Hypothesized Model	126.39***	5		.34***	.78	.12
Modifications						
Correlate Residuals of Competence Fulfillment with Relatedness Fulfillment	51.45***	4	74.95***	.24***	.91	.08
Add Path Relatedness Fulfillment on Demands-Abilities Fit	26.58***	3	24.87***	.19***	.96	.06
Correlate Residuals of Competence Fulfillment with Autonomy Fulfillment	10.66	2	15.92***	.14*	.98	.04
Add Path Autonomy Fulfillment on Demands-Abilities Fit ^a	3.90	1	6.76**	.12 ^{+n.s.}	1.0	.02
Alternative Model – Fully Mediated	25.88***	3		.19***	.96	.04

*** $p < .001$, * $p < .05$, + 90% CI [.01, .25], *n.s.* – non-significant, ^a Final Model

Table 7

Unstandardized Path Estimates, Standard Errors, and 95% Confidence Interval for the Mediation Path Model

Hypothesis	Path	β	Std. Error	95% Confidence Interval
1	Person-Community Fit → Satisfaction	.19	.07	.05, .34
2	Demands-Abilities Fit → Satisfaction	.12	.07	-.01, .26
3a.	Person-Community Fit → Autonomy Fulfillment	.32	.09	.15, .50
3b.	Person-Community Fit → Competence Fulfillment	.65	.09	.48, .81
3c.	Person-Community Fit → Relatedness Fulfillment	.27	.11	.06, .47
-	Demands-Abilities Fit → Autonomy Fulfillment	.21	.09	.03, .40
4	Demands-Abilities Fit → Competence Fulfillment	.20	.08	.04, .38
-	Demands-Abilities Fit → Relatedness Fulfillment	.49	.09	.31, .68
5	Autonomy Fulfillment → Satisfaction	.18	.05	.08, .29
6	Relatedness Fulfillment → Satisfaction	-.02	.05	-.18, .13
7	Competence Fulfillment → Satisfaction	.47	.07	.34, .60
-	Residuals Competence Fulfillment with Autonomy Fulfillment	.19	.06	.09, .31
-	Residuals Competence Fulfillment with Relatedness Fulfillment	.51	.08	.38, .67

Table 8

Fit Indices for Path Analysis of the Moderated Mediation Model

Model	χ^2	<i>df</i>	χ^2_{diff}	RMSEA	CFI	SRMR
Hypothesized Model	135.03***	7		.29	.78	.09
Modifications						
Correlate Residuals of Competence Fulfillment with Relatedness Fulfillment	60.86***	6	74.17***	.21	.91	.06
Add Path Relatedness Fulfillment on Demands-Abilities Fit	31.39***	5	29.47***	.16	.95	.05
Correlate Residuals of Competence Fulfillment with Autonomy Fulfillment	16.99	4	14.40***	.12	.98	.03
Add Path Autonomy Fulfillment on Demands-Abilities Fit	9.39	3	7.6***	.10 ^{+n.s.}	1.0	.02
Add Moderation of Satisfaction on Person-Community Fit ^a	2.68	1	6.70**	.09 ^{+n.s.}	1.0	.01
Alternative Model – Fully Mediated	31.37***	5		.16	.95	.04

****p* < .001, ***p* < .01, ⁺90% CI [.03-.18], ⁺⁺90% [.00, .23], *n.s.* – non-significant, ^a Final Model

Table 9

Unstandardized Path Estimates, Standard Error, and 95% Confidence Interval for the Moderated Mediation Model

Hypothesis	Path	β	Std. Error	95% Confidence Interval
1	Person-Community Fit → Satisfaction	.09	.09	-.08, .26
2	Demands-Abilities Fit → Satisfaction	.14	.07	.01, .28
3a.	Person-Community Fit → Autonomy Fulfillment	.36	.11	.15, .57
3b.	Person-Community Fit → Competence Fulfillment	.72	.11	.50, .93
3c.	Person-Community Fit → Relatedness Fulfillment	.11	.13	-.16, .37
-	Demands-Abilities Fit → Autonomy Fulfillment	.22	.10	.04, .41
4	Demands-Abilities Fit → Competence Fulfillment	.22	.09	.05, .40
-	Demands-Abilities Fit → Relatedness Fulfillment	.51	.09	.33, .69
5	Autonomy Fulfillment → Satisfaction	.18	.05	.08, .28
6	Relatedness Fulfillment → Satisfaction	-.11	.05	-.22, -.01
7	Competence Fulfillment → Satisfaction	.50	.07	.37, .63
-	Individual Filtering → Autonomy Fulfillment	.22	.13	-.03, .48
-	Individual Filtering → Relatedness Fulfillment	.68	.14	.40, .96
-	Individual Filtering → Competence Fulfillment	.36	.13	.11, .60
-	Individual Filtering → Satisfaction	.13	.10	-.06, .32
-	Residuals Competence Fulfillment with Autonomy Fulfillment	.17	.05	.08, .27
-	Residuals Competence Fulfillment with Relatedness Fulfillment	.47	.07	.39, .61

Table 10

R² and Standard Error for the Moderated and Un-Moderated Path Models

	Moderated Model	Un-Moderated Model	
	<i>R²</i> (Std. Error)	<i>R²</i> (Std. Error)	<i>R²_{diff}</i>
Autonomy Fulfillment	.24 (.05)	.22 (.05)	.02
Relatedness Fulfillment	.37 (.05)	.30 (.05)	.07
Competence Fulfillment	.46 (.05)	.43 (.05)	.03
Overall Community Satisfaction	.65 (.04)	.63 (.04)	.02

Table 11

Unstandardized Indirect Effects, Standard Errors, and 95% Confidence Intervals of the Mediated Models

Hypothesis	Path	Separate Analyses		Entire Un-Moderated Model Analyzed	
		β (Std. Error)	95% CI	β (Std. Error)	95% CI
3a./5	Person-Community Fit \rightarrow Autonomy Fulfillment \rightarrow Satisfaction	.15 (.06)	.08, .23	.06 (.02)	.02, .12
3c./6	Person-Community Fit \rightarrow Relatedness Fulfillment \rightarrow Satisfaction	.12 (.03)	.05, .19	-.02 (.02)	-.07, .00
3b./7	Person-Community Fit \rightarrow Competence Fulfillment \rightarrow Satisfaction	.39 (.05)	.28, .50	.31 (.06)	.21, .43
-	Demands-Abilities Fit \rightarrow Autonomy Fulfillment \rightarrow Satisfaction	-	-	.04 (.02)	.01, .09
-	Demands-Abilities Fit \rightarrow Relatedness Fulfillment \rightarrow Satisfaction	-	-	-.04 (.03)	-.09, .01
4/7	Demands-Abilities Fit \rightarrow Competence Fulfillment \rightarrow Satisfaction	.34 (.05)	.23, .44	.10 (.05)	.02, .20

Table 12

Unmoderated indirect effects and conditional indirect effects at different levels of individual filtering. Unstandardized coefficients, PC fit is mean centered.

Hypothesis	Conditioned on Individual Filtering	Path	β	Std. Error	95% Confidence Interval
8	0	Person-Community Fit x Individual Filtering → Autonomy Fulfillment → Satisfaction	.06	.03	.01, .12
	1	Person-Community Fit x Individual Filtering → Autonomy Fulfillment → Satisfaction	.04	.02	-.00, .09
9	0	Person-Community Fit x Individual Filtering → Relatedness Fulfillment → Satisfaction	-.01	.02	-.06, .02
	1	Person-Community Fit x Individual Filtering → Relatedness Fulfillment → Satisfaction	-.03	.02	-.09, -.00
10	0	Person-Community Fit x Individual Filtering → Competence Fulfillment → Satisfaction	.36	.07	.23, .50
	1	Person-Community Fit x Individual Filtering → Competence Fulfillment → Satisfaction	.22	.06	.11, .33
-	0	Person-Community Fit x Individual Filtering → Satisfaction	.09	.09	-.84, .26
	1	Person-Community Fit x Individual Filtering → Satisfaction	.29	.09	.11, .45
-	n/a	Demands-Abilities Fit → Autonomy Fulfillment → Satisfaction	.04	.02	.00, .07
-	n/a	Demands-Abilities Fit → Relatedness Fulfillment → Satisfaction	-.06	.03	-.11, .00
4/7	n/a	Demands-Abilities Fit → Competence Fulfillment → Satisfaction	.11	.04	.03, .19
-	n/a	Individual Filtering → Autonomy Fulfillment → Satisfaction	.04	.03	-.01, .09
	n/a	Individual Filtering → Competence Fulfillment → Satisfaction	-.08	.04	-.15, .00
	n/a	Individual Filtering → Relatedness Fulfillment → Satisfaction	.18	.07	.05, .31

Appendix B: Figures

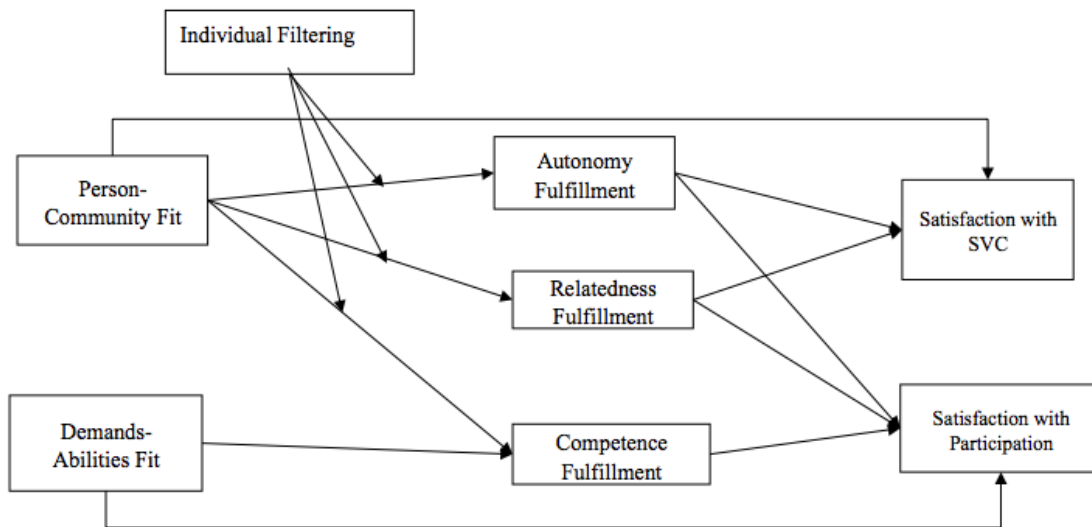


Figure 1. Hypothesized Model. Examining differences among member satisfactions within a self-organized virtual community of professionals.

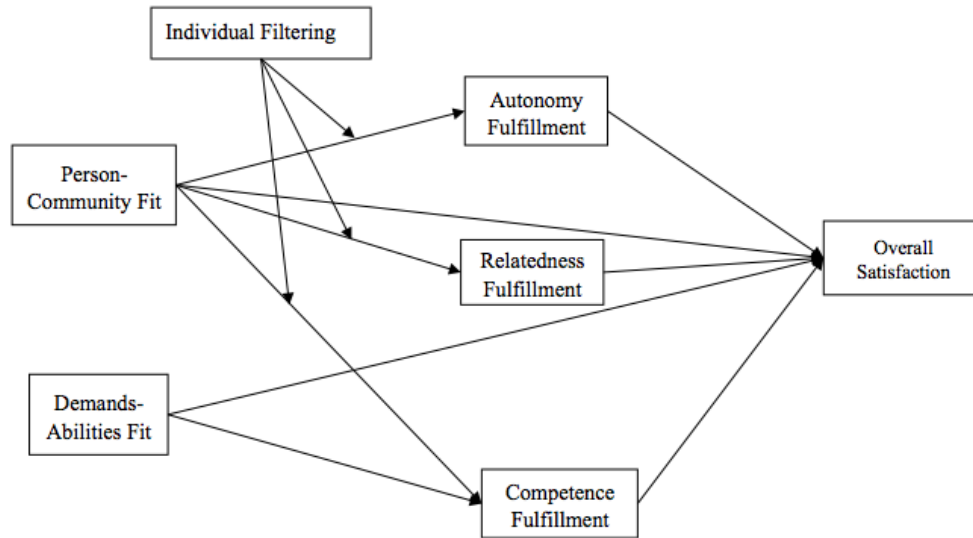


Figure 2. Moderated Model with Path Analysis. The model tested after measurement analyses revealed a single satisfaction outcome variable.

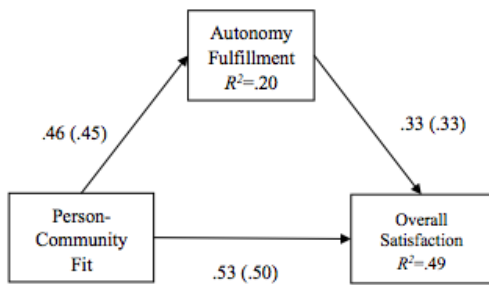


Figure 3a: Direct and Indirect effect of PC Fit on Overall Satisfaction through Autonomy fulfillment

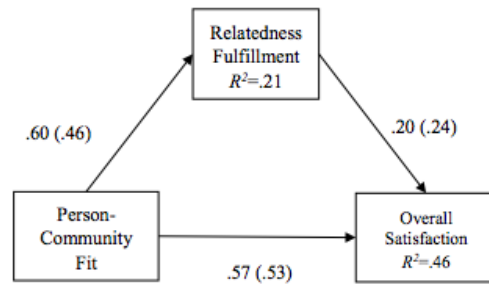


Figure 3b: Direct and Indirect effect of PC Fit on Overall Satisfaction through Relatedness fulfillment

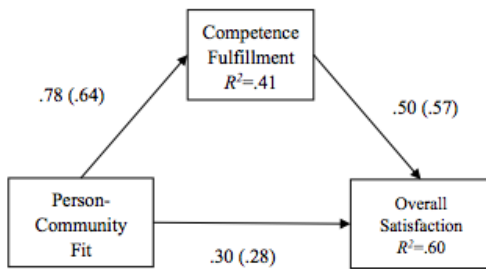


Figure 3c: Direct and Indirect effect of PC Fit on Overall Satisfaction through Competence fulfillment

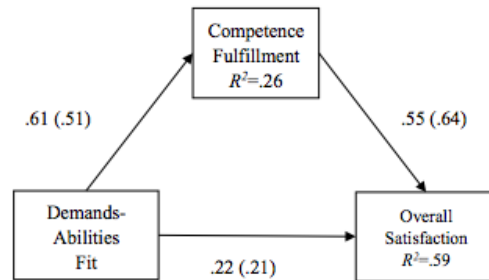


Figure 3d: Direct and Indirect effect of DA Fit on Overall Satisfaction through Competence fulfillment

Figure 3. Unstandardized and (standardized) path co-efficients for the saturated mediation models, with amount of variance explained.

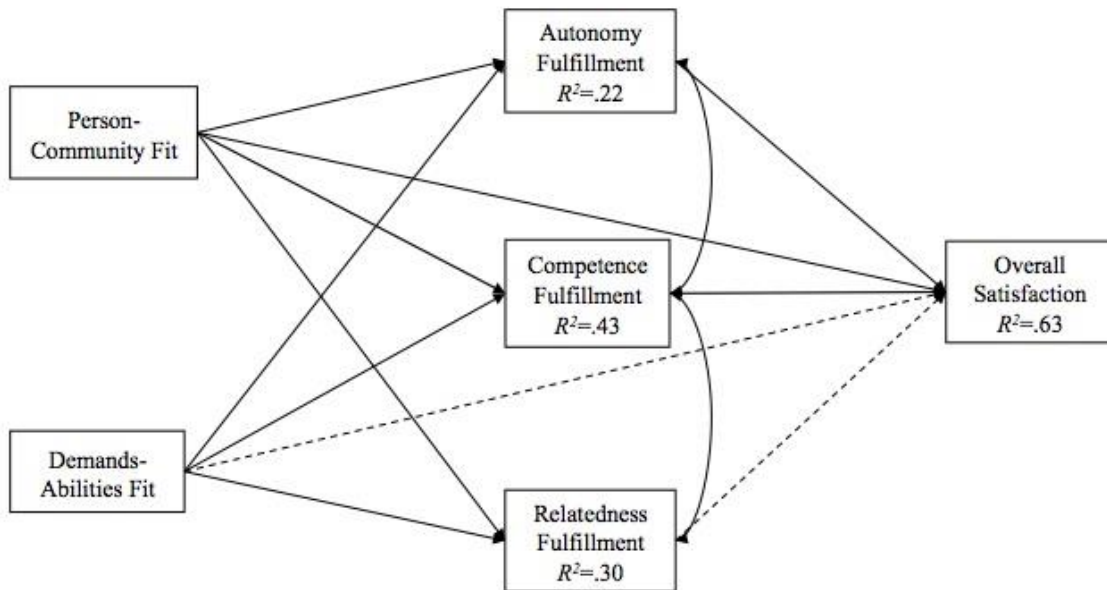


Figure 4. Mediated Statistical Model. A model of satisfaction based on the self-selection process participants engage in and their ability to fulfill their basic psychological needs.

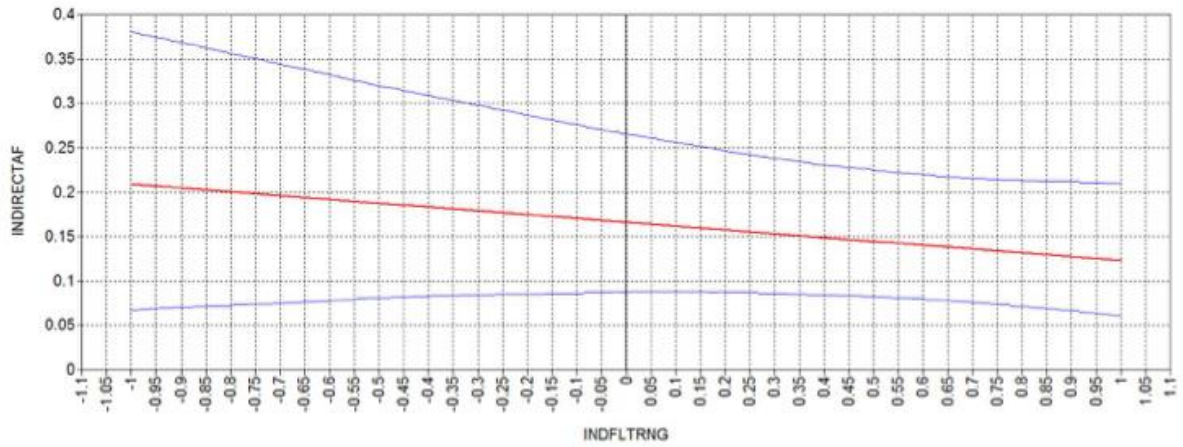


Figure 5. The slopes of the upper and lower portions (blue lines) of the confidence interval for the indirect effect of Person-Community Fit to Satisfaction through Autonomy Fulfillment as individual filtering moves from 0 to 1. The red line depicts the index of moderated mediation.

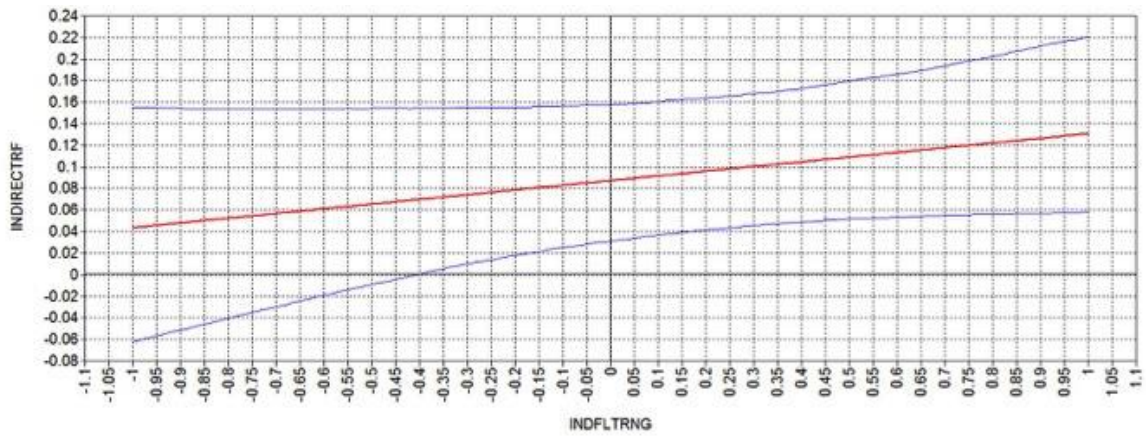


Figure 6. The slopes of the upper and lower portions (blue lines) of the confidence interval for the indirect effect of Person-Community Fit to Satisfaction with Relatedness Fulfillment as Individual Filtering moves from 0 to 1.

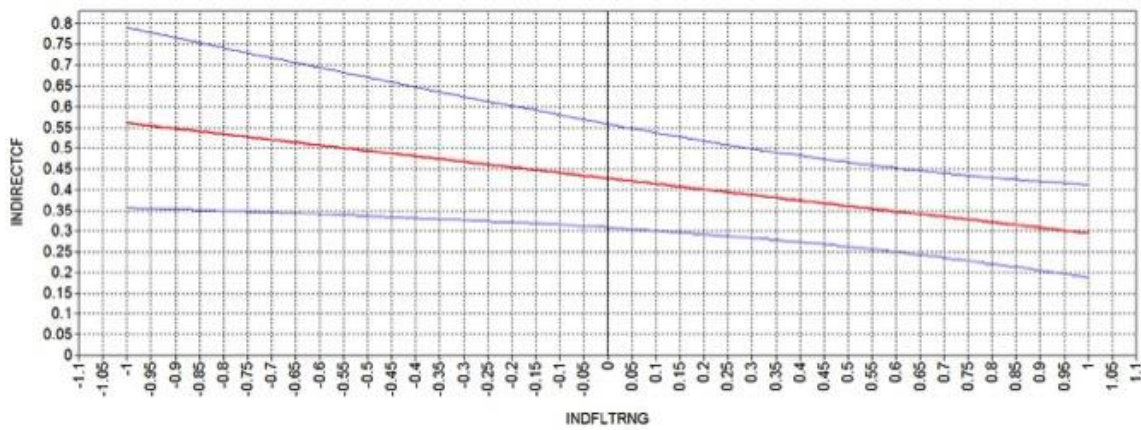


Figure 7. The slopes of the upper and lower portions (blue lines) of the confidence interval for the indirect effect of Person-Community Fit to Satisfaction through Competence Fulfillment as Individual Filtering moves from 0 to 1.

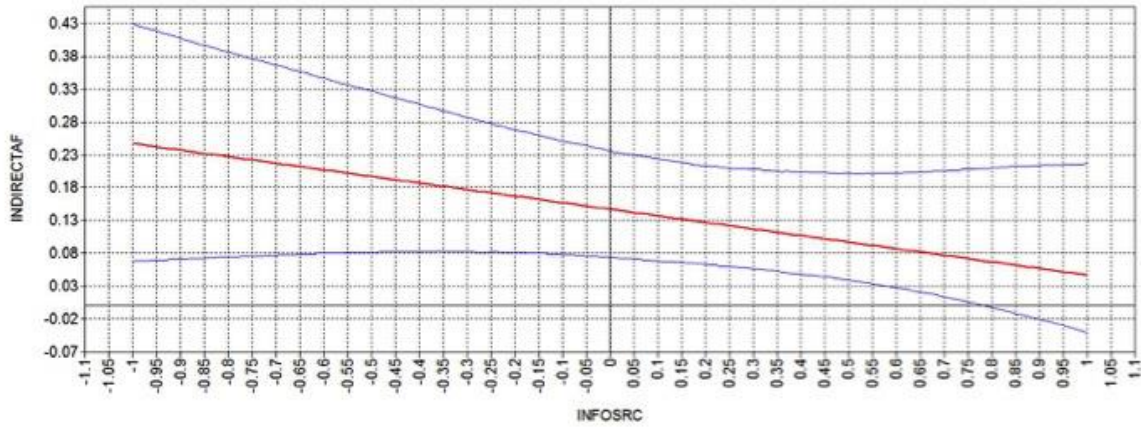


Figure 8. The slopes of the upper and lower portions (blue lines) of the confidence interval for the indirect effect of Person-Community fit to Satisfaction through Autonomy Fulfillment as information source moves from 0 to 1.

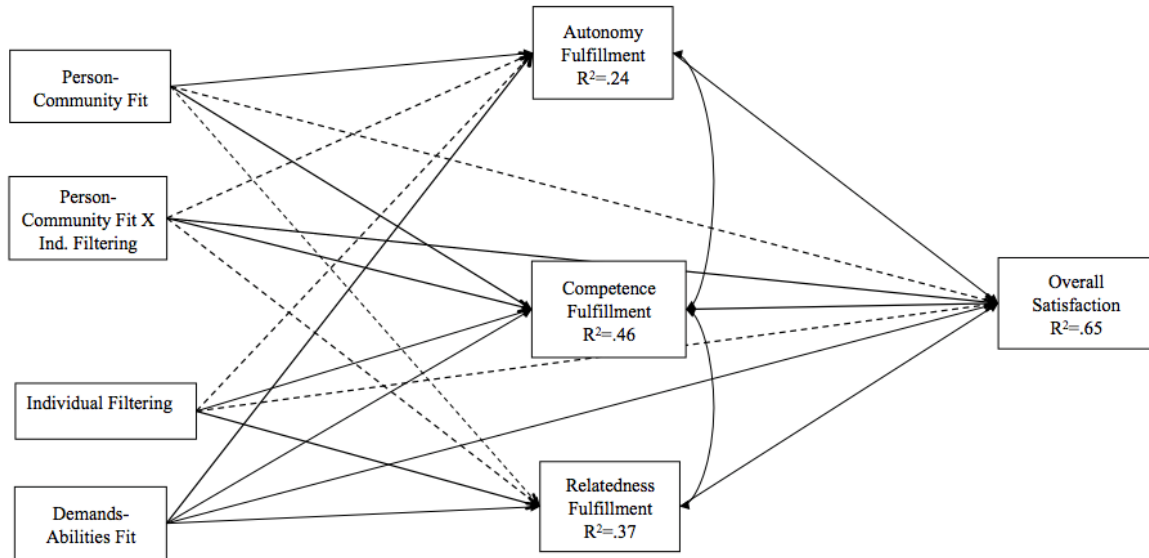


Figure 9. Moderated Mediation Statistical Model. A model of satisfaction based on the self-selection process participants engage in and their ability to fulfill their basic psychological needs, conditioned on their use of individual filtering.

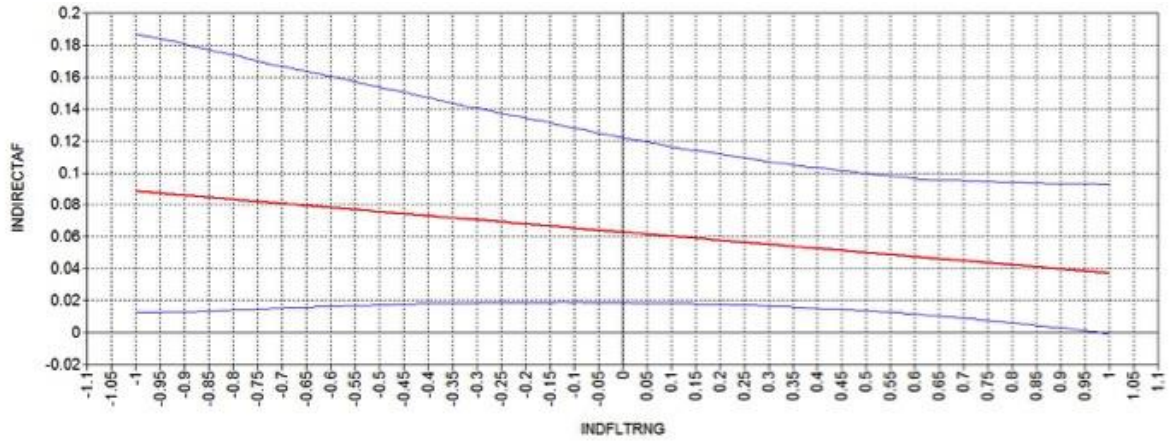


Figure 10. The slopes of the upper and lower portions (blue lines) of the confidence interval for the indirect effect of PC fit to Satisfaction through Autonomy Fulfillment as individual filtering moves from 0 to 1, controlling for all other effects in the model.

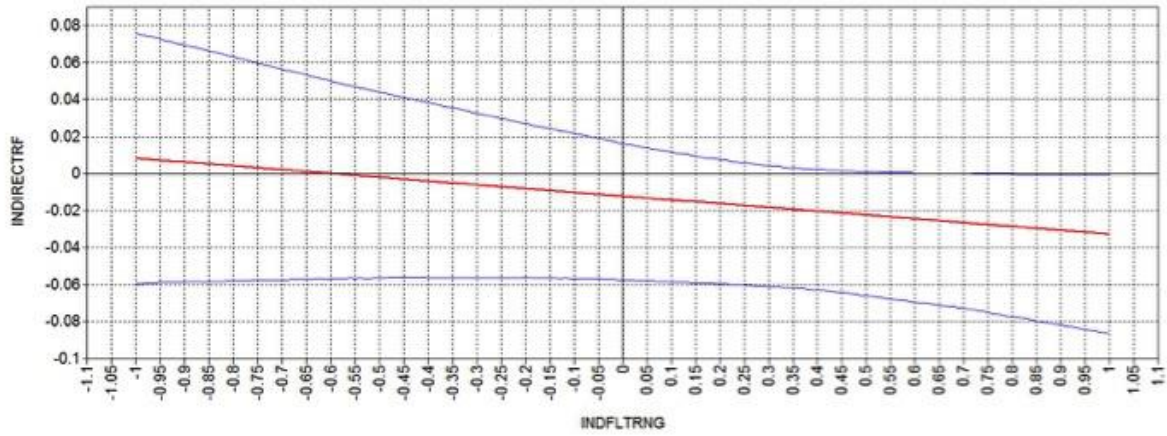


Figure 11. The slopes of the upper and lower portions (blue lines) of the confidence interval for the indirect effect of PC fit to Satisfaction through Relatedness Fulfillment as individual filtering moves from 0 to 1, controlling for all other effects in the model.

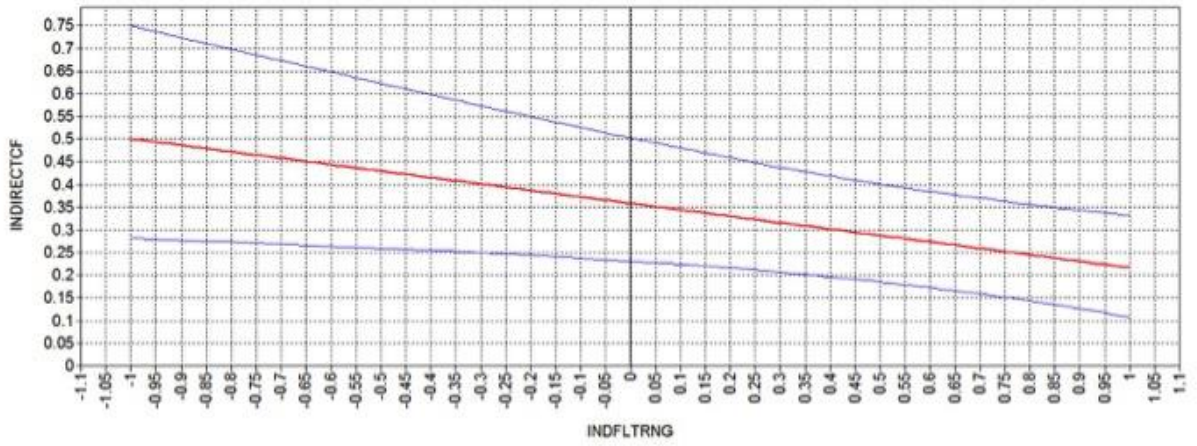


Figure 12. The slopes of the upper and lower portions (blue lines) of the confidence interval for the indirect effect of PC fit to Satisfaction through Competence Fulfillment as individual filtering moves from 0 to 1, controlling for all other effects in the model.

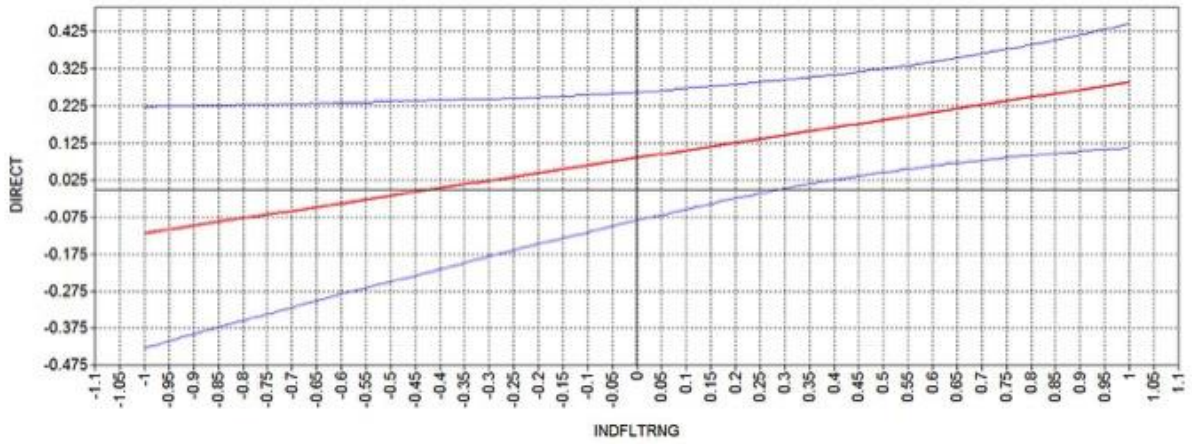


Figure 13. The slopes of the upper and lower portions (blue lines) of the confidence interval for the direct effect of PC fit to Satisfaction as individual filtering moves from 0 to 1, controlling for all other effects in the model.