Leader personal influences on membership decisions in moderated online social networking groups

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ABSTRACT

Moderated online social networking (MOSN) groups have become a prominent way for Internet users to form relationships, learn about specialized topics, and share their understandings with others. However, unlike traditional social and work groups, very little research has addressed the individual and collective characteristics influencing MOSN group membership decisions. This paper is concerned with the roles of leader and member personality and values characteristics in the formation of MOSN groups. Using data from 583 MOSN group members (including 38 leaders), we investigated three hypotheses concerning: 1) the presence of personality and values homogeneity, 2) the congruence between leader and member personality and values, and 3) whether leadership style is related to modal personality and values. We found partial support for all three hypotheses, which implies that MOSN group membership decisions are related to the personality and values traits of the leader. Findings suggest that in a clicks-and-mortar organization, an IS functional manager may consider enlisting personnel having the traits desired of the MOSN group membership to serve as the group leader. Furthermore, replacing the leaders of strategically important MOSN groups should be done with regard to personality and values continuity, since likely changes in the composition of the group may also change its strategic orientation.

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1. Introduction

Since the commercialization of the Internet in 1993, a number of online social networking sites have achieved global visibility [7,26]. Online social networking groups have become a profoundly important social medium, as they "provide sociability, support, information, a sense of belonging, and social identity" ([66], p. 53). Despite their promise for facilitating sources of intellectual capital for members and leaders, little is known about how online social networking groups form. Two basic questions concerning decisions by individuals to join social groups pertain to: 1) the extent and function of member homogeneity and 2) the influence of leaders on membership formation.

Our theoretical explanation regarding individual decisions to join MOSN groups draws from Schneider's [53] attraction–selection–attrition (ASA) theory. ASA is a multi-level theory that explains organizational functioning via the extent of trait similarity, or homogeneity, among members. ASA theory suggests that people with similar individual-level characteristics are attracted to similar organizational features. While homogeneity among people provides a foundation for common interests, language, and cooperation, it both enables and constrains groups. In prior studies involving traditional organizations, member homogeneity has been found to influence group creation, development, cohesiveness, and effectiveness [10,17]. While homogeneity is important for group cohesiveness, Schneider [53] warns that it can be destructive and counterproductive if the ASA processes are allowed to make it excessive in the long-term. Thus, the topic is important in the ongoing management of successful MOSN groups, which often hinge on a delicate balance between member diversity and homogeneity.

The purpose of this paper is to develop and test three hypotheses regarding the modal (group mean for a given trait) personality and values characteristics of online social networking groups. The first hypothesis tests whether *homogeneity* exists in MOSN groups by testing whether they can be differentiated by their modal personality and values. The second hypothesis investigates the *congruence* between leader and modal personality and values characteristics. The third hypothesis tests whether leadership style influences modal personality and values. All three hypotheses extend prior theory explaining conventional organizational behavior to the MOSN group context. This research is significant since no research to date has explored the extent of member homogeneity or its hypothetical antecedents

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in MOSN groups. Because of this void, there is a need for MIS researchers to study the ASA process in the context of MOSN groups, which are unique in that opportunities exist for leaders (moderators) to influence membership formation and since it is critical for online social networking group leaders to understand the dynamics of membership formation over time.

This paper ensues with the following sections: background of relevant literature, theory and hypothesis development, methods and findings. We conclude with a discussion about the findings, implications, limitations and directions for future research.

2. Background

The uses of MOSN groups by traditional organizations vary widely and have included knowledge sharing, product support, customer interactions and feedback, product development and public relations. These uses are growing, as organizations continue to discover new strategic uses for leveraging the knowledge made available to them by the online social network medium. Although the concept of MOSN groups is somewhat new to the organizational literature, the concept has aspects similar to physical communities. Since virtual and physical communities both intend to create value through collective work, we expect for some theories to hold true for both.

We use Schneider's [53] ASA theory as our basis for explaining the formation of homogeneity in online social networking groups. The attraction, selection and attrition effects are relevant explanations for the formation of online social networking groups because these processes explain how personality and values homogeneity in online social networking groups is purposeful, not random, and influences group effectiveness. According to ASA, homogeneity accompanies a unique shared profile of personality and values that is distinguishable from other groups. Another important part of ASA is the influence of leaders in group member formation. The role of leaders in the formation and effectiveness of MOSN groups is only now being addressed in MIS research. Previous studies have concentrated primarily on the influence of leader communication quality on network usage behavior [9,26]. Research is needed to validate formal decision processes that explain membership formation in virtual groups. Similar to traditional social groups or communities, members of virtual groups must also go through a series of association phases. However, these processes are much less formal and constrained in MOSN groups compared to traditional organizations.

Schneider [53] calls for using the *modal* personality and values to measure group personality and values profiles. These modal characteristics are defined as the mean of member scores for a given construct within a group. The modal statistic reveals the most common type found among members of the group and as such, also reveals a group profile. Prior research in IS indicates that modal individual-level characteristics may influence group formation. For example, individual differences were found to influence the usage and perceived relative advantage of group-oriented systems [31]. Group-perceived value of technical efficiency [40] and the business value of IT infrastructure [50] also indicate the relevance of modal values in evaluating social network adoption.

A review of the literature reveals two important implications of testing homogeneity in online social networking groups. First, homogeneity means that researchers can use modal traits to differentiate among organizations. Schneider et al. [54] assessed core organizational outcomes hypothesized by ASA, and found that industries and organizations can be reliably discriminated between using the modal personality type. Giberson et al. [17] extended these results by finding that both the modal personality and modal values characteristics of members are different between groups. Thus, traditional organizations can be empirically discriminated between in terms of both values and personality, suggesting that these characteristics might also differentiate MOSN groups. Second, similarities in values

and personality can be transformed into group effectiveness. Diverse values, which often depend on competing individual goals, increase risks associated with organizational conflict. Even when goals and corresponding values are shared [59] they compete for member attention [49]. Because goals are so important to members, we should expect values to often override organizational structures, such as the technological infrastructures that support MOSN groups. We expect online social network members to feel comfortable and interested in using technology (i.e., online media) to solve shared problems and in group decision-making [34]. The expected similarity in personality within groups has been shown between information systems users and developers [29].

The literature pertinent to the advancement of ASA decision theory commonly points to personality and values as being significantly important individual characteristics for indicating homogeneity in groups.

2.1. Personality

Member personality is essential to MIS research because it has been found to influence a wide range of behavior, including technology development [68], acceptance and use [14], and management [45]. Concerning online social network members, personality has been found to influence the attitudes, intentions and behavior of systems users [14], including Internet use [42]. Personality is a significant determinant of user learning in web-mediated learning environments [36].

The set of personality dimensions that has become the most prominently used is known as the *Five Factor Model* (FFM). In MIS research, FFM dimensions have begun to receive greater attention in IS adoption models. FFM personality dimensions were found to significantly influence IS acceptance and use [14] and specifically, Internet use [42]. Past MIS research has also shown that FFM variables are related to complex organizational behavior requiring member cooperation, including code review during system development [12]. Several MIS scholars have encouraged the inclusion of personality traits in research extending existing theoretical models [14] and exploring new settings: "personality may predict adoption of new technologies as well as extreme uses of established ones" ([42], p. 817).

2.2. Values

It has been argued that values are the highest form of knowledge in firms [63]. Values demonstrate individual and shared goals and intentions, thereby influencing group effectiveness [59]. Individual values are influenced by the various groups in which members participate [60] and at different levels of analysis [58]. Values can be elicited from shared programs, protocols [67] and policies [19,34] and are considered an integral part of organizational memory [59]. In several ways, the MIS literature suggests that prevailing values influence an explicit form of organizational learning, during which explicitly stored organizational memory is changed in the process. Personal values also have implications for MOSN groups, as they have been shown to influence the success of 1) IS designs [38,70], 2) policies on computer ethics [46] and information privacy [43] and 3) IS acceptance [58]. Value-based decision-making can also be influenced by IS-mediated feedback [23]. These studies indicate that values can both influence and become influenced by information technology.

Researchers have suggested that member values should inform the design of information privacy policies [15], agile software development processes [44], and product design [33]. The MIS literature also provides for a relationship between member values and social culture [13]. Furthermore, member values have been shown to influence the IS acceptance process [58], an important element in technology diffusion. It is therefore important to investigate the

dynamics associated with the personality and values profiles facilitated by fast emerging MOSN groups.

3. Theory and hypothesis development

This section describes and develops hypotheses pertaining to homogeneity formation (H1) in MOSN groups and the influence of leaders in that process (H2 and H3).

3.1. Homogeneity formation in online social networking groups

ASA asserts that over time, leader and member decisions cause group homogeneity to increase. Homogeneity within a group means that it has formed a unique trait that is comparable and testable across groups. When groups can be differentiated by their modal characteristics, homogeneity is said to exist. Schneider's "homogeneity hypothesis" is therefore a test of uniqueness, or for differences among organizations using modal criteria. In particular, personality, values, and interests are described by ASA as being important traits that become homogeneous within groups over time.

ASA explains that the homogeneity of personality and values results from three process effects, rather than random processes [55]. Each of these three processes explains how member congruence increases over time and causes unique modal characteristics in groups. First, the 'attraction effect' occurs when non-members choose to join a group based on their perceived fit with the current organizational culture. Pertinent to this study, non-members are drawn to groups they perceive to have personality and values similar to their own. The attraction phase therefore causes the development of a pool containing a disproportionate number of member candidates having personalities and values that fit the group. Similarly, groups are attracted to non-members who have characteristics similar to their own. Second, the 'selection effect' occurs when current group leaders and members recruit, accept and retain those having individual characteristics similar to the modal personality and values of the group. In this way, organizational leaders play an important role in influencing member congruence through their actions, decisions and communications [52,54]. Similarly, given a choice, individuals will likely self-select by accepting positions into organizations consisting of members the individuals perceived to be similar to them. This process further refines the applicant pool to encourage further personality and values homogeneity. Third, the 'attrition effect' further refines homogeneity by removing members who do not fit the personality and values profiles of the group. Groups and organizations actively "terminate" individuals who do not "fit" with others, and members tend to leave the organization if they do not fit into the environment. That is, they seek to remove themselves if they do not fit the prevailing modal personality and values of the group.

The homogeneity hypothesis is important as it pertains to the personality and values profiles of online social networking groups. When group members are similar in values and personality, we can expect greater cooperation and work cohesion within the group [17] and consequently, greater group functionality and effectiveness. Conversely, differences in individual characteristics among group members can be predictive of less cohesion, more conflict [34,59], and less functionality: "Effective organizations 'maintain' values, attitudes, and norms that contribute to corporate cohesion and morale" ([67], p. 123). For example, groups with similar values and personality are better equipped to behave in complex ways, such as coordinating successful organizational learning and performance. For these reasons, we believe that the homogeneity hypothesis will hold for the modal personality and values of MOSN groups and offer the following hypothesis:

H1a. There is significant between-group variability in online social network member personality traits.

H1b. There is significant between-group variability in online social network member personal values.

3.2. Leader–member congruency

The two remaining hypotheses tested in this study are motivated by an important explanation for the development of homogeneity— the relationship between the characteristics of the leader and the membership. MOSN groups may have one or very few designated leaders who play roles in the formation of homogeneity. According to ASA, leaders may both influence and become influenced by group modal characteristics, which will manifest as a congruence between leaders and members in personality and values.

In the MOSN context, leaders influence member beliefs and attitudes by controlling its structure and initiating and managing group communications. Leaders may change group structure (i.e., interfaces and functions) when they change environmental settings, initiate significant communications affecting the entire group, and control membership. MOSN group leaders communicate with members by group and individual email, message posts, and responding to membership and subscription requests, creating and reporting on polls, and sharing files. Prior research findings suggest that leader communications are integral to online social network strategic success [8], including the quality of group information processing [32]. Prior research has found that leaders influence collectively held and used cultural artifacts in virtual groups [32,65]. Prior research has also found positive relationships between the personality traits of leaders and organizational properties, such as strategy, structure, and decision risk [45].

Members also may influence leader and modal beliefs and attitudes in the MOSN context according to ASA theory [53]. This occurs in cases when members pick new leaders and communicate through posting and email. Member influences on the leader especially occur when leaders allow dissent or suggestions for changes to the group culture: "Higher-level learning takes place as members of the organization question underlying assumptions, procedures, and values, and attempt to substitute new paradigms for old ones" ([59], p. 110). ASA also explains how individuals have experiences that inform them about whether or not they "fit" within the prevailing culture, goals, and needs of the group. Further, those who are found not to "fit" are transitioned out of the group (attrition). Individuals both contribute to, and are subject to, these processes through their reinforcing interactions within the group culture.

Giberson et al. [17] found that the modal personality and values of group members are congruent with the personality and values profiles of leaders in conventional organizations. Because influence occurs through interactions between and among MOSN group leaders and members, we propose the "congruence hypothesis", which predicts that the individual personality and values of leaders will be statistically congruent to the modal profiles of group members:

H2a. In MOSN groups, the modal personality profile is congruent with the personality profile of the leader.

H2b. In MOSN groups, the modal values profile is congruent with the values profile of the leader.

3.3. Leadership style and membership characteristics

Online social network leaders have unique challenges as they interact with the cognitive dimensions of their respective members. They commonly solve personality conflicts and work with culturally diverse individuals [48]. Here, we argue that leadership style both influences and is influenced by modal personality and values in MOSN groups.

By changing the system settings in online social networks, leaders have been shown to influence learning effectiveness: "…designers

should be careful not to use online social networking for the sake of using social technology, and should keep in mind how the use of any type of technology element can support…learning—individually and as a collective group" ([3], p. 24). Prior research on web-mediated online social networking suggests that the ways in which users "store, retrieve and distribute" ([41], p. 417) information influence member learning and group effectiveness. For these reasons, we believe that the leaders of online social networking groups have a more intimate and influential role in the formation of their groups to which they have been previously attributed. Traditional organizational science research on 'strategic leadership' is concerned with the extent to which top managers influence strategic capabilities, which have included decision-making outcomes [21] and organizational learning [64].

Members also have influenced leadership style in traditional organizations, such as when modal characteristics (e.g., personality and values) determine the selection and implementation of leader strategies, including organizational learning (OL). In the OL literature, two distinct collective learning styles have emerged: single-loop and double-loop learning [2,5]. Single-loop learning (SLL) is very common in organizations, is related to incremental and pre-programmed change, and does not challenge prior organizational assumptions. Double-loop learning (DLL) is far less common, is related to radical change, and challenges organizational values. Leaders intending to implement either strategy behave according to the degree of change sought. For instance, change culminated by SLL is influenced by collective member values while change caused by DLL challenges collective member values ([25], p. 127). These learning strategies parallel two 'extent of change' leadership styles espoused in strategic leadership research: transactional and transformational [4]. Transactional leaders are more relations- and participative-oriented and avoid drastic change. Conversely, transformational leaders are directive- and task-oriented and are more open to change. Transformational leaders are more charismatic, inspirational, visionary, emotional, narcissistic, compassionate, empathetic and self-confident than transactional leaders [64].

We suggest that online social network leaders engage in one of two styles when interacting with group members. Transactional leaders are those who use their online social network to stimulate incremental change and communicate with their group in ways that demonstrate SLL. Conversely, we suggest that transformational leaders use their group as an opportunity to stimulate radical change and operate their online social network in the DLL mode. Furthermore, the learning mode employed by leaders is related to the modal characteristics of their groups: "A good organizational memory system is a prerequisite to double-loop learning" ([20], p. 26). This expectation includes modal personality and values dimensions: "These collective experiences [SLL and DLL] serve to create a firm personality and corporate culture that impacts how an organization functions" ([20], p. 26). Furthermore, personality traits of extraversion, power and affiliation are related to leadership effectiveness in traditional organizations [62]. Thus, OL theory explains that in the processing of organizational information leading to change, leadership style (transactional or transformational) both influences and is influenced by organizational members.

H3a. In MOSN groups, the modal personality of the group is related to leadership style.

H3b. In MOSN groups, the modal values of the group is related to leadership style.

4. Methods

This section explains the online social network Internet site used as a data source and study participants, measures, and procedures.

4.1. Sample site

Yahoo Online, Inc. owns several of the most popular web sites in the world [1]. One if these is *Yahoo! Groups* (http://www.groups.yahoo.com), which is among the world's largest collections of online discussion boards. The policies of Yahoo! Groups encourage and facilitate adoption by users of all ages and allow a group to be created for free by anyone in the world. Yahoo! Groups can be configured for different functionalities, intentions, and may be focused on virtually any topic domain. They may be either public or member-only access, some are moderator-only announcement bulletin boards and others are discussion forums open to all membership. Participants may be classified as members or moderators and creating a Yahoo! individual user profile is not necessary for joining a group. Among the features offered to each Yahoo!® Groups member are a group homepage, message posting, internal e-mail relaying, photo and file sharing, free mailing lists, calendar (including announcements), message archiving, bookmarks, access to the registered member list, polls, and database functions. Moderators may email invitations to others to join the group, approve or delete members and messages, edit homepage properties, and manage web tools.

The role of the moderator differentiates Yahoo! Groups from prominent social networking sites such as Facebook, Twitter, and LinkedIn, which are more peer oriented. Because the Yahoo! Groups moderator(s) have control over group configurations and properties, message content, and membership, they are more hierarchical within the group. While Yahoo! Groups members can make choices (i.e., how and how often to receive messages), the content of messages is entirely of the discretion of a moderator, who therefore participates as a group leader. Yahoo! Groups are typically formed to facilitate learning about a specific topic domain, which are categorized in a dozen or so ways.

4.2. Participants

With this background, the criteria for inclusion in the sample frame were three-fold. First, each group was required to be focused on one of three information systems-related topic categories as designated by the *Yahoo! Groups* site: Communications and Networking, Cyberculture, and Software. Second, each MOSN was required to be a serious group oriented toward learning and problem-solving. Third, each had to have at least one leader and three group member responses. All MOSN groups participating in the study were supported by the *Yahoo! Groups* facilities and were moderated.

In order to contact each group moderator, one of the coauthors collected the "List owner" email address from the "Group Email Addresses" box on the right hand side of each group home page. The email addresses of group moderators posted on 756 MOSN groups were collected from *Yahoo! Groups* (http://groups.yahoo.com/), a prominent provider of free web-based services. Fifty-four leaders agreed to provide access to themselves and their group for the study. In order for a group to participate, its leader and at least three members were required to respond to the survey. Accordingly, members and leaders associated with groups not meeting these criteria were removed from the analysis. As a consequence, participating MOSN groups (n = 38) ranged in membership from 80 to 8086 members, with a median of 966. This sample is generally consistent with previous research on leader–member congruence [17]. Consistent with the *Yahoo! Groups* policy for resident MOSN groups, no group reported revenues.

At the discretion of their moderators, MOSN groups may or may not require approval for joining the group. Group moderators reported that such approval was not required (n = 16), required by the group leader (14) or required by committee (4); four did not respond. The ages of group leader respondents ranged from 20 to 67, with a median of 41.5. While the economic differences between MOSN groups and

traditional groups show clear distinctions between the two types, these numbers indicate that the sample of online social networking groups participating in the study was heterogeneous.

Individual participants included 38 (35 male, 1 female; two did not respond) group leaders and 545 (445 male, 101 female) members resulting in a total of 583 subjects. The number of member participants for each group ranged from 3 to 77, with a mean of 16.3. The minimum of three members per group has been accepted in previous research using hierarchical statistical procedures [51,61]. Each member participant was solicited directly by the group leader via message posting to the online social network home page. Twenty two (58%) of the 38 group leaders were founders of their online social network.

4.3. Measures

Among other individual characteristics, personality and values are relatively stable measures and it is therefore reasonable to use them to construct collective profiles to assess the modal dispositions among MOSN groups. Converting these individual characteristics into modal values to represent group profiles has precedence and is accomplished using a wide range of data collection techniques [17,34,54].

Personality was assessed using the 'Big Five' personality inventory [18], which includes five 10-item subconstructs: extraversion, agreeableness, conscientiousness, emotional stability and openness to experience. These measures have theoretical foundations in the five-factor model enumerated by Hogan and Hogan [22]. Further, the use of these personality measures is standard practice in a long tradition of psychology research (see [28,27,30,69]). In order to minimize questionnaire size, we selected three items at random from each construct, resulting in a 15-item, 5 subconstruct measure of personality. Each personality item was anchored along a 5-point response scale of $1 =$ very inaccurate to $5 =$ very accurate. A principal components factor analysis using the Equamax extraction method was applied to personality measures to ensure unidimensionality and reliability before testing hypotheses.

We assessed values using an instrument developed by Smith et al. [57]. This work has its foundations in the work of Hogan and Hogan [22] and Schwartz and Bilski [56]. Originally designed as a 10 subscale, 64 item instrument, we also limited this measure to 3 items per subscale. The resulting 30-item measure assessed ten aspects of personal values: esthetic, affiliation, benevolence, economic, hedonistic, power, security, status, theoretical, and traditional. Each values item was anchored along a 5-point response scale of $1 =$ very unimportant to $5 =$ very important. Again, a principal components factor analysis (also using Equamax) was used to technically assess measures before hypothesis testing.

Hypothesis 3 required the use of a variable measuring the leadership style of each online social networking leader. Leaders were asked, "How would you classify the group's primary function?" and provided with six options: 1) periodic email distribution, 2) learning, 3) socialization, 4) linking vendors and customers (e-business), 5) providing real-time technical answers and 6) others. These options were recoded, based on our understandings of theories on leadership style and collective learning, into either transactional or transformational leader intentions. Leaders who indicated that the purpose for their online social network was real-time technical answers or email we coded as 'transactional' (n = 16), while those indicating that their purpose was learning, eBusiness, or Socialization were coded as 'transformational' (15).

4.4. Procedures

Each group moderator in the sample frame was solicited to participate in a study on MOSN groups in exchange for the posting of results for all participating moderators and group members. Each

participating online social network moderator responded by email with their intentions to participate in the survey. Each was sent a leader survey, which contained 69 items. Of these, 14 questions regarded private identification (for study purposes), group demographics and personal demographics and 45 items assessed personality and personal values. Upon completion of the leader survey, moderators were sent a more detailed explanation of the study in order to encourage more effort in the solicitation of members. As a consequence to responding to the leader survey, group moderators were sent a second survey intended for their members. The second survey excluded group demographics items and contained a total of 51 questions.

To assess the reliability of measures, factor loadings, means, standard deviations, intraclass correlations, and Cronbach's alpha statistics were computed for all personality and values constructs. Hypothesis 1, which suggests that MOSN groups can be discriminated among based upon their modal personality and values profiles, were tested using two separate MANOVAs. These tests used either personality or values scores as multiple dependent variables and both analyses used group membership as the fixed variable. Our intention was to find significant main effects for group membership in the MANOVA results. Hypothesis 2, the congruence hypothesis, first required an overall test of homogeneity within groups. Following Bliese [6], we calculated Intraclass Correlation Coefficients (1) and (2), or ICC(1) and ICC(2). ICC(1) is "the ratio of between-group variance to total variance" ([6], p. 355), and can be interpreted as the "proportion of observed variance in ratings due to systematic between-target differences compared to the total variance in ratings" ([39], p. 8). ICC(2) estimates the "reliability of the group means" ([6], p. 356) and represents a measure of *both* inter-rater reliability and inter-rater agreement. Next, leader–member similarity was assessed using leader individual responses and the modal profiles of their respective groups. We calculated the Pearson correlation between leader and modal personality scores *across* groups as a single correlation to assess leader–member congruence. To test Hypothesis 3, two separate MANOVAs were calculated—one for the three included personality characteristics and one for the eight included values. Both analyses used leadership style as the fixed factor.

5. Findings

Factor analysis results and descriptive statistics of the personality measures are reported in Table 1. The factor analysis applied to personality produced no cross loadings and all factors contained exactly three items as expected. The results of the factor analysis and the descriptive statistics of values measures are reported in Table 2. Again, the factor analysis produced no cross loadings and all factors contained exactly three items as expected. According to accepted practice, all study constructs were found to have acceptable reliability (Cronbach, 1951; [47]). The remainder of this section reports the results of hypothesis testing.

5.1. Hypothesis 1: between-group differences in personality and values

Pursuant to Hypothesis 1, two MANOVA tests (summarized in Table 3) produced significant overall effects for both personality (Wilk's lambda multivariate criteria, $\lambda = .474$, $p < .001$) and values ($\lambda = .211$, $p < .001$). We then examined main effects for each personality trait, finding all five to be significant. The effect sizes (adjusted R^2, or η^2) for significant personality traits were .091 ($p < .05$) for agreeableness, .155 ($p < .01$) for conscientiousness, .103 ($p < .01$) for extraversion, .117 ($p < .01$) for neuroticism ($p < .01$), and .234 for openness ($p < .001$). We found all ten main effects for values constructs to be significant. Effect sizes (adjusted R^2, or η^2) for significant values traits were .04 for esthetic ($p < .01$), .079 for affiliation ($p < .001$), .137 for benevolence ($p < .001$), .210 for economic

Table 1
Statistical Characteristics of the 'Big Five' personality measures.

Big 5 domain	Factor analysis[a]		Construct descriptives[b]			
	Item	Loading	Mean	σ	Mean IIC	Stand. alpha
Agreeableness	1	.848	4.16	.69	.43	.69
	2 (−)	.776				
	3	.724				
Conscientiousness	1	.823	3.67	.76	.54	.78
	2	.793				
	3	.844				
Extraversion	1	.822	3.34	.89	.51	.75
	2	.776				
	3 (−)	.845				
Neuroticism	1	.862	2.36	1.00	.61	.82
	2	.855				
	3 (−)	.824				
Openness	1	.843	3.98	.912	.55	.79
	2 (−)	.859				
	3 (−)	.810				

[a] The following pertain to the Values factor analysis: Kaiser–Meyer–Olkin MSA = .716, Bartlett's Sphericity sig. = .000, Fixed number of factors = 5, Total Variance Explained = 69.38%.
[b] Calculations made after all negative items were reverse scored.

(p<.001), .107 for hedonistic (p<.01), .170 for power (p<.01), .085 for security (p<.10), .129 for status (p<.001), .021 for theoretical (p<.01) and .188 for tradition (p<.01). Thus, the preponderance of this analysis resulted in support for Schneider's [53] 'homogeneity hypothesis' (H1a and H1b). That is, personality and values homogeneity exists in online social networking groups.

Table 2
Statistical characteristics of the values measure.

Big 5 domain	Factor analysis[a]		Construct descriptives[b]			
	Item	Loading	Mean	σ	Mean IIC	Alpha
Esthetic	1	.627	3.83	.61	.35	.61
	2	.714				
	3	.746				
Affiliation	1	.760	3.58	.80	.52	.77
	2	.819				
	3	.773				
Benevolence	1	.827	4.05	.68	.64	.84
	2	.843				
	3	.838				
Economic	1	.734	3.49	.79	.63	.84
	2	.796				
	3	.795				
Hedonistic	1	.836	3.95	.65	.54	.78
	2	.799				
	3	.663				
Power	1	.751	3.77	.78	.56	.79
	2	.585				
	3	.807				
Security	1	.700	3.88	.64	.43	.69
	2	.802				
	3	.736				
Status	1	.838	3.31	.84	.62	.83
	2	.744				
	3	.860				
Theoretical	1	.777	4.35	.52	.39	.65
	2	.681				
	3	.762				
Tradition	1	.820	2.96	.95	.63	.84
	2	.872				
	3	.855				

[a] The following pertain to the Values factor analysis: Kaiser–Meyer–Olkin MSA = .842, Significance of Bartlett's Sphericity = .000, Fixed number of factors = 10, Total Variance Explained = 71.16%.
[b] Calculations made after all negative items were reverse scored.

Table 3
Between-group effects for modal personality and values.

Trait	Type III SS	MS	F	η^2	ICC(1)	ICC(2)	r[a]
Personality							
Agreeableness	25.53	0.69	1.47	0.038**	0.02	0.19	–
Conscientiousness	52.33	1.414	2.69	0.000***	0.05	0.46	.09
Extraversion	46.98	1.27	1.69	0.008***	0.01	0.12	–
Neuroticism	68.71	1.86	1.95	0.001***	0.05	0.47	.27
Openness	113.07	3.06	4.49	0.000***	0.15	0.73	.40**
Values							
Esthetic	22.31	0.60	1.67	0.009***	0.02	0.22	–
Affiliation	50.78	1.37	2.35	0.000***	0.05	0.46	.01
Benevolence	50.85	1.37	3.49	0.000***	0.12	0.67	.23
Economic	93.73	2.53	5.17	0.000***	0.10	0.61	.44**
Hedonistic	40.38	1.09	2.88	0.000***	0.02	0.21	–
Power	79.23	2.14	4.22	0.000***	0.10	0.64	.23
Security	33.86	0.92	2.46	0.000***	0.08	0.56	.07
Status	74.88	2.02	3.33	0.000***	0.06	0.47	.29
Theoretical	13.08	0.35	1.34	0.092*	0.04	0.37	.02
Tradition	126.11	3.41	4.64	0.000***	0.14	0.71	.10

* p<.10.
** p<.05.
*** p<.01.
[a] r is the Pearson's correlation coefficient between leader and modal group characteristics.

5.2. Hypothesis 2: leader–member congruence in modal personality and values

Prior to assessing leader–member similarity, we first needed to demonstrate homogeneity of personality and values among all participants in MOSN groups. In our sample, ICC(1) scores ranged from .01 to .15, suggesting a small to no effect. ICC(2) values of .71–.90 suggest *strong* inter-rater agreement, values of .51–.70 suggest *moderate* inter-rater agreement, and values of .31–.50 suggest *weak* inter-rater agreement [39]. ICC(2) scores in our sample ranged from .12 to .73. Thus, on a trait-by-trait analysis, the results suggest no agreement to strong agreement. The *F* statistics from the ANOVA equations used to calculate ICC(1) and (2) were significant for those traits demonstrating at least weak inter-rater agreement, providing sufficient justification for aggregating those respective individual responses to create modal scores [37]. For subsequent analyses, those traits demonstrating no inter-rater agreement (ICC(2) = .3 or less) were dropped (i.e., agreeableness, extraversion, esthetic, and hedonistic).

H2a posited that the modal personality profile is congruent with the personality profile of leaders in MOSN groups while H2b tested the same for values. We tested these hypotheses by first calculating a mean member personality and value score for non-leader members of each participating group. The result was eleven (one for each included personality and values construct) pairs of mean member and leader trait scores. This particular analysis evaluated the extent to which leader and follower traits were similar by trait across groups. To test congruence on a trait-by-trait basis, we calculated a Pearson's correlation for each pair within groups, resulting in eleven coefficients (see Table 3). With regard to personality traits, openness produced a significant correlation between modal and leader traits (H2a). With regard to values, the economic construct produced a significant correlation (H2b).

The next analysis assessed the similarity in the leader and modal *profile* of personality, values, and all traits across groups. This provides a view of the broader congruence between leaders and modal profiles. In order to further evaluate the similarity in leader and modal profiles, we ran three separate analyses (i.e., personality, values, and combined). For personality, we calculated the modal personality score for conscientiousness, neuroticism, and openness for each online social network. Next we calculated the Pearson correlation between leader and modal personality scores *across* groups as a single correlation, resulting in a Pearson r = .69, p<.001. We followed the same procedure for values

and then all traits as a profile across groups and found $r = .35$ ($p<.01$), and $r = .51$ ($p<.01$), respectively. Consequentially, we found support for our 'congruence hypothesis' (H2a and H2b). The results suggest that the personality and values homogeneity found among online social networking groups in tests of H1 is also present between MOSN leaders and members.

5.3. Hypothesis 3: leadership style and modal personality and values

Hypotheses H3a and H3b suggest that group personality and values profiles are related to leadership style (transactional vs. transformational). The MANOVA procedure found significant overall effects for both personality ($\lambda = .993$, $p<.01$) and values ($\lambda = .971$, $p<.01$). Reviewing the main effects for each personality trait, we found openness to be significantly higher in groups whose leadership style was categorized as "transformational" ($\eta^2 = .039$, $p<.001$). Regarding values, significant effects were found for benevolence ($\eta^2 = .06$, $p<.1$), status ($\eta^2 = .09$, $p<.1$), and tradition ($\eta^2 = .040$, $p<.05$) (refer to Table 4). Thus, this analysis resulted in partial support for H3a and H3b, that leadership style is a MOSN group characteristic related to the personality and values profiles of members. Table 5 summarizes the level of support for each study hypothesis.

6. Discussion

Among study contributions, the findings provide further evidence that personality and values are important user characteristics in the management of complex information systems. We extend prior MIS research by showing that personality and values are intertwined with the formation of MOSN groups. We also extend traditional organizational research by demonstrating that MOSN groups *also* develop discernable personality and values profiles, and that these profiles are related to characteristics of the group leaders. Interestingly, considering the mean trait scores across all participants, the personality traits agreeableness and openness to experience and the values traits of benevolence and theoretical were the highest rated characteristics. Theoretical and openness to experience traits are both related to an interest in learning, new ideas, and experiences. Given that the stated purpose for most MOSN groups in this study was "learning" this may provide some insight as to the "type" of person who may naturally gravitate to the medium. Similarly, benevolence and agreeableness

Table 4
Leadership style effects for modal personality and values.

Trait	Type III SS	MS	F	η^2	Group modal transactional	Group modal transformational
Personality						
Agreeableness	.24	.14	.51	.48	4.25	4.16
Conscientiousness	1.35	.61	2.34	.13	3.86	3.65
Extraversion	.00	.00	.00	.96	3.34	3.34
Neuroticism	2.45	.98	2.43	.12	2.09	2.37
Openness	.03	.79	.04	.84	4.02	3.98
Values						
Esthetic	.38	.63	1.02	.31	3.74	3.85
Affiliation	.77	.46	1.23	.27	3.73	3.58
Benevolence	1.64	1.12	3.56	.06*	4.27	4.04
Economical	.94	.77	1.51	.22	3.33	3.50
Hedonistic	.48	.35	1.13	.29	3.84	3.96
Power	.34	.63	.56	.46	3.68	3.78
Security	.25	.41	.62	.43	3.81	3.89
Status	2.01	.67	2.92	.09*	3.55	3.30
Theoretical	.56	.28	2.07	.15	4.46	4.33
Tradition	1.15	.89	1.26	.26	3.13	2.94

* $p<.10$; ** $p<.05$; *** $p<.01$.

Table 5
Summary of hypothesis support.

Hypothesis	Support
Between-group differences in personality and values ('homogeneity hypothesis')	
H1a: Between-group variability in member personality	Strong
H1b: Between-group variability in member values	Strong
Leader–member congruency ('congruence hypothesis')	
H2a: Leader–member personality congruence	
Test 1: Mean profiles across members	Partial
Test 2: Modal profile across groups	Strong
H2b: Leader–Member values congruence	
Test 1: Mean profiles across members	Partial
Test 2: Modal profile across groups	Strong
Leadership style and membership characteristics	
H3a: Modal personality related to leadership style	Not supported
H3b: Modal values related to leadership style	Partial

are both related to getting along with others, which seems critical in an online forum wherein the typical verbal, vocal, and visual cues are inherent in face-to-face (and to some degree phone-based) communication.

This research investigates three primary hypotheses regarding the nature of the personality and values of leaders and members in MOSN groups. Hypothesis 1 was concerned with whether differences in personality and values exist between MOSN groups. We found that MOSN groups are characterized by distinguishable modal profiles. Of the five personality measures tested, three were found to be significantly different: conscientiousness, neuroticism and openness. Of the ten values constructs, eight were significantly different: affiliation, benevolence, economic, power, security, status, theoretical and tradition. Together, these traits contribute to the unique personality and values profile of each online social network. ASA theory might suggest that the online social network purpose, process, leadership style, etc. would attract and retain members whose personality and values traits are a good "fit" with these online social network structural and interpersonal features, over time resulting in a relatively homogeneous set of personality and values characteristics.

Hypothesis 2 was concerned with whether or not leader personality and values were related to their respective group's modal personality and values in MOSN groups. More specifically, Hypotheses H2a and H2b suggest that the modal personality and values profiles for online social network members will be relatively congruent with leader personality and values, respectively. First, we found online social network member and leader openness trait and economic values scores to be significantly related across all participating MOSN groups. These results suggest that leaders and followers within a MOSN group may be characterized by higher scores on the openness and economic constructs.

Our analysis suggests the "types" of individuals who may be more inclined to participate in MOSN groups. Individuals scoring higher on openness tend to seek new experiences, enjoy learning, and tend to be intellectually curious [11]. While we do not have a control group for comparison, it seems reasonable that individuals interested in participating in an online social network (vs. a traditional learning outlet) may score relatively higher on openness. Roughly half of the MOSN groups included in our sample were connected in some way with work—in many cases groups that provide answers to technology-related questions. This problem-solving and learning-oriented culture in the MOSN groups we sampled lends itself to the need for openness. This culture may also account for the similarity in economic values among members and leaders, as individuals holding higher economic values tend to be interested in gaining wealth, earning money, and realizing profits [22]. Thus, to the extent that the online social network topic or service brought together individuals dealing in commerce or business in some regard (as opposed to a purely humanitarian forum, for

example), it seems reasonable that, collectively, the study participants would hold generally similar economic values.

Hypothesis 3 introduced leadership style as a variable of interest for explaining group homogeneity. As theorized in prior research, we were interested in testing whether or not leadership style plays a role in the formation of group homogeneity. We found that the leadership style of leaders is not related to any personality construct used in the study. However, leadership style was found to be related to some values profiles of members in online social networking groups. Specifically, MOSN groups scoring high on the values of benevolence and status also score high on leadership style. This implies that higher benevolence scores in an online social network pursuing more transformational types of leadership thinking. Higher member benevolence may support relationship-needs when pursuing more threshold-pushing ideas and discussions, as well as "soften" the higher power. Similarly, networks having a higher status value will likely strive to associate with MOSN leaders who have either attained, or are likely to attain, status themselves through a transformational leadership style. In summary, the combination of benevolence and status values that we found to differentiate between transactional and transitional leadership may be a natural and necessary characteristic supporting the goals of both leadership extremes.

The findings of this paper have implications for methodology, theory and practice. Methodologically, the findings of this study inform organizational science in at least two ways. First, we found the well-accepted individual-level personality and values constructs to be psychometrically valid and suitable for advancing our understanding of the online social network setting. This is significant in MIS research, which is just beginning to make progress developing theory in online social network settings. This suggests that factors not included in this study (i.e., other than personality and values) may serve as valid measures for differentiating online social networking groups. Second, this study uses individual personality and values to form *modal profiles* in online social networking groups. The modal measures were useful in differentiating between online social networking groups. Third, the findings of our congruence hypothesis (H2) speak to the utility of leaders as group proxies in studies. As is common across the social sciences, MIS studies commonly use leaders as proxy respondents in organizations. Our findings suggest that the use of leaders as organizational proxies is only partially valid. We found leader–member congruence for the openness personality trait and the economic values trait. However, leader–member congruence did not exist for the other modal personality and values characteristics.

This study contributes to organizational theory in a variety of important ways. First, the study replicates hypothesis tests (H1 and H2) previously applied to samples of traditional organizations [17,54] in an online social network setting. While the *homogeneity hypothesis* (H1) has been tested several times in traditional organizations, we found support for the first time using a sample of MOSN groups. The H1 results suggest that online social networking groups, like traditional organizations, can be reliably discriminated between using their personality and values profiles. Our congruence hypothesis (H2) findings suggest that personality effects on the success of the overall MIS effort found in traditional organizations [29] may also be observed in virtual environments.

Second, findings with regard to the *homogeneity hypothesis* (H1) extend understandings about ASA to virtual groups. The theory posits that over time, groups become relatively homogeneous in the personality and values of their members. We found that individuals are likely to seek to join and participate in online social networking groups due to their perceived fit with the personality and values profiles of the group. In other words, online social network membership is partially an expression of personality and values.

Third, the findings of the congruence hypothesis (H2) inform the literature on strategic leadership and collective learning. Findings showed that leaders play a role in the formation of the modal characteristics of

MOSN groups. By indicating that distinct modal patterns exist within MOSN groups, H1 implies the existence of a new source of capital that may be leveraged by traditional organizational leaders. The findings regarding H2 show that leaders are a source of this capital. Therefore, one requirement of online social network leaders is an ability to interact effectively with members in virtual environments. Online social network leaders successful at these interactions may leverage 'member capital' for their own benefit, whether it is for personal or professional gain.

Fourth, this paper extends prior work by testing a new hypothesis (H3) regarding the role of leadership style on the formation of modal personality and values of online social networking groups. The hypothesis was partially supported, suggesting that leadership style is associated with homogeneity as indicated by modal values. This finding suggests that values may be related to other complex socio-technical capabilities relevant to online social networking groups. The H3 results do not provide evidence that modal personality is related to MOSN leadership style. Our discussion has emphasized similarities in the leadership style and collective learning literature and opens the discussion of influences on modal characteristics to many other systems adoption theories. In other words, our findings suggest that innovation diffusion theories (e.g., TAM and TRA) may also stimulate group homogeneity as indicated by modal personality and values measures.

While this paper focuses on explaining personality and values homogeneity in MOSN groups using ASA theory, the relevance of homophilic theory is clearly apparent. Homophily is the tendency of individuals to associate with similar others [35] and is often explained by the adage "birds of a feather flock together." As previously demonstrated in prominent MIS research [16], homophily may be driven by status or values similarities, making the theory especially relevant to this paper. However, while homophilic theory is used to describe sociological phenomena across a wide spectrum, we believe that ASA theory is more relevant to competitive organizations, which is the focus of this paper.

7. Conclusions

7.1. Implications for practice

Our results have a wide range of implications for practitioners of both MOSN groups and traditional organizations. First, this study shows that non-design issues significantly influence the formation of online social network membership. This implication is important since most pertinent research focuses on improving the design of either the infrastructure or user interface of the online social networking site [24]. H1 findings indicate that distinguishable personality and values profiles exist in online social network environments. Consequently, practitioners should consider the ways in which the intellectual properties of the MOSN groups in which they participate can limit or enhance strategic advantage.

Second, our findings strongly suggest that the differential modal characteristics found to be present in MOSN groups may impact the success of MIS and other departments. Using IS development as an example function, managers may consider enlisting key personnel to lead and form MOSN groups. This can be accomplished using at least two strategies of which we can conceive: 1) form an online social network for each defined job role, or 2) form an online social network to support either the department or departmental teams. Findings indicate that such arrangements hold promise and the modal characteristics formed within MOSN groups should be considered a potential asset that may be leveraged by these departments.

Third, our findings suggest the "type" of individuals who may be attracted naturally to MOSN groups—as suggested by the personality and values factors we found to characterize members. Table 1 shows that the personalities of online social networking members are characterized by high levels of agreeableness and openness to experience and low levels of neuroticism. The values of such members are characterized

by high scores on the theoretical and benevolence dimensions and low scores on the tradition and status scales.

H2 findings show that leader–member congruence in the openness personality trait is related to membership formation in MOSN groups. Similarly, when there is congruence between the member and leader on the economic values trait, membership is more likely. Using this approach, leaders and members high on openness and economic traits tend to congregate in MOSN groups. Future research is needed to determine the roles these personality and values types play in determining group effectiveness.

7.2. Limitations

7.2.1. Non-response bias

While the web-based delivery of the survey instrument was the only practical way to collect data from members of MOSN groups, this aspect likely resulted in non-response bias. The sample was likely skewed by the inclusion of respondents who are more active within the online social network than non-respondents. Another possible source of non-response bias is the use of moderators in the recruitment of members. Respondents may likely have greater affinity, off-line relationship, or simply a more a positive rapport with the group leader. Also, the sample of leaders and members was predominantly male. For these limitations, we have no comparison data available testing differences between such a sample and a random sample. Each of the above points may have influenced the results of H2 and H3, which were partially supported.

7.2.2. Generalizability

We acknowledge several limitations to the generalizability of study findings. First, the phrase "moderated online social networks" implies a limited focus on only social networks that are web-mediated and moderated and consequently constrain generalizability. Therefore, the results of all three hypotheses may not apply to online groups that are based on network centrality, such as Facebook and LinkedIn. Second, the lack of random sampling of groups and members resulted in a volunteer sample, which may also limit the generalizability of all results. In future research, this can be tested using multiple subject recruitment strategies and comparing the results. Third, the sample size of 38 organizations used in H2 and H3 reduces statistical power and the generalizability of those results.

One the other hand, data collection involved asking group leaders to solicit the participation of members without regard for whether the leader had anything to do with the member joining.[2] This was believed to decrease homogeneity findings in the sample and consequently made the three hypotheses more conservative tests. Therefore, we believe that all study findings are more valid than if assurances were made that all members had been recruited by the leaders. Because of the study sampling procedure, we believe that the findings are more generalizable to samples in which employees are randomly sampled.

7.3. Future research

Results presented here provide evidence regarding the personality and values influences among leaders and members of MOSN groups. Findings suggest that there is a systematic role, although more research is needed to understand the nature of this process. Additional research is needed to understand this process: What influences leader–member homogeneity over time?, What leader role is important in its operation?, and How can it enhance online social network effectiveness? Due to the implications of homogeneity in MOSN groups, research is needed to better understand its relationships with life cycle stages, adaptability, and member benefits.

While we found that MOSN groups have distinguishable modal profiles, we could not deduct distinguishable or preferable patterns from our findings. Future research, with a larger and a more systematic sample, may help uncover such patterns. Furthermore, subsequent research may reveal how distinguishable patterns in MOSN groups may positively improve group functionality. Future research should investigate how social arrangements influence the formation of modal personality and values. For example, it would be interesting to test whether our findings of congruence will be more or less pronounced in MOSN groups containing members in the same physical IS department. Future research is also needed to better understand the specific aspects of collective learning that are influenced by the modal personality and values of online social networking groups. All organizations engage in organizational learning to some degree, but how can online social network-mediated cultures cause specific kinds of learning capability in firms? Answers to such questions would be useful to managers seeking to exploit the intellectual capital made available by the highly accessible online social network medium.

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