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From conformity to reactance: Contingent role of network centrality in consumer-to-consumer influence

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Central consumers in a group often are influential, because their social prominence commands conformity from other members. Yet, there can be another contradictory effect of centrality, such that other members regard it as a threat to their attitudinal freedom and express reactance instead of conformity. Whether a group member conforms or reacts to the evaluation of a more central member might depend on the strength of their relationship, which determines the social cost of disagreeing. We provide evidence of such an interaction between centrality and relational strength with an experiment where participants with preexisting affective ties of varying strengths taste a snack in groups (Study 1) and a field study where participants connected by instrumental ties consume a complex service (Study 2). A scenario-based experiment manipulating centrality and strength of ties provides further evidence that reactance underlies the observed effects (Study 3).

Keywords:

Consumer-to-consumer influence

Centrality

Shared consumption

Tie strength

1. Introduction

By sharing their opinions, information, and personal experiences with a product, consumers influence one another (Cohen & Golden, 1972; Zhu & Huberman, 2014), some more than others (Flynn, Goldsmith, & Eastman, 1996; King & Summers, 1970). A well-established goal in marketing research is to understand these disparities in influence, to be able to leverage the most influential consumers (Godes, 2011; Libai et al., 2010). One popular approach to this challenge is to consider any group of consumers as forming networks, whose structure determines the consumer-to-consumer influence processes (Lee, Cotte, & Noseworthy, 2010). Because social ties are unevenly distributed, some consumers occupy central positions, whereas others remain peripheral, and the differences in their influence are significant (Friedkin, 1993). Marketing studies regularly confirm that network centrality (i.e., being connected to many other consumers) confers influence on a consumer, yet to the best of the authors' knowledge, these studies focus solely on products consumed individually (e.g., studying how social relationships influence a focal consumer in selecting a piano tuner, Reingen & Kernan, 1986). Network positions likely also affect consumer-to-consumer influence processes in co-consumption contexts though, in which all parts of the network synchronously share the consumption experience (e.g. a group of colleagues eating at

a restaurant). This article seeks to fill a gap by analyzing the influence that two consumers have on each other, as a function of their relative network centrality in a co-consumption group. With their co-presence, the social asymmetry associated with vastly different centralities becomes particularly salient and exerts situational pressure on peripheral consumers to conform with the evaluations of central consumers. But this pressure does not necessarily result in conformity. Because it conveys a potential threat to attitudinal freedom, it might spark reactance (Fitzsimons & Lehmann, 2004; Mourali & Yang, 2013).

By demonstrating the ambivalence of centrality, which may drive either conformity or reactance, this paper contributes to a network approach to consumer behavior. Prior research conceptualizes influence as either positive (peripheral consumer aligns attitudes or behaviors with those of a more central consumer) or non-existent (peripheral consumer ignores the opinion of the more central one), which is consistent with the practical aim of activating favorable influences. But this approach ignores the prediction of reactance theory that influence attempts might backfire and induce consumers to diverge radically from their source. To examine the conditions in which such “boomerang effect” may be likely, this research builds on prior findings that suggest reactance depends on the cost of resisting (Miron & Brehm, 2006). We argue that, for a focal consumer participating in a co-consumption episode, the cost of disagreeing with a highly central participant depends on the strength of their relationship, a network dimension that determines attachment, mutual binding, and constraints on action (Granovetter, 1973). With these considerations, the current research responds to a call from Lee (2014) to address the role of centrality in

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relation to tie strength, providing support to the notion that studies of consumer networks cannot separate structural and relational dimensions.

Accordingly, the current article presents two co-consumption studies, among groups of people who know one another with varying intensity. The studies both consist in analyzing all pairs of members (all dyads) within those groups, measuring the dyadic difference in their satisfaction with the consumable, the dyadic difference in their centrality scores and the strength of their tie. In Study 1, participants consumed a new snack together and then evaluated the product (shared condition). Another set of participants tasted the same product but had no possibility of communicating with or seeing any others (solitary condition). The results confirm the predicted interaction effect between centrality and tie strength on product evaluation only in the shared condition. Study 2 then confirms this interaction in a very different context, with a high involvement, utilitarian service consumed over several months (i.e., business education). Last, in study 3, a scenario-based experiment, centrality and tie strength are manipulated in order to provide further evidence that centrality generates threat to attitudinal freedom and that both variables interact to affect reactance behaviors.

2. Network centrality and consumer-to-consumer influence

Centrality is one of the most frequently considered network characteristics, because of its demonstrated effect on social power and structural influence (Marsden, 2002). High network centrality affects a variety of marketing outcomes, including new product adoption (Katona, Zubcsek, & Sarvary, 2011; Kim & Park, 2011), product-related information-seeking behavior (Lee, 2014), and shopping behavior (Gentina & Bonsu, 2013). In a similar vein, centrality appears correlated with opinion leadership (Gentina, Butori, & Heath, 2014; Lee et al., 2010; Risselada, Verhoef, & Bijmolt, 2015). Central consumers are influential, first, because the number of others they reach in their daily social interactions is greater than the number reached by more peripheral consumers. Centrality also confers a “social hub” position (Goldenberg, Han, Lehmann, & Hong, 2009), such that the person serves as a passage point for information that flows throughout the network. With broader information sources, central consumers thus tend to be perceived as better informed, and their advice is more sought after by other consumers (Lee et al., 2010). Finally, centrality provides preferred social status (Ibarra & Andrews, 1993), such that central consumers enjoy more integration and acceptance in the network (Gentina et al., 2014). Their influence thus stems from the inclination of peripheral consumers to conform to their opinions, as part of an integration strategy (Van den Bulte, Wuyts, Dekimpe, Gijbrecchts, & Pieters, 2010).

3. Pressures to conform to central consumers when consumption is shared

Centrality in networks was found to influence consumer behavior in a variety of settings, from selecting a piano tuner (Reingen & Kernan, 1986), to choosing to prescribe a new drug (Iyengar, Van den Bulte, & Lee, 2015), to deciding to affiliate with a social media platform (Goldenberg et al., 2009; Katona et al., 2011). In these contexts, social interaction has the potential to intervene in consumers' thinking, either before (decision making) or after (evaluation) consumption. The consumption episode itself is not shared with others though; in prior studies, centrality does not operate *during* consumption.

Yet extensive literature on small group dynamics suggests that synchronous interactions with other consumers during consumption should affect the role of network centrality. Confronting other group members, especially peer group members (Childers & Rao, 1992), results in significant attitude changes, due to social pressures to conform with what is perceived as the majority opinion (Asch, 1955; Kaplan, 1987). Imagine a set of five consumers going out for dinner in a group. A reasonable prediction asserts that all of them refrain from sharing

aspects of their judgments that they deem socially inappropriate when evaluating the meal (Ramanathan & McGill, 2007). Yet such a view is structure-blind, in that it ignores preexisting ties among the group, which may produce very different social positions for the individual members. As some in the group may already know each other well, and others may not, the shared experience generates a temporary social structure, assigning a specific centrality level to each participant, presumably with consequences for their perceived attitudinal freedom.

Assume that in this example, a consumer B is a friend of all other participants, but consumer A is friendly only with B and barely knows the others. Given the unique group composition at that dinner, B has a much more central position than A. According to a network approach, the typical pressures for conformity in small groups will have a disproportionate effect on A. First, A lacks information to determine accurately what is socially appropriate for the group and perceives B as better equipped in this respect. Second, with her high centrality, during that dinner B will have a stronger influence in defining appropriateness, not just appraising it (Friedkin, 1993). Using B's opinion as a proxy for appropriateness and conforming to it thus will be an appealing strategy for A. Third, because she is more central, B is likely to fill more of the conversational space and can be more outspoken in sharing her opinion (Lee et al., 2010). As research shows, central nodes in a network are more prone to assertiveness (Brass & Burkhardt, 1993). Overall, these arguments suggest that during shared consumption, peripheral consumers feel pressure to conform with the opinions of more central others.

4. Interaction between centrality and strength of ties

If centrality generates pressure to conform, then a reasonable prediction would be that less central consumers tend to respond to this pressure by simply conforming to more central ones. Following Asch's seminal work (Asch, 1955), the conformity literature has grown extremely strong, providing various explanations for that kind of response to normative pressure (Chartrand & Bargh, 1999; Cialdini & Goldstein, 2004). However, pressure to conform can also backfire and result in reactance, defined as a motivational state directed toward restoring freedom in response to perceptions that this freedom is under threat (Miron & Brehm, 2006). Following threats to attitudinal or behavioral freedom, people often react by asserting it “more forcefully than they would otherwise” (Kray, Thompson, & Galinsky, 2001: 948). For example, smokers might smoke more in response to pressures exerted by a spouse to quit the habit (Miron & Brehm, 2006). Marketing studies observe reactance among consumers opposing the norm or experts' recommendations (Fitzsimons & Lehmann, 2004; Algesheimer, Dholakia, & Herrmann, 2005).

Because the situational pressure to conform and the urge to reassert freedom are countervailing forces, reactance theorists often focus on isolating the conditions in which one prevails over the other (Miron & Brehm, 2006). A key factor is the extent to which negative outcomes might result from reacting (Crawford, McConnell, Lewis, & Sherman, 2002; Heilman, 1976). Considering our case, negative outcomes lie in the social cost of disagreeing, which should depend, according to network theories, on the strength of the tie, a multifaceted notion that captures the “amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services” between two persons (Granovetter (1973: p. 1361).

An intuitive take on the issue would be that disagreement is easier to express when the tie is strong, as intimacy might allow greater possibility to speak one's mind openly and thus freely express disagreement. Weak ties, on the contrary, supposedly command more restraining in the course of social interactions, less self-exposure and transparency in confiding, because reciprocity on the other end of the relationships isn't guaranteed (Granovetter, 1973). However, there is also considerable support for the reverse argument that social cost of disagreeing should increase with tie strength. With a strong tie, further interactions,

beyond the focal consumption episode, are to be expected, which according to interdependence theory should make a difference (Davis & Rusbult, 2001). The episode is just one occurrence in a longer-term relationship-building process, thus negative outcomes are to be expected in the future (e.g., denial of social support), making the option of conforming more appealing than restoring attitudinal freedom through reactance. If the tie is weak though, the prospect of no or limited interactions in the future might leave more room for reactance (Pallak & Heller, 1971). Other arguments rely on balance theory (Davis & Rusbult, 2001). Regardless of further interactions, disagreement with a strong tie carries a potential for discomfort that people tend to avoid; they rather search for opinion consistency (Priester & Petty, 2001). Moreover, agreement avoids the painful suspicion that a difference in opinion might be symptomatic of decreased attachment, which reduces the risk of weakening the tie (Heider, 1958). If the tie is already weak though, it has limited value, so nothing is to be lost by disagreeing.

The above-mentioned mechanisms should be dramatically emphasized when tie strength is considered, not in the privacy of one-to-one interactions, but in the context of a larger group of other preexisting ties, with dyadic interactions taking place in the presence of other persons. Disagreement with a highly central interaction partner in that case should be even more difficult to express, as the salience of multiple other connections of the central member makes the focal tie appear less “exclusive” and more fragile. Also, there might be a fear that others in the group take disagreement as a sign of poor relationship with the more central member.

Taken together, these arguments suggest that a consumer’s response to the pressure to conform to a more central consumer should be driven by relational strength in the dyad. When the tie is strong, difference in centrality levels should reduce disagreement (conformity effect); when the tie is weak, this difference should increase disagreement (reactance effect).

5. Study 1

Study 1 aims to test the predicted interaction between difference in centrality levels and tie strength on product evaluation in a controlled setting. In a taste test, participants first consumed as a group, then evaluated the food product individually. This study used food as the focal product because people commonly eat together, and influence of others on food evaluations already has been demonstrated (Cruwys, Bevelander, & Hermans, 2015). Participants tasted an Indian snack unavailable for purchase in the study setting (France). Thus, none of them was acquainted with this “exotic” foreign food, and the experience features ambiguity that typically favors social influence (Deutsch & Gerard, 1955).

According to our arguments, the interaction between difference in centralities and tie strength stems from a situational pressure to conform, which results from knowledge of others’ opinions, gained through communication, and consciousness of the structure of preexisting social ties in the group. However, latent confounders such as shared traits also could prompt the predicted effects (Goldsmith-Pinkham & Imbens, 2013), resulting in agreement that is unrelated to social dynamics. Two participants may rate similarly (differently) the product just because they have similar (different) preferences and not because they influence each other by sharing their opinions. Therefore, in addition to the condition in which members of the groups could talk and share their opinions (thereafter referred to as the shared condition), another condition mandated that participants consume and evaluate the product individually (thereafter referred to as the solitary condition). The study was thus a one-factor (shared condition, solitary condition) between-subject experiment. In line with prior research that uses similar designs (Falk & Ichino, 2006; Ramanathan & McGill, 2007), the analysis of the data from the solitary condition functioned as if consumers were in groups, such that the analysis considered “pseudo-groups”. If, as expected, the predicted effects arise in the shared condition but not in

the solitary condition, they must be due to interaction dynamics, not latent confounders (Iyengar et al., 2015).

5.1. Participants

129 students enrolled in a two-year undergraduate program at a French college of business voluntarily participated in the study ($M_{age} = 18.80$ years, $SD = 0.94$ years; 64% female). This specifically targeted population offers adequate variability in the relational strength across members. All the courses of this program take place in the same location, a small building with 11 classrooms. Yet first- and second-year students never have classes together, and within each year, students have some classes in plenary sessions and most classes in small groups composed at the beginning of the academic year. Thus the relational strength of dyads of students varies, from knowing each other only by sight (e.g., two students from different program years) to knowing each other very well (e.g., two students in the same year and small group). This context is thus well suited for this experiment, which requires participants in variable network positions in a given co-consuming group.

5.2. Procedure and material

The data collection involved two steps. First, students completed a questionnaire and, on a roster of all students enrolled in the program, indicated their level of friendship with each student (to ease recall, names were listed by groups or cohorts, and then sorted alphabetically). The survey took place in a computer room during a course meeting, delivered by a teacher claiming to conduct research on creativity. This teacher did not appear as a stakeholder in the taste test phase.

Second, four weeks later, students were randomly assigned to the shared or solitary condition. Participants in the shared condition also were randomly assigned to co-consumption groups of four persons. To minimize the possibility of participants chatting about the study and jeopardizing its validity, the taste test data were collected in a single day. All participants received a preliminary briefing in an auditorium: They would take part in a product test for an Indian snack targeted at the French youth market. To improve the credibility of this cover story, an Indian researcher was introduced as the manager of the Indian company commissioning the survey, and two others were introduced as French professors providing consultancy services. All three were unknown to the participants.

The data collection for the shared condition occurred in a classroom (30×20 m²). A table and chairs in the center of the room helped enable the shared consumption. Group members, seated around the table, received a reminder of the study purpose, as indicated during the preliminary briefing. Each participant received about 20 cl of the snack and 20 cl of water in plastic glasses. After asking them to consume as much or as little as they wanted, the experimenter left the room, saying he would give them each a questionnaire afterward so that they could offer their product opinions. The experimenter said nothing about whether participants could talk while consuming. After 8 min, the experimenter returned with pen-and-paper questionnaires, directed the participants to four chairs placed in the four corners of the room, and asked them to fill in their questionnaires on their own, without any discussion. While doing so, the participants could not see one another. This design reflects recommendations from prior research that suggests participants should be allowed to judge by themselves to give free expression to their reactance (Clee & Wicklund, 1980). Finally, the experimenter asked the participants not to discuss their experiences with those yet to take the taste test. To maintain equivalence between the two conditions, participants assigned to the solitary condition were also invited to participate in batch of four persons, following a random assignment. These participants underwent an identical procedure but were seated in isolated cubicles, and consumed and evaluated the product on their own.

Table 1
MRQAP regression results for dyadic difference in satisfaction (study 1, shared condition).

Variable	Model 1			Model 2		
	<i>b</i>	β	<i>p</i>	<i>b</i>	β	<i>p</i>
Tie-strength	0.14	0.19	<0.01	0.27	0.38	<0.01
Δ centrality	0.01	0.01	0.40	0.09	0.19	0.02
Δ sweetness	-0.19	-0.18	<0.01	-0.18	-0.17	0.01
Δ spiciness	0.17	0.13	0.02	0.18	0.13	0.02
Δ saltiness	-0.05	-0.03	0.30	-0.06	-0.04	0.26
Δ fattening	0.23	0.17	<0.01	0.22	0.16	0.01
Tie-strength \times Δ centrality				-0.04	-0.25	0.01
R ²		0.11			0.13	

5.3. Measures

In order to measure the dependent variable, participants rated their overall satisfaction with the snack on a semantic differential scale (“What is your level of satisfaction with the snack you just ate?”; 1 = “I am not satisfied at all,” 10 = “I am very satisfied”; Oliver, 2006; Kekre, Krishnan, & Srinivasan, 1995). Because the key dependent variable is the level of disagreement between two group members, the measure relied on the dyadic difference in satisfaction. For the dyad {*i*,*j*}, the difference in satisfaction is $|\text{satisfaction}_i - \text{satisfaction}_j|$, where satisfaction_i is participant *i*'s overall satisfaction with the snack. The dyadic values entered two square matrices, one for the shared condition and one for the solitary condition. Cell *ij* of a matrix contained the difference in satisfaction between *i* and *j* if *i* and *j* belonged to the same (real or pseudo) group and *i* \neq *j*. Otherwise it was blank.

To assess the strength of ties, following Baldwin, Bedell, and Johnson (1997), the sociometric questionnaire contained a measure of friendship that asked each respondent to indicate the amount of leisure time spent with each of the other students (0 = “do not spend any time together,” to 5 = “hang out very often”).¹ Friendship ties were chosen because they resonate well with the hedonistic nature of the product consumed. That is, snacks often are consumed by people enjoying themselves with friends. In the resulting valued adjacency matrix, each cell contains a value (0–5) that indicates the level of friendship.

For each respondent, his or her degree centrality is the sum of preexisting ties that he or she has with other participants in the same consumption group. Formally, $C_i = \sum_{j \neq i}^K t_{ij}$, where t_{ij} represents the value of *i*'s tie to *j* stored in the adjacency matrix, and *K* is the number of persons in the consumption group (Knoke & Yang, 2008). When network data is binary (two nodes either have a tie or have no tie), *t* takes either 0 or 1 and centrality is merely a count of ties. In our case, though, the network is valued: cells in the matrix vary with strength. Degree centrality is then a summation of strengths from the focal node to all others in the network (Knoke & Yang, 2008; Borgatti, Everett, & Freeman, 2009). For the dyad {*i*,*j*}, the difference in centrality is defined as $|C_i - C_j|$.

Finally, several covariates were measured. The dyadic difference in satisfaction with the new snack can be driven by similar (or dissimilar) ratings of specific product attributes (Oliver, 2006). For example, two participants may love (hate) spiciness and therefore be similarly satisfied (unsatisfied) with the new snack for this reason. Therefore, participants rated their satisfaction with several attributes of the snack—sweetness, saltiness, spiciness, and fattiness—on 1–7 semantic differential scales (“How satisfied are you with each of the following

¹ The measurement of strength based on frequency sometimes relies on objective measures (e.g. “once a year”, “once a month”, etc.). We opted for a scale with only 2 anchors with rather subjective wording because asking to recall specific interactions might increase the recency bias which is typical in network studies (Brewer, 2000): a respondent urged to provide a specific number of interaction will usually base his/her response on the very last week of interaction much more than on the “typical week”, even though the last week might be totally unrepresentative of usual interaction patterns (Chang & Krosnick, 2003).

characteristics of the snack?”; 1 = “not satisfied at all,” 7 = “very satisfied”). We opted for a “one item per attribute” logic, consistent with prior demonstrations of its robustness (Kekre et al., 1995; LaBarbera & Mazursky, 1983). The differences in ratings then could be calculated for each dyad and each product attribute. For spiciness for example, the evaluation difference between participant *i* and participant *j* was $|\text{spiciness}_i - \text{spiciness}_j|$.

5.4. Results

Data came from 88² participants in the shared condition (19 groups of 4 persons and 4 groups of 3 persons, forming 252 dyads) and 37 in the solitary condition (7 pseudo groups of 4 persons and 3 pseudo groups of 3 persons, forming 102 dyads).³ It was organized into square matrices (88 \times 88 in the shared condition, 37 \times 37 in the solitary condition) that specified several types of relatedness among participants (tie strength, dyadic difference in centrality, dyadic difference in satisfaction). Standard hypothesis tests are impossible with such network data, because the observations are not independent. Thus, the analysis relies instead on double semi-partialling multiple regression quadratic assignment procedures (MRQAP), a non-parametric test (Dekker, Krackhardt, & Snijders, 2007) available in the UCINET 6 package (Borgatti et al., 2009).

MRQAP starts with a regular ordinary least squares (OLS) estimation of regression coefficients across cells of the dependent, independent, and control matrices. The rows and columns of the dependent matrix are then randomly permuted, resulting in a new matrix used for another OLS regression, ultimately generating new coefficients and R-square values. This matrix contains a structure of dyadic ties that differ from the original on a cell-by-cell basis but are similar on a global level (i.e., each dyadic value appears the same number of times in the matrix), such that it preserves the level of autocorrelation on which further tests are conditioned (Kilduff & Krackhardt, 1994). The permutation and regression process repeats a high number of times (here, 1000 times), in order to generate a distribution that provides a reference for comparison with “real” observed values.

The key prediction for this study is that there is a significant negative interaction between difference in centrality and tie strength such that the dyadic difference in satisfaction increases with difference in centrality at low tie strength, due to reactance mechanisms, but decreases at high tie strength, due to conformity mechanisms. The results from the shared condition support this prediction ($\beta_{\text{tie-strength} \times \text{difference-in-centrality}} = -0.25$, $p = 0.01$; Table 1). The interaction of tie strength with difference in centrality is also negative and significant without any covariates in the model ($\beta_{\text{tie-strength} \times \text{difference-in-centrality}} = -0.22$, $p = 0.02$).

An OLS regression is not adequate for hypothesis testing with network data, however in our case the coefficients from OLS and MRQAP are similar. Thus, to depict the interaction, we ran an OLS regression and plotted the interaction for the different levels of tie-strength (Hayes & Matthes, 2009; Fig. 1). Figure 1 shows that the difference in satisfaction increases with the difference in centrality in weak-tie conditions, as expected when reactance dominates. In other words, the level of disagreement in satisfaction increases with difference in centrality when there is no friendship to preserve and no or limited costs of reacting. However, the difference in satisfaction decreases with the difference in centrality in strong-tie conditions, as predicted for when conformity dominates.

The hypothesized interaction between tie strength and the difference in centrality also could be due to some latent confounds unrelated

² One group of four had to be excluded from the sample because a member had not provided tie-related data.

³ As these numbers suggest, in a few groups one member did not show up on due time. As a result, these groups are of size 3 instead of 4. Additional analyses excluding the dyads from those groups yield findings similar to those described thereafter.

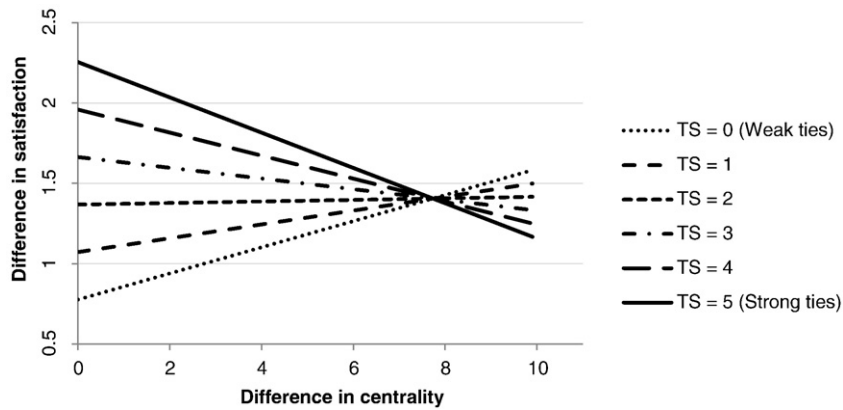


Fig. 1. Relationship between difference in centrality and difference in satisfaction as a function of tie strength (study 1, shared condition, satisfaction was assessed on a 1 to 10 scale).

to the social dynamics at play during the co-consumption episode. The convergence or divergence observed in participants' evaluations could reflect similarity, rather than situational pressures to conform exerted on peripheral consumers. To rule out this possibility, a regression analysis was conducted on participants in the solitary condition (see above), who could not communicate, thus not gain knowledge of others' judgement. It yields non-significant coefficients for both tie strength and difference in centrality ($\beta_{\text{tie-strength}} = 0.10$, $p = 0.31$; $\beta_{\text{difference-in-centrality}} = -0.11$, $p = 0.42$) and for the interaction between tie strength and difference in centrality ($\beta_{\text{tie-strength} \times \text{difference in centrality}} = -0.19$, $p = 0.14$), contrary to the findings from the shared condition. Taken together, these findings confirm that communication is necessary for the predicted effects to occur; they do not result from latent confounds such as similar preferences or traits.

That is not to say that similarity does not influence our findings at all though: during communication (in the shared condition), people might have unveiled their characteristics and in case of similarity (dissimilarity) agreed (disagreed) primarily with others whom they deem similar (Allen & Wilder, 1975). Another concern with similarity is that it might affect not only agreement, but the nature of social relationships themselves, with similar people forming more easily strong ties (McPherson, Smith-Lovin, & Cook, 2001). These limitations are the reason why a study was designed to manipulate the variables of interest (study 3, Section 7).

5.5. Discussion

In this study, the predicted negative interaction between difference in centrality and tie strength arose from shared consumption. Social asymmetry in a dyad increases agreement only if the tie is strong, such that concern for preserving the tie demands conformity. It instead favors disagreement if the tie is weak, such that the costs of reactance are minimal.

6. Study 2

Study 1 offers evidence that the structure and strength of preexisting ties among consumers affect the patterns of social influence during the shared consumption of a low involvement, hedonic product (a snack), lasting a few minutes. The goal of Study 2 is to extend the scope of these findings by testing the hypothesized interaction in the case of a high involvement, utilitarian service consumed over several months: a graduate business education program. Previous research confirms that students think of themselves as consumers (Ng & Forbes, 2008). A graduate business education program has great importance for students who anticipate positive career outcomes from completing it, and it also constitutes a shared experience that involves essentially group work and regular collective discussions (Baldwin et al., 1997). Study 2

thus captures participants' evaluation several months after, instead of minutes after, making up their minds.

6.1. Participants

This study was conducted among 50 graduate students in a Master of Science in Marketing at a major French business school (different from the one in Study 1). The program was taught in English, and most students were foreigners living in France. They participated in the study at the end of the 10-month teaching part of the program. During that program portion, students attended all classes together daily; therefore, they all knew one another to some extent. All students shared the same consumption experience, which is a salient difference from Study 1, in which several smaller consumption groups were randomly assembled from the target population.

6.2. Procedure and material

Students received invitations to take a student satisfaction survey in the school's experimental lab. Participation was not compulsory, yet all students completed the survey and received a school t-shirt valued at €15 as a gift. The students came to the experimental laboratory in batches of 10, at scheduled hours. They were directed to cubicles, where an online questionnaire was open for them on lab computers.

After the students answered the questions about their program, they provided data about their ties with their classmates, supposedly for an unrelated study on relationships at work. As in Study 1, the tie-related data were obtained with the assistance of a roster, such that each student marked each classmate's importance as a source of advice and information. This instrumental, rather than affective, type of tie reflects the utilitarian nature of the consumable in this study. Finally, the respondents were thanked, given their gift, and requested not to discuss the survey with students who were yet to take it. The process took 25–30 min. Later, a debriefing email was sent to all the students.

6.3. Measures

The students rated the program (1 = "not satisfied at all," 7 = "very satisfied")⁴ in response to the query, "To what extent are you satisfied with the program" (Oliver, 2006). As in Study 1, the dependent variable is the level of disagreement between students. Difference in satisfaction was operationalized exactly as in Study 1.

⁴ In this study we used a 1 to 7 satisfaction scale to respect the continuity with the satisfaction measures used by the business school to assess student satisfaction.

To assess the strength of ties, following Baldwin et al. (1997), participants answered, "To what extent do you consider this person a source of information and advice for school-related or course-related matters?" (1 = "never ask for advice," 5 = "ask for advice very often"), for all other students in the program. The difference in centrality was operationalized exactly as in Study 1. Finally, consistent with the notion that satisfaction scores can converge (diverge) as an outcome of similar (dissimilar) ratings of certain service attributes, participants had to provide satisfaction ratings on program-related attributes ("How satisfied are you with each of the following aspects of the program?"), using a 1–7 semantic differential scale (1 = "not satisfied at all," 7 = "very satisfied"). The attributes were administrative support, classroom facilities, course content, evaluation, help in job search, timely information, quality of professors, and workload (adapted from Gruber, Fuß, Voss, & Gläser-Zikuda, 2010). As in Study 1, differences in ratings then could be calculated for each dyad and each product attribute.

6.4. Results

The data, organized in square matrices (50 × 50), reflect 2540 unique dyads (49 dyads per respondent). The average tie strength was 2.44 (SD = 1.39). As in Study 1, the MRQAP confirmed the hypothesized negative interaction between difference in centrality and tie strength ($\beta_{\text{tie-strength} \times \text{difference-in-centrality}} = -0.08, p = 0.049$, Table 2). The interaction between tie strength and difference in centrality is also negative and significant when no covariates are included in the model ($\beta_{\text{tie-strength} \times \text{difference-in-centrality}} = -0.15, p = 0.01$).

We again used an OLS regression to illustrate the interaction for the different levels of tie strength. As Fig. 2 shows, the difference in satisfaction increases with the difference in centrality in weak tie conditions, as should be when reactance dominates. The difference in satisfaction instead decreases with the difference in centrality in strong tie conditions, as should be the case when conformity dominates.

6.5. Discussion

Study 2 replicates the interaction observed in Study 1, notwithstanding the dissimilarities between these studies. Therefore, the contingent role of centrality in driving either agreement or disagreement is also observed for high involvement consumables with great importance for their consumers.

7. Study 3

For both studies 1 and 2, the variables of interest (difference in centrality and tie strength) were not manipulated. Although the comparison of real groups in the shared condition with pseudo-groups in the solitary condition of study 1 provides some safeguards, the role of latent confounding factors cannot be ruled out completely. Our core

theoretical argument is that centrality creates pressure to conform, resulting in some perceived threat to freedom, which translates either into conformity when the tie is strong or reactance when the tie is weak. Thus, the first objective of study 3 is to test that, when consumption takes place in group, centrality of the interaction partner increases the perceived threat to attitudinal freedom. Specifically, we tested that, compared to more central consumers, less central consumers will perceive a greater threat to their freedom. The second objective was to provide further evidence that centrality can backfire into reactance behaviors when the tie is weak more than when the tie is strong, a notion that – to our knowledge – has not been tested before. Specifically, we tested that less central consumers that consume with a weak tie, compared to a strong tie, will express more reactance behaviors. Last, because individuals differ in their urge to conform or dissent when facing pressure (Santee & Maslach, 1982), we tested the moderating effect of participants' need for uniqueness (Tian, Bearden, & Hunter, 2001).

7.1. Participants and procedure

Study 3 used a scenario-based experiment. 209 adults living in the United Kingdom (89 males, $M_{\text{age}} = 36.8$ years) from the Prolific Academic website (www.prolific.ac) participated in exchange for 0.95 lb. The experiment used a 2 (centrality: low, high) × 2 (tie strength: weak, strong) between-subject design. Twenty-two participants' data were discarded because they failed to remember their centrality in the scenario and/or they reported that the name of the acquaintance (friend) listed was in fact a friend (mere acquaintance), leaving 187 participants for analyses.

All participants were first asked to provide the first name of a good friend and of a mere acquaintance living in the same city as them. They were then randomly assigned to one of 4 scenarios (Appendix A). Participants were asked to imagine that they were having lunch in a restaurant with either the acquaintance (weak tie) or the friend (strong tie) listed and two other persons that were either good friends of them, unknown to the acquaintance/friend (high centrality) or good friends of the acquaintance/friend, unknown to them (low centrality). For instance, participants in the low centrality/strong tie condition had to imagine having lunch with a friend and two other persons unknown to them but good friends of their own friend.

After reading the scenario, participants were asked to write down what they would think and feel in such a situation, they were then asked to rate their perceived threat to freedom with regard to the situation imagined and to rate their intentions to perform different behaviors, that ought to follow from reactance (e.g., leaving early), during the lunch (Levav & Zhu, 2009; Miron & Brehm, 2006). As markers of reactance, study 3 assessed reactance behaviors rather than disagreement in product/service evaluation following actual consumption (like in studies 1 and 2) because a scenario doesn't allow actual consumption.

7.2. Measures

Participants rated their perceived threat to freedom with regard to the situation imagined with three 10-point (not at all/extremely) scale items adapted from Jonas et al. (2009) and Dillard and Shen (2005) ("How restricted would you feel in what you say"; "How restricted would you feel to speak your mind"; $\alpha = 0.77$). Participants rated the likelihood that they would perform some reactance behaviors during the lunch⁵ with five 9-point (very unlikely/very likely) scale ("Try to leave early"; "Spend a great deal of time checking my smartphone"; "Pay more attention than usual to things going on at other tables"; "Go to the restroom for no reason"; "Spend a great deal of time looking up at the TV screen in the restaurant"; $\alpha = 0.89$). Participants need for uniqueness was

⁵ These behaviors were identified in a pretest performed on 171 other participants from the same website.

Table 2
MRQAP regression results for dyadic difference in satisfaction (study 2).

Variable	Model 1			Model 2		
	b	β	p	b	β	p
Tie-strength	0.01	0.02	0.32	0.05	0.06	0.11
Δ centrality	-0.01	-0.03	0.32	0.01	0.03	0.31
Δ classroom facilities	0.06	0.08	0.05	0.06	0.08	0.04
Δ course content	0.33	0.36	<0.01	0.33	0.36	<0.01
Δ evaluation	0.12	0.14	<0.01	0.12	0.14	<0.01
Δ help in job search	0.01	0.01	0.40	0.01	0.01	0.41
Δ administrative support	0.05	0.07	0.05	0.05	0.07	0.06
Δ information on time	0.01	0.01	0.46	-0.01	-0.01	0.52
Δ quality of professors	0.10	0.12	0.02	0.10	0.12	0.02
Δ workload	0.04	0.04	0.13	0.04	0.04	0.12
Tie-strength × Δ centrality				-0.01	-0.08	0.049
R ²		0.25			0.26	

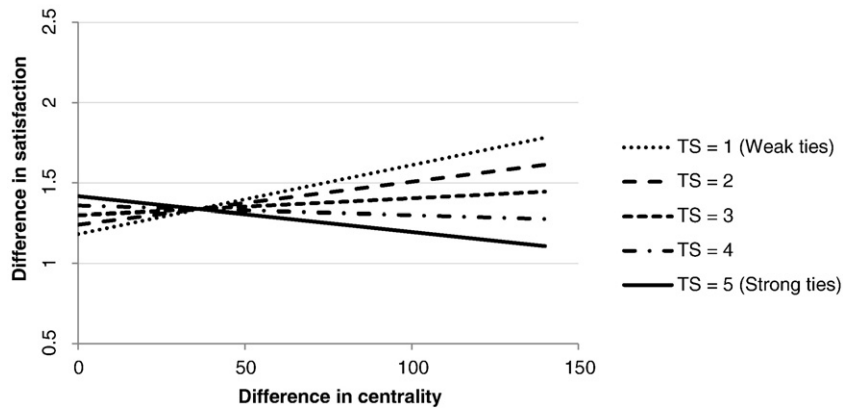


Fig. 2. Relationship between difference in centrality and difference in satisfaction as a function of tie strength (study 2, satisfaction was assessed on a 1 to 7 scale).

assessed with the short form from [Ruvio, Shoham, and Brenčić \(2008\)](#), that included twelve 5-point scales (e.g., “I actively seek to develop my personal uniqueness by buying special products or brands”; $\alpha = 0.88$).

7.3. Results

A 2 (centrality) \times 2 (tie strength) ANOVA on perceived threat to freedom, indicated, as expected, that participants low in centrality perceived higher threat to their freedom ($M_{\text{Low Centrality}} = 5.27$) than participants high in centrality ($M_{\text{High Centrality}} = 3.84$, $F(1, 183) = 24.74$, $p < 0.001$). Tie strength did not have a main effect ($F(1, 183) = 1.67$, $p = 0.20$) nor did it interact with centrality ($F < 1$). This finding is consistent with our theorization that less central consumers feel a threat to freedom when confronted with more central members of a group.

The second step of our argumentation was that perceived loss of freedom stemming from difference in centrality triggers reactance if strength is low, i.e. if there is limited social cost to it. Thus we expected participants low in centrality consuming with a weak tie to express more reactance than participants consuming with a strong tie. For participants high in centrality, no such difference was to be expected. A 2 (centrality) \times 2 (tie strength) ANOVA confirmed (marginally) the expected interaction between centrality and tie strength on reactance behaviors ($F(1, 183) = 3.27$, $p = 0.07$). For participants low in centrality, the ones consuming with a weak tie were more likely to perform reactance behaviors ($M_{\text{Weak Tie}} = 4.39$) than the ones consuming with a strong tie ($M_{\text{Strong Tie}} = 3.25$, $t(92) = 2.79$, $p < 0.01$). This difference was not significant for participants high in centrality ($M_{\text{Weak Tie}} = 2.33$, $M_{\text{Strong Tie}} = 2.10$, $F < 1$).

Concerning the moderating impact of need for uniqueness (NfU), we found a significant interaction between centrality and NfU on perceived threat to freedom ($b = 1.39$, $t(182) = 3.60$, $p < 0.01$). At low NfU ($M - 1SD = 1.89$), we replicated the finding identified earlier that participants low in centrality perceive higher threat to their freedom than participants high in centrality ($b = -2.43$, $t(182) = 6.14$, $p < 0.001$). At high NfU ($M + 1SD = 3.36$), however, perceived threat to freedom didn't depend on centrality ($F < 1$). An interpretation of this finding is that, because they show higher private self-consciousness, autonomy and expressiveness in interpersonal behaviors ([Schlenker & Weigold, 1990](#)), people high on NfU tend to speak their mind openly with less regard for situational pressure to conform than people low on NfU. We also tested for the impact of NfU on how centrality and strength of tie affect reactance behaviors, yet it was not significant ($|t| < 1$).

7.4. Discussion

Study 3 provides additional evidence in support to our view that centrality influences threat to attitudinal freedom and interacts with strength of ties to generate reactance. The manipulation of network

variables, as well as the direct measurement of threat to freedom and reactance behaviors allow to better rule out alternative interpretations of the patterns observed in studies 1 and 2.

8. General discussion

Network centrality is often equated with power and influence in groups ([Friedkin, 2001](#)); central consumers thus tend to be depicted as prominent influencers of more peripheral consumers ([Lee et al., 2010](#); [Risselada et al., 2015](#)). Focusing on the context of shared consumption, the current findings suggest that this social asymmetry actually is a double-edged sword: The difference in centrality exerts some conformity pressure on the most peripheral consumer in the dyad but also may result in a boomerang effect, through reactance. Perceiving a threat to attitudinal freedom, a peripheral consumer might seek to restore it by evaluating the product in a way radically different from a central consumer's evaluation. Our research identifies strength in the dyad as driving which psychological force prevails, i.e. whether conformity prevails over reactance. When the tie is strong, the cost of dissenting is high, so the pressure stemming from social asymmetry results in conformity. When the tie is weak, the cost is low, and the urge to reassert attitudinal freedom prevails.

From a managerial standpoint, while prior work tends to invariably identify central consumers as valuable influencers ([Van den Bulte et al., 2010](#)), our findings invite practitioners to have a more nuanced approach. Centrality indeed confers influence, yet not necessarily positive influence. The quality – not only the quantity – of central consumers' relationships should be better taken into account and their leveraging should be activated primarily to reach their strong relationships. For this purpose, perhaps the most promising trend is the increasing availability of digital traces of social interactions between consumers, in particular within online brand communities. By either participating to or orchestrating such communities, managers can access information capturing relational strength such as the rate of message exchange between any two pairs of consumers or the volume of text in their message ([Howison, Wiggins, & Crowston, 2011](#)). Similarly, recent work provides ground for predicting strength of ties between social media friends from a variety of features such as their education or the type of words exchanged in posts made on each other's walls ([Gilbert & Karahalios, 2014](#)). A more intrusive method would be to collect first-hand information on relational strength directly from consumers, a practice which would be particularly relevant in referral programs. Firms could survey customers willing to send a referral about the emotional closeness, the frequency of interaction or the duration of their relationship to the target (information which can eventually be cross-checked by surveying the target too), and activate rewards accordingly.

From a theoretical stand point, the findings contribute to the network approach to consumer-to-consumer influence, by studying

structural (difference in centrality) and relational (strength of ties) features of consumer networks in conjunction (Lee et al., 2010). Moreover, it extends this approach to shared consumption contexts, whereas most prior studies consider only individual consumption (Goldenberg et al., 2009; Iyengar et al., 2015), with the exception of Lee et al.'s (2010) efforts to relate centrality to opinion leadership among participants of clubs that organize social events.

Second, because the study of co-consumption has ignored network concepts (Lee et al.'s work notwithstanding), the current article also has implications for continued research in this field. Prior studies usually rule out the possibility of a preexisting social structure that could affect social influence during co-consumption, by considering groups of strangers assembled solely for the purpose of the study (Simpson, Griskevicius, & Rothman, 2012). The goal is to ensure that any observed interpersonal influence stems from interaction dynamics, taking place during the co-consumption, such that no relational background can act as a confounding factor (Cruwys et al., 2015). As a result, they emulate situations in which consumers "have no past or future together and ... little if any investment or commitment to their fleeting 'relationship'" (Simpson et al., 2012: 330). These studies cannot describe the many instances in which co-consumption takes place with known others rather than strangers. The current studies instead suggest that a different design—using groups of participants with preexisting relationships of varying intensity—can better reflect the reality in many shared consumption contexts.

The current research also contains some limitations. For example, it demonstrates that the structural and relational features of a dyad of consumers affect the chances that they agree in their evaluation right after consuming, but what happens later on? Does an evaluation formed under the pressure of social asymmetry endure, after the co-presence ceases? Research should determine whether agreements reached in these conditions lead to significant outcomes in the longer term, such as purchase, usage, or customer retention (Haenlein, 2013).

The design of Study 1 prompted participants to share precisely for the purpose of evaluating (i.e., to test a hypothetical market launch), so it is not perfectly generalizable to shared experiences involving food in the real world. Groups usually snack in conjunction with another social activity, such as watching a movie, playing a game, or exchanging small talk, and the end purpose is not to form a specific evaluation of the product. Further research might adopt designs similar to that of Study 1 but make the product to be evaluated less central to the consumption episode.

Regardless of their network position, consumers possess different traits that might affect their urge to follow others' evaluations as well as their intentions to influence others (Santee & Maslach, 1982). Accordingly, we found in study 3 that need for uniqueness moderated the impact of centrality on perceived threat to freedom. Further research could investigate the role of other traits. For example, Gentina and colleagues found that the relationship between centrality and opinion leadership was moderated by the susceptibility to normative influence (Gentina et al., 2014).

Lastly, it would be interesting to study whether our results generalize to other (non-western) cultures. Prior work found that the expectations of individual freedom of choice are higher in individualistic compared with collectivistic cultures, thus resulting in higher propensity for reactance in individualistic cultures (Miron & Brehm, 2006; Steindl, Jonas, Sittenthaler, TrautMattausch, & Greenberg, 2015). Collectivists should thus manifest less reactance, hence less disagreement in our context. Another pattern related to culture worth investigating is that reactance depends on whether the threat affect the individual alone or the reference group at large (Jonas et al., 2009).

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Appendix A. Appendix

A.1. Low centrality scenario

It is a day off. You are about to go for lunch at a nearby restaurant and on your way you meet (*name of friend/acquaintance provided*) with two friends that are also looking for a place to eat. You decide to go for lunch together.

You have never met the two friends of (*friend/acquaintance*) before, so (*friend/acquaintance*) is the only one who knows everybody in the group.

One of the friends of (*friend/acquaintance*) suggests a new restaurant that just opened nearby and you all agree to try it out. The restaurant is quite busy but the waitress finds you a table that is well located. The dishes are very appetizing.

A.2. High centrality scenario

It is a day off. You are with two close friends and are about to go for lunch at a nearby restaurant and on your way you meet (*name of friend/acquaintance provided*) who is also looking for a place to eat. You decide to go for lunch together.

(*friend/acquaintance*) has never met your two friends before, so you are the only one that knows everybody in the group.

One of your friends suggests a new restaurant that just opened nearby and you all agree to try it out. The restaurant is quite busy but the waitress finds you a table that is well located. The dishes are very appetizing.

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