Balance and Word-Of-Mouth Communication: a Signed Digraph Analysis of Consumers’ Cognitive Networks

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ABSTRACT
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to engage in future macro-level marketplace communication.

INTRODUCTION
Researchers across a variety of disciplines including econom-
ics, sociology and marketing have established the significant im-
 pact of WOM on the marketplace, due to its inherent reliability,
reach, and relevance (Godes et al. 2005). Early WOM researchers
generally considered the phenomenon from a macro or marketplace
perspective (Frenzen and Nakamoto 1993). For example, Bass
(1969) developed a model that described the significance of inter-
personal communication relative to mass media following the
introduction of a new product, and Granovetter (1973) highlighted
the role of social networks in his examination of job changers’
quests for new employment. More recently, Godes and Mayzlin
(2004) concluded that online conversations regarding TV shows
that transcend across (as opposed to within) community networks
may be more predictive of ratings than simple counts of online
mentions. Focusing instead on the micro perspective of WOM are
researchers who describe and define the individual consumer traits,
motivations and other factors associated with WOM behaviors,
such as altruism (Price et al. 1995), and self-enhancement (Wojnicki
and Godes 2006).

Frenzen and Nakamoto (1993) first illustrated the value of
integrating the macro and micro perspectives in WOM. They
created a simulation to demonstrate the macro effects of consumer
communication across various combinations of strong and weak
relationship ties. Then, they demonstrated consumers’ propensities
to share marketplace information depending on the moral hazard
associated with the information and concluded that “when moral
hazard is high, weak ties are frail,” that is, when sharing market-
place information in costly, consumers may still share the informa-
tion with their strong ties, but are less likely to share it with their
weak ties. In the present research, we seek to similarly bridge the
micro and macro perspectives to improve our understanding of
WOM processes.

Here, the phenomenon is considered at a supra-individual level,
but all from the perspective of a single consumer—the disseminator
of the WOM. The unit of analysis is a WOM “digraph” that represents
the disseminator’s cognitive network associated with a specific
WOM experience. Employing the theories and empirical methods
associated with basic balance theory, our objective is to demonstrate
the prevalence and implications of consumers’ desire for balance in
the context of WOM. This enquiry is worthy of our efforts, since
consistency has been established as a fundamental cognitive and
social process (Eagly and Chaiken 1998; Hummon and Doreian 2003).

BALANCE THEORY
Balance theory is both a general theory and a methodological
framework for conducting empirical analyses (Hummon and Doreian
2003). The concept of balance has been fruitfully applied to various
contexts such as international relations, community elites
(Wasserman and Faust 1999), and consumer behavior. The theory
of “cognitive balance” was introduced by Heider (1946), who mod-
eled our universal quest for consensual validation of personal tastes
with his P-O-X triad, encompassing one person (P), the other (O) and
an entity (X). Social network analysts characterize the P-O-X triad as
one form of a digraph—a set of nodes that are connected by directed
(i.e., flowing from one to another) and valenced relations in a closed
network (Wasserman and Faust 1999). The valences of the ties can
be operationalized in a variety of ways, such as positive/negative
affect or similarity/dissimilarity. Psychological balance exists when
the ties between these three nodes are harmonized, that is, they are all
positive or one tie is positive and the other two are negative, as per the
laws of transitivity.

Behavioral researchers have leveraged Heider’s theory as a
foundation for other more nuanced balance-related theories such as
cognitive dissonance (Festinger 1957), self verification (Swann
1983), and parallel constraint satisfaction (Simon et al. 2004).
Cognitive dissonance, the most pervasive of these balance theories,
specifies that people strive for consistency across their related
cognitions, particularly when they have foresight or when their
convictions are public (Festinger 1957). Intolerable inconsistencies
are reconciliation by changing the valence or significance of cogni-
tions. While the present research focuses on basic balance theory,
we examine consumers’ future WOM propensities following bal-
anced and imbalanced WOM experiences as a possible means to
maintain consistency. We also suggest other factors to explore in
future WOM research in accordance with cognitive dissonance.

Balance theory has been applied to several consumer phenomena.
Belk (1976) demonstrated that consumers’ recalled gift-giving ex-
periences are more balanced than would be the case if the experiences
were generated by chance (40% vs. 24%), and that satisfaction with
gift-giving is correlated with balance. Other research indicates that
consumer choice is affected by attribute balance (Chernev 2005), and
that persuasion attempts laden with inconsistent emotions may lead to
less favorable brand attitudes (Williams and Aaker 2002). In the
context of celebrity endorsements, research indicates that consumers
may implicitly consider a self-celebrity-brand triad in their attitude
formations (Kamins 1990). For our context, we translate Heider’s P-O-
X triad to a basic D-R-T triad (disseminator-receiver-product). The
signs of the three ties that connect these three nodes will be identified
as likes or dislikes, as identified by the disseminator—see figure 1. In a
preliminary study, we first seek to establish the relevance of balance in
WOM communication with this framework.

Based on the laws of transitivity and given the eight possible
versions of this signed digraph, four are balanced and the other four
are unbalanced. As such, if generated by chance, we would expect
50% to be balanced. Based on the preference for balanced conditions
as stated by balance theory, we anticipate that more than 50% of the
WOM triads generated by consumers will be balanced and that
consumers will be more satisfied when their WOM experiences are
balanced:
H1: The digraphs associated with consumers’ WOM experiences are more balanced on average than would be expected if the digraphs were generated by chance.

H2: Consumers report higher levels of satisfaction with WOM experiences when the digraphs associated with the experience are balanced vs. when they are not balanced.

PRELIMINARY STUDY–INDEPTH INTERVIEWS

Method and Analysis

Ten one-on-one, phenomenological interviews were conducted. Participants included five women and five men ranging in age from 24 to 60, with significant variation across class, vocation and ethnicity. These in-depth interviews were conducted at a central research facility and lasted between two-and-a-half and three hours. Participants were each paid $100 as compensation.

An interviewer blind to the research objective followed an interview guide that encouraged discovery-oriented exploration of consumers’ perceptions of their WOM experiences. Participants were asked to articulate their “thoughts, feelings and experiences regarding sharing information with others about products and services” using their own words through storytelling, photo probes, Kelley grid/laddering, and sensory exercises (Thompson et al. 1997; Zaltman 1997). The terms “word-of-mouth,” “balance” and “consistency” were not brought up by the interviewer and emic terms were probed and defined by participants. The interviewer guided the participant to focus across a multitude of retrospective experiences (as opposed to abstract generalizations), which afforded inference of patterns within and across interviews (Holt 1997; Thompson et al. 1997).

Given our focus on retrospective accounts, we acknowledge issues associated with recall, particularly the propensity for people to recall consistent events (Freeman 1992). To address this, we also test implications associated with balanced and imbalanced hypothetical experiences in the main study. Here, we highlight three points in defense of recalled accounts that are particularly relevant to this context as suggested by Gardial et al. (1994). First, regardless of whether it represents objective reality, recalled protocol is assumed to be representative of memory structure, which is particularly germane to cognitive networks. Second, memory may be predictive of future behaviors, which we seek to understand here in terms of future WOM. Last, “memory data may be the basis for most consumer WOM.
communications, as consumers are more likely to relate memories of their experiences (what they think actually occurred) than the actual experience itself” (p.551). This implies the association between consumption experience recall and WOM behaviors, which we suggest transcends beyond the WOM experience as an ends to become a recalled experience itself.

Interviews were taped and later transcribed to yield over 200 pages of single-spaced data. Two coders who were blind to the research objective first identified all of the WOM experiences (N=47), and then coded tie valences. The \( D \rightarrow R \) tie represents the disseminator’s perception of her relationship with the receiver immediately before the experience. The \( D \rightarrow T \) tie represents the valence of the product message. The \( R \rightarrow T \) tie was defined as the disseminator’s perception of the receiver’s satisfaction with the product. Each of these ties was coded as “+1” (like, positive affect) or “-1” (dislike, negative affect). In addition, the coders rated the disseminator’s level of satisfaction with the experience as “+1” (satisfied), “0” (neutral), “-1” (dissatisfied), or “na” (not mentioned). Inter-rater reliability was established at 82% for the experiences, 77% for the ties and 84% for the satisfaction ratings. Discrepancies were resolved through discussion. The coders also highlighted recurring themes from the participants’ recounts. This post-hoc, secondary task was purposefully vague and intended to provide general insights, some of which were examined in the main study.

Results & Discussion

Forty-seven complete WOM experiences were identified in the data. Table 1 describes the data according to the valences of the ties. For illustration purposes, an example of each of the four types of complete triads elicited is highlighted in figure 2. Amongst the triads, 59.57% contained only positive ties, and all of the triads had a positive \( D \rightarrow R \) tie.
Of the 47 triads, 31 were balanced (BalProp=.660), supporting hypothesis 1 (one-sided \(r(1,47)=.160, p=.014\). Thirty-seven (78.72\%) were rated as “satisfying” and 10 (21.26\%) were rated as “dissatisfying” (zero were rated as “neutral”). The correlation between satisfaction and balance is \(r=.724 (p<.001)\), confirming hypothesis 2. Further insight into the relationship between balance and satisfaction is highlighted in the cross-tabulation count at the bottom of table 1; balance and satisfaction are not independent (\(\chi^2(1)=24.612, p<.001\)). Furthermore, six of the 47 WOM experiences identified were anomalous; that is, they were not “balanced and satisfying,” nor were they “unbalanced and dissatisfying;” all six were “unbalanced and satisfying.” A more detailed analysis reveals that since the D\(\rightarrow\)R tie was positive for all triads, in order for these six triads to be unbalanced, the disseminator and the receiver had to disagree regarding their opinion of the product (i.e., the D\(\rightarrow\)T and R\(\rightarrow\)T ties are either positive and negative respectively, or vice versa). Furthermore, these six experiences could be categorized into two types. The first is that the disseminator appeared to have an extremely strong tie with the receiver, such that the disagreement about a single product/service was trivial compared to the personal relationship:

“… like when I’ve told my mother that I bought a certain pair of shoes… and she says, oh no you don’t that’s just silly, I don’t really worry about it as much cause they have their views and that’s fine but it’s just fun being able to share something that you’ve experienced with other people.”

Interviewee F

“… sometimes it could be a nothing thing. I mean who cares if she goes to that restaurant really.”

Interviewee H

For the second type of anomaly, the whole experience is viewed as trivial or inconsequential:

“...(My friend asks me) What do you like? I like Sam Adams… It… tastes good. Whether or not it’s true or not true, he’s not really focusing on my opinion because he’s… only half listening. It isn’t going to get underneath his psyche and make an impression.”

Interviewee G

“I’m saying, ‘I have this (CD). I want to share it with you… it’s either positive or negative. It could be so many things. But it’s just information. That’s what it is. That’s all it is… The other person’s thinking, ‘All right. I’ll check it out,’ Then, he’d either be saying, ‘Hey, that’s not for me. Throw it away-whatever,’ but it doesn’t really matter either way.”

Interviewee D

When interpreting the results of these interviews, we highlight the positivity effect and its implications in terms of recall biases—consumers may be more likely to recall positive, satisfying, and cognitively balanced experiences. For example, Freeman (1992) concluded that many inaccuracies in participants’ recall of networks could be attributed to their propensity to “correct” for imbalance or intransitivity. Recognizing these biases and in order to elicit data in the subsequent main study with sufficient variance across the various WOM experiences, we do two things. First, for half of the recalled WOM experiences, participants are instructed to recall a WOM experience for a product with which they were dissatisfied. Second, hypothetical scenarios are also incorporated where the WOM digraphs are manipulated. The coders also noted that the degrees of the valence and the importance of the ties varied within and across episodes, consistent with balance theorists who criticize unitary tie measures as being too constraining (Simon et al. 2004).

We address this in the main study by incorporating continuous interpersonal weight (importance) and strength measures (duration, intensity, intimacy-Granovetter 1973) as well as product involvement related metrics to represent the ties.

For several of the WOM experiences described, disseminators suggested they would not make suggestions again to the same receiver and/or regarding the same product. Therefore in the main study we also measure future WOM. Based on these insights, we anticipate that:

H3: The (im)balance of the digraph associated with a WOM experience will (discourage) encourage disseminators to generate (less) more future WOM—both to the same receiver and regarding the same product.

H4: When the aggregate ties in a WOM digraph have higher weight, the relationship between balance and future WOM will be strengthened; unbalanced digraphs result in much less future WOM, and balanced digraphs result in much more future WOM as compared with digraphs with lower weights.

The coders also noted that the D\(\rightarrow\)T tie was often challenging to code, since the disseminator’s private evaluation of the product differed from what they publicly communicated (e.g. figure 2 triad 3). Of course, this is not completely atypical; people’s private thoughts and public behaviors are not always consistent. We consider our private self, our public self, and other domain-specific selves in our day-to-day activities (Baumeister 1998). For example, in his gift-giving analysis, Belk incorporated the ideal self (1976). Based on this theory and the interview data, we refine the definition of the disseminator in the main study to be “the public self” (D) and incorporate a fourth node representing “the private self” (S) (figure 3). This allows us to interpret differences between when the disseminator tells the truth (D\(\rightarrow\)T and S\(\rightarrow\)T are consistent) vs. when they do not (D\(\rightarrow\)T and S\(\rightarrow\)T are inconsistent) regarding their true or private opinion of the product.

The examples described also highlight the significance of tie valence definitions. The D\(\rightarrow\)R relationships between the girl and her mother (figure 2, triad 3) was strong and positive according to our “positive affect (like)” definition, resulting in unbalanced. However, if the D\(\rightarrow\)R tie was defined in terms of perceived similarity (particularly in product preferences/experience) the D\(\rightarrow\)R tie could be negative, and the triad therefore balanced. In the main study, we also measure S\(\rightarrow\)R similarity and explore the implications of incorporating this definition.

**MAIN STUDY**

**Sample and General Procedure.** Members of an independent online U.S. research panel were emailed an invitation to participate. 498 participants completed the study and received points redeemable from the research firm for items such as CDs and DVDs. The final sample was 51.5% female and all were aged eighteen to 65 years, with 31.3% aged 25–34.

Participants were emailed a link to the experiment website and given a 72-hour window in which to complete the experiment. The study consisted of three main stages; the first was to recall personal WOM experiences, the second was to answer questions regarding randomly generated hypothetical WOM experiences, and the last stage was general demographic and other questions.

**Measures-Recalled WOM Experiences.** Participants were first asked to recall a real WOM experience with a particular person about a specific television show, restaurant, movie, book, or retail store.
The survey was programmed such that the product, category and receiver’s name were automatically threaded into the relevant questions on subsequent screens. Participants were first asked to indicate the timing of the conversation, then proceeded to questions regarding each of the six network ties, all of which were posed in the form of 7-point scales. The ties between the consumer nodes (i.e., “S,” “D,” and “R”) were derived from the sum of two questions: “dislike/like” and “not enjoy/enjoy spending time together.” The weight measures for all ties were comprised of a sum of two 7-point scale questions with the anchors of “important/unimportant” and “means a lot/means nothing.”

The S→R tie was defined as “how the disseminator privately and truly feels about the receiver.” S→R strength or closeness was measured in terms of “am not/am very close” and “we do/do not provide emotional support to each other.” S→R similarity was measured via category specific preferences and knowledge or experience—both anchored by “very different/similar.” The S→D tie was defined as participants’ private true feelings regarding their public WOM behavior. Two questions accounted for the S→D valence measure, anchored by “did/did not do the right thing” and “glad/not glad about what I said.” The S→T tie was similarly defined as the disseminator’s private and true feelings about the product. Valence was operationalized in terms of “dislike/like” and “least/most favorite.” The D→R and D→T ties were defined as the public relationships and proclamations respectively. As such, the measures for these ties were similar to those of S→R and S→T, except instead of the “private and true” opinions or judgments, public perceptions and messages were considered. For all tie measures with the exception of R→T, participants were asked to consider their opinions at the time that the WOM communication occurred. This was important, since as stated it is possible that their opinions or judgments could change following the experience based on the receivers’ feedback or based on subsequent experiences. The R→T valence was defined as the disseminator’s perception of the receiver’s product judgment and measured in terms of “liked/disliked” and “terrible/great.” Participants were asked two 7-point scale questions regarding their general satisfaction with the experience (including “dissatisfied/satisfied” and “regret/am glad”). Last, participants answered four 7-point scale questions regarding “future WOM,” including actual and anticipated WOM to the same receiver and actual and anticipated WOM regarding the same product.

Participants then repeated the same procedure, but this time they were prompted to think of a WOM experience regarding a product in one of the other product categories and a product with which they were not satisfied. These two criteria were added in an attempt to maximize variance.

**Measures—Hypothetical WOM Experiences.** Following the recalled experiences, participants were presented with hypothetical scenarios that included details associated with the simple (D→R→T) WOM triad and where the D→R tie was always positive (i.e., communication to a friend). In the first part of the scenario, the disseminator’s judgment of a product (D→T) in one of the five categories (movie, store, restaurant, book or TV show) was randomly manipulated to be positive, neutral or negative. Participants were then asked to indicate how likely they would be to bring up this product in conversation with a friend (7-point scale “not very likely / very likely”). The scenario continued with positive or negative feedback from the friend (R→T). Participants were then asked to indicate their satisfaction with the experience as well as their future WOM intentions (both regarding the same product and to the same receiver).

**Analyses.** The WOM digraphs generated from the recalled WOM experiences contain five semi-cycles or semi-paths (three or more nodes connected by ties) where all nodes are distinct and the starting and ending node are the same (Wasserman & Faust 1999). Specifically, there are five semi-cycles: four of length three (i.e., with three ties: D→S→T→D; S→R→T→S; D→S→R→D; and D→R→T→D) and one of length four (i.e., with four ties: D→S→R→D→T). To determine whether the digraphs are balanced, the balance associated with each of the five semi-cycles contained in the digraphs is considered based on transitivity. To evaluate relative balance across digraphs, Wasserman and Faust (1999) suggest a “cycle index for balance,” a continuous measure that ranges from zero (completely imbalanced) to one (completely balanced). This index is calculated by dividing the number of positive semi-cycles in the digraph by the total number of semi-cycles, where shorter semi-cycles have higher weights because they represent more direct reasoning:

\[
\text{Balance Ratio} = \frac{\sum_{L} b_L}{\sum_{L} t_L}
\]

where:
- \(L\) is the length of a semi-cycle
- \(b_L\) is the number of balanced semi-cycles of length \(L\)
- \(t_L\) is the total number of semi-cycles of length \(L\)
- \(1/L\) can be any monotonically decreasing function of \(L\)

In this case, the count of the four semi-cycles of \(L=3\) and the one of \(L=4\) that are balanced (\(b_L\)) is divided by the total number of semi-
cycles of each length \( t_L \). In advance of gathering data, a thorough
analysis of the possible tie configurations was conducted. Based on
the six ties, which can be positive or negative, there are a total of 64
\( 2^6 \) possible configurations. The ten conceivable configuration
types are based on the combinations of balanced semi-cycles, of
which only five are possible or compatible for this digraph. Given the
configuration likelihoods and respective balance ratios, the average
expected balance ratio is .503, which we use as the benchmark for
hypothesis 1.

Results and Discussion

Tie valences did not vary across category, so the category
variable was collapsed for all analyses. The valences across ties
range from \( M_{R\rightarrow T}=2.079 \) to \( M_{S\rightarrow D}=6.555 \). Note that the mean
valences for \( S\rightarrow D \) and \( S\rightarrow R \) are significantly higher than all other
ties \((p<.05)\) and \( R\rightarrow T \) is significantly lower than all others \((p<.05)\).
When valence is operationalized as similarity for \( S\rightarrow R \), the mean
is not significantly different vs. when it is operationalized as affect
\((M_S\rightarrow R_{affect}=6.438, M_S\rightarrow R_{similar}=5.652, r=0.365, p<.001)\). In
other words, it appears that directionally disseminators report
slightly higher affect than similarity with the receivers, there are very
few recalled WOM episodes with high \( S\rightarrow R \) affect and low similarity
or vice versa.

The disseminator’s private vs. public relationship with the
receiver is not significantly different in terms of valence \((M_{S\rightarrow R}=6.438 \) vs. \( M_{D\rightarrow R}=6.289, \text{diff NS})\). However, the private
relationship is more important \((M_{S\rightarrow R}=6.187 \) vs. \( M_{D\rightarrow R}=4.388, \text{diff p<.001})\) as compared to the public relationship. Here, we see that
consumers may seem to recall WOM mostly to those with whom they
have positive relationships—both privately and publicly—and that
they value their private assessments more so than their public
assessments. Separately, although the disseminators’ evaluations of
products is about equal when comparing private vs. public assess-
ments, \((M_{S\rightarrow T}=4.834 \) vs. \( M_{D\rightarrow T}=4.925, \text{diff NS})\), once again
disseminators value their public opinions as being more important
(Weights: \( M_{S\rightarrow T}=3.892, M_{D\rightarrow T}=2.986, p<.05)\).

Since half of the 996 recalled experiences in this study were
prompted to be regarding products that the disseminator does not like,
the balance and satisfaction measures in table 2 are presented in
aggregate and separately for digraphs with positive \( S\rightarrow T \) ties
and with negative \( S\rightarrow T \) ties. Note that the balance ratio is significantly
higher when the \( S\rightarrow T \) tie is positive vs. when it is negative
\((BalRatio_{\text{pos}}=0.930, BalRatio_{\text{neg}}=0.750, p<.001)\) as is the satisfaction
measure \((Sat\text{pos}_{S\rightarrow T}=6.390, Sat\text{neg}_{S\rightarrow T}=5.960, p<.001)\). This pattern is supported for the hypothetical WOM
scenario triads, where measured satisfaction is higher when \( D\rightarrow T \) is positive vs. when it is negative \((Sat\text{pos}_{D\rightarrow T}=5.693, Sat\text{neg}_{D\rightarrow T}=5.292, p<.001)\).
When the \( D\rightarrow T \) tie is neutral, mean satisfaction with the
WOM experience \((Sat\text{neutral}_{D\rightarrow T}=5.199)\) is significantly lower than
when it is positive \((p<.001)\), but only directionally lower than when it is
negative (diff NS). This makes sense, since WOM regarding neutral
products may be less-newsworthy. Note at the bottom of table 2 that the
propensity to generate WOM regarding positive, neutral and negative
products for the hypothetical experiences is also non-linear \((Talk\text{pos}_{D\rightarrow T}=6.08, Talk\text{neg}_{D\rightarrow T}=3.37, Talk\text{neg}_{D\rightarrow T}=5.33)\). Positively and
negatively evaluated products are talked about more than neutral
products \(p<.001)\).

Hypothesis 1: Proportion of Balanced Digraphs. The propor-
tion of balanced triads \((BalProp=0.787, \text{see table 2})\) is significantly
greater than would be expected if the triads were generated based
on chance alone \((p<.001)\). After incorporating the private self,
the balance ratio of .852 is also significantly greater than .503 \((p<.001)\).
Replacing the \( S\rightarrow R \) tie from affect to similarity does not impact the
balance ratio \((BalRatio_{affect}=0.852, BalRatio_{similar}=0.853, r=0.854, p<.001)\).
The recency of the WOM experiences does not affect the
mean balance ratio, which ranged from .773 to .869 (NS). Thus the
first hypothesis is supported in both studies and across all permuta-
tions of the balance calculation. Furthermore, although we cannot
directly compare the four-node balance ratio vs. the three-node
balance proportion, the fact that the four-node ratio is significantly
greater than the three-node proportion \((BalRatio=0.852, BalProp=0.660, \text{diff p<.001})\) suggests the significance of the private
self in WOM communication.

Hypothesis 2: Balance and Satisfaction. The balance-satisfaction
correlation was significant with \(S\rightarrow R\) defined as affect or similarity
and for the hypothetical scenarios \((range from r=.170 to .228, all
p’s<.001)\). We therefore conclude consumers are more satisfied with
balanced WOM experiences.

Hypothesis 3: Balance and Future WOM. The correlation
between balance and each of the future WOM measures indicates
a significant relationship \((r=.078 \) to .196, all \(p’s<.001)\). Here we highlight an
important insight: future WOM to the same receiver is best predicted
when considering WOM experiences that are the same product
\((coeff_{actual}=+.661, coeff_{null}=+.609, \text{both } p’s<.05)\), but it is not for WOM
to the same receiver. It seems that the cognitive balance associated with a WOM experience may help predict future
WOM to others regarding the same product, but cognitive balance does not
play a role in predicting future WOM to the same receiver.

What does predict future WOM to the same receiver? Here we highlight an
important insight: future WOM to the same receiver is best predicted by \(S\rightarrow R\) and \(D\rightarrow R\) valence, where three of the four coefficients are
positive and significant \((S\rightarrow R: coeff_{actual}=+.207, coeff_{null}=+.241, \text{both } p’s<.001); D\rightarrow R: coeff_{actual}=+.086 \text{ (NS)}, coeff_{null}=+.377, p<.001)\). It makes sense that consumers may talk more in the future with
receivers with whom they perceive positive relationships, and
particularly when this assessment of the relationship is private and true.
Next, while the disseminator’s relationship with the receiver may best predict
future WOM to that same receiver, the disseminator’s private assessment
of the product is a key predictor of anticipated future WOM
regarding that same product \((S\rightarrow T: coeff_{null}=+.230 p<.05)\). Note
that the coefficients for the \(D\rightarrow T\) tie are not significant for any of the
dependent variables. Apparently it matters less what people publicly
say and more what they truly and privately think about the product.
Even after controlling for the effects of time, feedback from the receiver
regarding the product \((R\rightarrow T)\) is not a significant predictor of any of
the future WOM measures. Last, we highlight that the disseminator’s
private feelings about the WOM experience (i.e. the \(S\rightarrow D\) tie valence)
is a positive and significant predictor of anticipated future WOM to the
same receiver and regarding the same product \((coeff_{same} R=+.176, coeff_{same} T=+.366, \text{both } p’s<.001)\).

Examining future WOM based on the hypothetical scenarios
(see table 3), the first notable pattern is no significant difference
between anticipated future WOM to the same receiver, regardless
TABLE 2
Main Study–Descriptive Statistics

<table>
<thead>
<tr>
<th>TIES (recalled)</th>
<th>n=996</th>
<th>S-R</th>
<th>D-R</th>
<th>S-T</th>
<th>D-T</th>
<th>R-T</th>
<th>S-D</th>
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<tbody>
<tr>
<td><strong>Valence (affect)</strong></td>
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</tr>
<tr>
<td>SD</td>
<td>.986</td>
<td>1.086</td>
<td>2.177</td>
<td>2.079</td>
<td>2.014</td>
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<td>1-7</td>
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<tr>
<td><strong>Valence (similarity)</strong></td>
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<tr>
<td>Mean</td>
<td>5.652</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>SD</td>
<td>1.111</td>
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<td>Range</td>
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<td>NA</td>
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<td></td>
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<tr>
<td><strong>Weight</strong></td>
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</tr>
<tr>
<td>SD</td>
<td>1.370</td>
<td>2.331</td>
<td>2.141</td>
<td>2.003</td>
<td>1.934</td>
<td>2.171</td>
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<td>7</td>
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<tr>
<td><strong>Strength</strong></td>
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<td></td>
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<tr>
<td>Mean</td>
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**OTHER MEASURES**

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>S-T pos</th>
<th>S-T neg</th>
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<tbody>
<tr>
<td><strong>Balance</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Proportion-Recalled</td>
<td>.787 (N=717)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>(D-R-T 3 nodes)</td>
<td>.410</td>
<td>NA</td>
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<tr>
<td>Range</td>
<td>0-1</td>
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<td>NA</td>
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<tr>
<td><strong>Ratio-Recalled</strong></td>
<td>.852 (N=717)</td>
<td>.916 (N=487)</td>
<td>.717 (N=230)</td>
</tr>
<tr>
<td>(all 4 nodes)</td>
<td>.250</td>
<td>.197</td>
<td>.292</td>
</tr>
<tr>
<td>Range</td>
<td>.16-1</td>
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**Satisfaction**

<table>
<thead>
<tr>
<th>Recalled experiences</th>
<th>Mean</th>
<th>S-T pos</th>
<th>S-T neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.193 (N=996)</td>
<td>6.311 (N=645)</td>
<td>5.976 (N=351)</td>
</tr>
<tr>
<td>SD</td>
<td>1.002</td>
<td>.866</td>
<td>1.183</td>
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<tr>
<td>Range</td>
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**Hypothetical Experiences**

<table>
<thead>
<tr>
<th>Mean</th>
<th>D-T pos</th>
<th>D-T neg</th>
<th>D-T neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothetical</td>
<td>5.389 (N=844)</td>
<td>5.693 (N=321)</td>
<td>5.486 (N=330)</td>
</tr>
<tr>
<td>SD</td>
<td>1.558</td>
<td>1.515</td>
<td>1.534</td>
</tr>
<tr>
<td>Range</td>
<td>1-7</td>
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</table>

**WOM Propensity**

<table>
<thead>
<tr>
<th>Mean</th>
<th>D-T pos</th>
<th>D-T neg</th>
<th>D-T neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothetical</td>
<td>5.036 (N=844)</td>
<td>6.084 (N=321)</td>
<td>5.404 (N=330)</td>
</tr>
<tr>
<td>SD</td>
<td>2.027</td>
<td>1.523</td>
<td>1.938</td>
</tr>
<tr>
<td>Range</td>
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</tr>
</tbody>
</table>

Of balance or various tie configurations (means range from 3.209 to 3.333 out of 4, all diff’s NS). For these hypothetical scenarios, the D→R tie was positive across all conditions—it is logical that regardless of this specific WOM experience, future WOM to the same friend may be relatively constant. There were, however, differences across conditions in terms of future WOM regarding the same product. Consistent with results reported above, participants indicate higher future WOM to others regarding the same product when the WOM digraph is balanced vs. when it is imbalanced (M_bal=3.313, M_imbal=3.186, diff p<.10). These results provide evidence regarding the relationship between balance and future WOM, while minimizing issues associated with recall biases.

**Hypothesis 4: Tie Weights and Future WOM.** A split sample analysis was conducted to compare the correlations of the balance ratio with future WOM on digraphs with high and low aggregate weights, with the aggregate weight represented by the sum of the six ties (range 6-42, median=21.5). Consistent with H4, the correlation between balance and future WOM is significant for the high aggregate weight digraphs, but not for the low aggregate WOM digraphs across all four future WOM measures. Similar to the
insights derived in the preliminary study, it is not surprising that the effect of the balance associated with trivial WOM experiences is much less predictive of future WOM.

GENERAL DISCUSSION
In this research, the theories and empirical methods associated with cognitive balance (Heider 1946) were leveraged to examine the significance and implications of balance on consumers’ WOM behaviors. Specifically, consumers’ individual, micro-level cognitive networks or “signed digraphs” containing social relationship and product perceptions and representing their WOM experiences were analyzed. Importantly, we contribute to our understanding of WOM by bridging the micro and macro perspectives; the link between the balance associated with these consumers’ cognitive networks and future inter-consumer communication was established.

In a preliminary study employing in-depth interviews to elicit participants’ recalled WOM experiences, results indicate that WOM experiences are likely to be balanced and that consumers are more satisfied when this is the case. In the main study, WOM cognitive networks comprised of four-nodes (the public self (D) the private self (S), the receiver (R) and the product (T)) based on recalled and hypothetical WOM experiences were examined. Results indicate a significant correlation between balance and future WOM and that various tie measures associated with WOM experiences may moderate this effect. Specifically, future WOM to the same receiver is best predicted by the disseminator’s assessment of their relationship with
the receiver, but cognitive balance is not a significant predictor of future WOM to the same receiver when tie valences are incorporated. The balance ratio associated with a WOM experience does help predict future WOM regarding the same product, as does the disseminator’s true assessment of the product. Furthermore, our results also indicate that WOM digraphs with higher aggregate weights are more predictive of future WOM.

Overall, the present research supports the premise that consumers seek and are more likely to recall balanced WOM experiences. However, based on our methods and results we cannot assert that consumers succeed in their apparent goal of experiencing balance. Although consumers may distort their recollections of experiences to be more cognitively balanced than they actually were (Freeman 1992), in this case, perception may be reality. It is the recollection of experiences and their associated balance that affects future behavior (Gardial et al. 1994), including, presumably, future WOM propensities.

While consumer researchers have previously examined the relevance and implications of balance and consistency in other important consumer contexts, this research represents the first time that balance theory has been systematically applied to WOM. Although we employed the most basic theories of balance and transitivity as a means to explore the viability of their application to this phenomenon, we demonstrated numerous nuanced effects and suggest that other balance-related theories should now be explored. For example, based on cognitive dissonance (Festinger 1957), it would be worthwhile to examine whether and under what conditions people seek to validate their product evaluations through WOM, and whether they seek to reinforce opinions that are consistent with their reputation and/or their publicly stated convictions via WOM. Since Festinger offers that people reconcile dissonance by changing the valence or significance of their cognitions, it would be interesting to understand under what conditions consumers change their opinions of people and/or products vs. when they change the relative importance of their relationship with the person or the product. Considering the proliferation of consumer opinion via the internet, it would also be worthwhile to examine the implications of the relative balance associated with consumers’ online product postings and ratings when they are either anonymous vs. when they are not—does the private self have any effect in an anonymous setting? Separately, an examination of consumers’ varied proclivities to accept inconsistency may provide useful insight. Although previous research demonstrates consumers’ varied tolerances of duality (Williams and Aaker 2002), we offer that WOM-related trait factors such as opinion leadership or expertise may also be related to consumers’ relative acceptance of inconsistency.

REFERENCES