Online Resource B: Dynamic Network Surveys, Reliability, and Validity

Surveys can assess important elements of perceived dynamic network schemas. They are especially important when generating dynamic network charts becomes overly complex. Part 1 of this Online Resource provides a dynamic network survey of full systems. This survey examines how various entities in a social network are perceived to be involved in a targeted behavior or goal pursuit. Part 2 provides a dynamic network survey of communications (or interactions). This survey assesses the perceived motivational issues underlying communications between dyads, which can be extended to larger social network connections. Part 3 discusses how to analyze the reliability and validity of these surveys.

PART 1: THE DYNAMIC NETWORK SURVEY OF FULL SYSTEMS

The dynamic network survey of full systems is an egocentric survey that would be distributed to samples of individuals, groups, or relevant parties to make generalizations about the important factors influencing a target behavior or goal pursuit. In the example below, the first section of items represents a Type I dynamic network survey. These items are relevant to studies examining individual behaviors or individual goal pursuits that are largely characterized with network motivation and generally positive orientations. The second section of items extends the survey to understand individual behaviors or individual goal pursuits that have significant network resistance, network reactance, or social conflicts as well. Using all of the items from the first and second section represents a full Type II survey to understand all of the social network roles involved in a target behavior or goal pursuit. Peripheral role linkages are also included in the surveys, given their potential relevance in social networks.

The items in the survey below are illustrated in the context of getting a summer internship goal/behavior. However, researchers could simply replace the phrase “get (or getting) a summer internship” across all items in the survey with the specific behavior or goal pursuit that they are interested in studying. For instance, to examine the goal of losing five pounds in three months, researchers would replace the goal striver item “I will get a summer internship” with “I will lose five pounds in three months.” Alternatively, to study employee turnover within a one-year period, researchers could replace the item with “I will stay at this organization for the next year.”

In each subsection below, the first two items for each construct (i.e., Item 1 and Item 2) represent the individual’s overall behavior directed toward the goal or other entities in the social network. These are referred to as self items. Theoretically, this characterizes the generalized outbound linkages directed from the individual to important elements in his or her dynamic network system. The third and fourth items (i.e., Item 3 and Item 4) represent the behavior of other entities in the social network directed toward the individual and his or her goal pursuit process. Theoretically, this characterizes the generalized inbound linkages directed toward the individual and his or her dynamic network system from others in the network. These items are referred to as other items in the survey below. Using both the self and other items allows the survey to capture how the focal entities not only influence the target behavior/goal pursuit and others in the system, but also how others in the system may influence the egocentric entity. Past social influence and interpersonal relations models have not accounted for these complexities.
and multidirectionalities across social network role activations.¹

Each concept in the survey below is measured with multiple items so that reliability can be assessed, although more or less questions could be asked, depending on methodological constraints. For example, if applied researchers have legitimately serious time constraints and do not want to overburden their given sample, they could use only one *self* item and one *other* item in each section below to tap basic motivational issues, but this implicitly assumes that other research demonstrates the scale’s reliability. If there are greater time constraints, using one *self* and one *other* item for system supporter, system competency, goal striver, and performance concepts provides a minimalist approach to testing basic elements in the theory on relatively positive systems (eight questions total). Alternatively, researchers could select a subset of variables in the theory that they identify as being most relevant to their investigations.

As for response formats, Items 1 through 4 in each section could be scored on five-point Likert scales ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The way in which these items can be combined to represent the different factors in dynamic network theory is discussed in Part 3 of this Online Resource. Item 5 is a supplemental question of likely relevance to researchers interested in identifying the specific sources of the social network role activations. For example, correlating these dummy-coded source variables with Item 3 and/or Item 4 (or the broader factor) in each section can identify who is most strongly associated with the given role activation. This could also provide a statistical representation of the specific “stakeholders” that are relevant to the given system, in line with stakeholder theorizing (Donaldson & Preston, 1995; Mitchell, Agle, & Wood, 1997). Future research should examine the psychometrics of the survey and continue to refine its measurement.

**Observer Assessment**

Item 1 *(self)*: I would recognize that others are observing whether I get a summer internship or not.
Item 2 *(self)*: I would be aware that other people are observing whether I get a summer internship or not.
Item 3 *(other)*: Other people would recognize whether I get a summer internship or not.
Item 4 *(other)*: Other people would be observing whether I get a summer internship or not.
Item 5 *(supplemental)*: The people that would be observing whether or not I get a summer internship, if any, are:

friends family coworkers students acquaintances strangers other:_______

**Interactor Assessment**

Item 1 *(self)*: I may be in the presence of people that get summer internships.
Item 2 *(self)*: I could be around people that get summer internships.
Item 3 *(other)*: Other people that get summer internships may be in the presence of me.
Item 4 *(other)*: Other people that get summer internships could be around me.
Item 5 *(supplemental)*: The other people that get summer internships that could be in the presence of me, if any, are:

friends family coworkers students acquaintances strangers other:_______

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¹ Future research will need to examine the extent to which the responses for the *other* items are generated from the *self* responses through the consensus bias (Krueger & Clement, 1994), projection and stereotype mechanisms (Goel, Mason, & Watts, 2010), empathetic capacities, or other causes. The assessment of the *other* items is also related to proxy reporting techniques (Huckfeldt, 2001).
System Supporter Assessment
- Item 1 (self): I will support other people that help me get a summer internship.
- Item 2 (self): I intend to support other people that help me get a summer internship.
- Item 3 (other): Other people will support my getting a summer internship.
- Item 4 (other): Other people intend to support my getting a summer internship.
- Item 5 (supplemental): The other people that will support my getting a summer internship, if any, are:
  - friends
  - family
  - coworkers
  - students
  - acquaintances
  - strangers
  - other: __________

System Competency Assessment
- Item 1 (self): I am typically competent at getting summer internships.
- Item 2 (self): I usually have skills at getting summer internships.
- Item 3 (other): Other people around me are typically competent at helping me get summer internships.
- Item 4 (other): Other people around me usually have skills at helping me get summer internships.
- Item 5 (supplemental): The people around me having competence at helping me get summer internships, if any, are:
  - friends
  - family
  - coworkers
  - students
  - acquaintances
  - strangers
  - other: __________

Goal Striver Assessment
- Item 1 (self): I will get a summer internship.
- Item 2 (self): I intend to get a summer internship.
- Item 3 (other): Other people will get a summer internship with me.
- Item 4 (other): Other people intend to get a summer internship with me.
- Item 5 (supplemental): The other people that will get a summer internship with me, if any, are:
  - friends
  - family
  - coworkers
  - students
  - acquaintances
  - strangers
  - other: __________

Performance Assessment
- Item 1 (self): I have an internship arranged for the summer.
- Item 2 (self): I have a summer internship offer.
- Item 3 (other): Other people have an internship arranged for the summer with me.
- Item 4 (other): Other people have summer internship offers with me.
- Item 5 (supplemental): The other people that have summer internship offers with me, if any, are:
  - friends
  - family
  - coworkers
  - students
  - acquaintances
  - strangers
  - other: __________

Stronger assessments of performance would objectively assess the target behavior or goal achievement over time. For example, it would be preferable for third parties to collect objective data that show whether or not the goal was achieved or not (or the behavior was executed or not). In the example above, data could be collected at the end of the summer to see if the person participated in a summer internship.

In more comprehensive assessments of behaviors or goal pursuits that have conflict, competition, or negative relations, the questions in the next several sections below (or a subset, such as system negation) could be added to the survey. This broader instrument represents a Type II survey, which also assesses generalized peripheral role activations and multiplex linkage assessments. However, if such complexity does not exist or is not central to the given assessment, the items in the Type I survey above may be sufficient.

If a Type II self-report survey is used, assessing performance measures at the end of the survey can provide a stronger methodological test of the theory (Feldman & Lynch, 1988). Theoretically consistent with the mediation model in dynamic network theory (see Chapter 2),
the following item order can be used to help mitigate order effects: observer, interactant, system supporter, system negator, supportive resistor, system reactor, system competency, goal striver, system competency resistance, goal preventer, performance, and emotion/satisfaction. If feasible, counterbalancing or random allocation of items with various filler items would also be advised whenever possible to enhance measurement rigor.

System Negator Assessment
Item 1 (self): I would negatively react to other people that help me get a summer internship.
Item 2 (self): I would have a negative attitude toward other people that support my getting a summer internship.
Item 3 (other): Other people would negatively react to my getting a summer internship.
Item 4 (other): Other people would have a negative attitude about my getting a summer internship.
Item 5 (supplemental): The other people that would negatively react to my getting a summer internship, if any, are:
   friends  family  coworkers  students  acquaintances  strangers  other:________

Supportive Resistor Assessment
Item 1 (self): I will support others that resist my efforts to get a summer internship.
Item 2 (self): I will support others that restrict me from getting a summer internship.
Item 3 (other): Other people will support resisting my efforts to get a summer internship.
Item 4 (other): Other people will support restricting me from getting a summer internship.
Item 5 (supplemental): The other people that will support resisting my efforts to get a summer internship, if any, are:
   friends  family  coworkers  students  acquaintances  strangers  other:________

Although this set of items may not be as salient for some behaviors, these items can be salient in others, such as in studies examining individuals trying to abstain from a behavior (e.g., abstaining from smoking).

System Reactor Assessment
Item 1 (self): I would negatively react to others that prevent me from getting a summer internship.
Item 2 (self): I would have a negative attitude about others that hinder me from getting a summer internship.
Item 3 (other): Other people would negatively react to my being prevented from getting a summer internship.
Item 4 (other): Other people would have a negative attitude about my being hindered from getting a summer internship.
Item 5 (supplemental): The other people that would negatively react to my being prevented from getting a summer internship, if any, are:
   friends  family  coworkers  students  acquaintances  strangers  other:________

System Competency Resistance Assessment
Item 1 (self): I am typically competent at making it difficult for myself to get summer internships.
Item 2 (self): I usually have skills at preventing myself from getting summer internships.
Item 3 (other): Other people around me are typically competent at making it difficult for me to get summer internships.
Item 4 (other): Other people around me usually have skills at preventing me from getting summer internships.
Item 5 (supplemental): The other people that are competent at making it difficult for me to get summer internships, if any, are:

friends  family  coworkers  students  acquaintances  strangers  other: ________

**Goal Preventer Assessment**

Item 1 (self): I will make it difficult for myself to get a summer internship.
Item 2 (self): I will prevent myself from getting a summer internship.
Item 3 (other): Other people will make it difficult for me to get a summer internship.
Item 4 (other): Other people will prevent me from getting a summer internship.
Item 5 (supplemental): The other people that will prevent me from getting a summer internship, if any, are:

friends  family  coworkers  students  acquaintances  strangers  other: ________

**Supplemental Items**

Researchers could ask supplemental questions to further describe the social context of the dynamic network system, if time and space permits. For example, researchers could replace the categories in Item 5 with other categories that are more relevant to the behavior or goal under analysis. Alternatively, in appropriately confidential settings, instead of Item 5 above in each section, researchers could ask participants to list specific names, initials, or codes to specifically identify the exact individual or group entities in the social network. This would also allow researchers to tally the total number of perceived entities in the social network serving the given role. Such questions are likely most relevant in confidential studies, such as researchers, counselors, or consultants using the information to track their clients' progress over time or to answer research questions that require such identifications and tallies.

Demographic variables could be also assessed for each section in the survey. These variables could serve as additional control variables, important covariates, or predictor variables in the analyses, given sufficient statistical power. The following set of items illustrate a parsimonious, albeit limited, approach for assessing demographic characteristics in each section of the survey. These items could be asked immediately after Item 5 in each section of the survey:

Item 6 (Supplemental): Which demographic terms best represent these other people?

GENDER: mostly women  mostly men  even mix  don’t know
AGE: most are less than 40 years  most are over 40 years  even mix  don’t know
ETHNICITY: mostly people of color  mostly white  even mix  don’t know

These demographic questions would obviously be modified to fit the likely characteristics of the samples under study (e.g., “40 years” would be changed to reflect the likely median of the given sample). At the end of the survey, the participants in the study could also be asked to indicate their own demographic characteristics (e.g., their gender, age, and ethnicity) as well as other control variables and dependent measures concerning the social network or target goal pursuit, including proxy measures for authorized system support, if relevant (e.g., assessing whether the entities hold leadership or management positions in relation to the given goal pursuit). As for other dependent variables, researchers could ask questions concerning participants’ emotional reactions to the goal pursuit, which should correlate with goal achievement and performance levels according to the theory. The following provides an example in the context of the summer internship goal/behavior:

Item 1 (self): I am satisfied with where I am at in getting a summer internship.
Item 2 (self): I am happy with where I am at in getting a summer internship.
Item 3 (other): Other people are satisfied with where we are at in getting a summer internship.
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Item 4 (other): Other people are happy with where we are at in getting a summer internship.
Item 5 (supplemental): The other people that are happy with where we are at in getting a summer internship, if any, are:
   friends  family  coworkers  students  acquaintances  strangers other:________

PART 2: THE DYNAMIC NETWORK SURVEY OF COMMUNICATIONS

The dynamic network survey of communications allows researchers to assess the parameters in dynamic network theory on specific communications (or interactions) between dyads in selected samples or settings. These surveys could be applied in various ways. For example, researchers could assess people’s perceptions about the specific communications they recently had with each other. Researchers could also apply these surveys to evaluate how people perceive their interactions in experimental and laboratory settings or those involving economic games or specific dyadic conflicts (e.g., Mellers, Haselhuhn, Tetlock, Silva, & Isen, 2010). Alternatively, some researchers may be interested in asking individuals to provide general assessments of the typical communications they experience with specific members in their daily social networks, such as their spouse, friends, and/or coworkers. Data from this survey could then be used to predict other individual difference variables. For example, the perceived system support and system negation experienced across a person’s social network interactions could be used to predict traditional scales of social support, stress, and subjective well-being.

In the survey below, the items are directed toward a specific communication experience (or interaction). The survey asks participants to respond to items that probe the entities, goals, social network roles, system competencies, and performances of the targeted communication. If possible, it is ideal to have both individuals in the dyad respond to the survey. This provides additional methodological rigor and allows researchers to assess elements of dynamic network intelligence (DNI) between the entities, which is discussed below.

Entity Assessment

Item 1: I was communicating with _________________ in this exchange. (Note: Only initials or codes could be collected in confidential or anonymous assessments).

If multiple people are sampled in a clearly bounded social network, group, or organization, the above qualitative item would allow researchers to show the exact communication linkages in the social network. For example, these analyses may show that (1) person X communicated with person Y and Z, (2) person Y communicated with person X, Z, and another person Q, (3) person Z communicated with person X and Y, and (4) person Q only communicated with person Y over a finite period of time. Researchers could use traditional social network analyses and statistics to describe the above structure. Further, the variables in dynamic network theory could be used to describe the motivational issues in the overall social network structure (e.g., its average level of system support experienced across the communications). Researchers could also correlate traditional egocentric social network data with the aggregated dynamic network metrics to explore new theoretical relationships in dynamic network systems. For instance, does the density of individuals’ broader social networks correlate with their network motivation across the communications in their networks?

Goal Assessment

Item 1: The main goal of this communication was to ________________.

Researchers could also ask participants to check the main goal, purpose, or reason for the communication from a list, if relevant to the analysis (e.g., to socialize, to discuss work issues, to discuss family issues, to discuss a problem, other: ________). The remaining questions below
could be assessed on five-point Likert scales, ranging from Strongly Disagree (scored 1) to Strongly Agree (scored 5).

**Observer Assessment**
- Item 1 (self): I intensely listened to every single thing the other person said in relation to the goal of this communication.
- Item 2 (self): I was engrossed in observing all aspects of this communication.
- Item 3 (other): The other person intensely listened to every single thing I said in relation to the goal of this communication.
- Item 4 (other): The other person was engrossed in observing all aspects of this communication.

**Interactant Assessment**
- Item 1 (self): I spent a lot of time interacting with the other person in relation to the goal of this communication.
- Item 2 (self): I took a substantial amount of time to interact with the other person in relation to the goal of this communication.
- Item 3 (other): The other person spent a lot of time interacting with me in relation to the goal of this communication.
- Item 4 (other): The other person took a substantial amount of time to interact with me in relation to the goal of this communication.

**System Supporter Assessment**
- Item 1 (self): I strongly supported the other person in relation to the goal of this communication.
- Item 2 (self): I very much supported the other person in pursuing the goal of this communication.
- Item 3 (other): The other person strongly supported me in relation to the goal of this communication.
- Item 4 (other): The other person very much supported me in pursuing the goal of this communication.

**System Competency Assessment**
- Item 1 (self): I am typically very competent at communicating with the other person to pursue the goal of this communication.
- Item 2 (self): I am usually very skilled at communicating with the other person to strive for the goal of this communication.
- Item 3 (other): The other person is typically very competent at communicating with me to pursue the goal of this communication.
- Item 4 (other): The other person is usually very skilled at communicating with me to strive for the goal of this communication.

**Goal Striver Assessment**
- Item 1 (self): I was extremely committed to the goal of this communication.
- Item 2 (self): I intensely tried to achieve the goal of this communication.
- Item 3 (other): The other person was extremely committed to the goal of this communication with me.
- Item 4 (other): The other person intensely tried to achieve the goal of this communication with me.

**Role Performance**
- Item 1 (self): I performed extremely well in the goal of this communication.
- Item 2 (self): I performed at the highest level possible in this communication.
Item 3 (other): The other person performed extremely well in the goal of this communication with me.

Item 4 (other): The other person performed at the highest level possible in this communication with me.

**Overall Performance for Both**

Item 1 (combined): The overall communication between me and the other person fully achieved the goal in an excellent manner.

Item 2 (combined): The total performance of the communication between me and the other person was at the highest level possible.

All “role performance” and “overall performance” items could be combined to represent a broader performance construct, if statistical results indicate a unidimensional factor with sufficient internal consistency; see Part 3 of this Online Resource for more theoretical rationale.

Methodologically, if possible, it is advantageous to also have third-party observers, researchers, or experts provide assessments of the role and overall performance indicators. For example, the third parties could assess the performance of the entities and their communication through live observations, audio recordings, video recordings, or transcripts. Such dependent variables would help reduce common-method bias when testing the theory. Using only self-reported dependent variables in cross-sectional surveys often overinflates the correlations with independent variables, given the proximity of assessment (Feldman & Lynch, 1988).

In more comprehensive and rich theoretical assessments, especially those with conflict, competition, or negative relations, the following questions could be added to the communication survey. This instrument, which would include the items above, would represent a Type II survey that includes peripheral role assessments and multiplex linkage assessments. If there are serious time and space constraints, researchers could select only those variables across the theory that they justify as being most relevant to their investigations (e.g., examining how system negation may influence individuals’ perceptions of procedural justice, or adding only system negation to Type I surveys, given its potential greater variance).

**System Negator Assessment**

Item 1 (self): I felt very negatively toward how the other person was pursuing the goal of this communication.

Item 2 (self): I had a very negative attitude about how the other person was pursuing the goal of this communication.

Item 3 (other): The other person felt very negatively toward how I was pursuing the goal of this communication.

Item 4 (other): The other person had a very negative attitude about how I was pursuing the goal of this communication.

**Supportive Resistor Assessment**

Item 1 (self): I strongly supported the other person in resisting the goal of this communication.

Item 2 (self): I very much supported the other person in preventing the goal of this communication.

Item 3 (other): The other person strongly supported me in trying to resist the goal of this communication.

Item 4 (other): The other person very much supported me in preventing the goal of this communication.
System Reactor Assessment
Item 1 (self): I felt very negatively toward the other person, if he or she was preventing the goal of this communication.
Item 2 (self): I had a very negative attitude about the other person, if he or she resisted the goal of this communication.
Item 3 (other): The other person felt very negatively toward me, if I was preventing the goal of this communication.
Item 4 (other): The other person had a very negative attitude about me, if I resisted the goal of this communication.

System Competency Resistance Assessment
Item 1 (self): I am typically very competent at communicating with the other person to resist the goal of this communication.
Item 2 (self): I am usually very skilled at communicating with the other person to prevent the goal of this communication.
Item 3 (other): The other person is typically very competent at communicating with me to resist the goal of this communication.
Item 4 (other): The other person is usually very skilled at communicating with me to prevent the goal of this communication.

Goal Preventer Assessment
Item 1 (self): I was extremely committed to prevent the goal of this communication.
Item 2 (self): I intensely tried to resist the goal of this communication.
Item 3 (other): The other person was extremely committed to prevent the goal of this communication.
Item 4 (other): The other person intensely tried to resist the goal of this communication.

Dynamic Network Intelligence and Supplemental Items
Besides testing relationships in dynamic network theory, the above survey items also allow researchers to assess various aspects of dynamic network intelligence (DNI) in the theory. For example, researchers could examine the degree to which Entity A’s rating of Entity B’s goal striving is accurate in light of Entity B’s response. To illustrate, if Entity A rated that Entity B’s goal striving was 4 on a five-point Likert scale and Entity B reported his or her goal striving at 3, Entity A’s absolute value of inaccuracy or error would be 1 on the five-point scale (i.e., |E| = 1).

As another example, if Entity A rated Entity B’s goal striving as 3 on a five-point Likert scale and Entity B reported his or her own goal striving at 5, the absolute value of inaccuracy or error would be 2 on the five-point scale (i.e., |E| = 2). Future research could also examine the degree to which it is important to differentiate over and underestimations of DNI on specific social network roles and/or across all social network roles in the survey.

Additionally, researchers could calculate the absolute value of average inaccuracy or error across all of a person’s other social network role responses by summing the absolute value of inaccuracy or error across all of these social network role items and dividing it by the total number of items (i.e., \( \sum |E| \) on other items / number of other items). Lower absolute error implies greater dynamic network intelligence for the other social network role responses.

Such assessments can also indicate the degree to which a person manifests accurate and inaccurate network optimism and pessimism as discussed in Chapter 5. For example, believing that another person is a system supporter while the other person indicates little system support shows inaccurate network optimism and low DNI on the system supporter dimension. Of course,
the above assessment of dynamic network intelligence assumes that individuals are transparent and honest in their survey responses and have a capacity to accurately judge their own motivational and behavioral orientations regarding their social network roles. Given the debate that self-report may not always be an accurate assessment of one’s behavior (Vazire & Mehl, 2008), future research could also examine other relevant measures for DNI comparisons, such as those based upon external observers or other physiological, nonverbal, or implicit indicators of social network role activations.

Further, using the survey in the above manner to make inferences about the DNI for system competency and performance is potentially even more problematic, because one could plausibly argue that a self-report of one’s own system competency and performance may not accurately represent these dimensions in light of other more objective sources of data, such as tests and objective performance measures. Indirect support for this comes from research showing that employees’ self-ratings of their performance have relatively low associations with supervisor’s ratings (meta-analytic $r = .22$; Heidemeier & Moser, 2009).

More generally, the above conceptualizing is related to research examining “assumed similarity” (Human & Biesanz, 2011), over- and underestimation of perceived agreement (Goel, Mason, & Watts, 2010), and the false-consensus effect (Krueger & Clement, 1994). However, it extends this work to understand important motivational factors involved in how social networks are involved in goal pursuits, which has not been examined in the past. Research will need to examine if the inaccuracies found in the psychological literature on attitudes, beliefs, performance, and personality extend to the accuracies or inaccuracies about social network role perceptions in dynamic network systems. For example, are individuals more accurate at estimating the level of *other* goal striver activation in the system as compared to *other* system negator activation?

Research could also explore a variety of cognitive and behavioral antecedents, consequences, and moderators of DNI. For example, does Biesanz and Human’s (2010) finding apply to perceptions about social network role activations? (e.g., “people motivated to form accurate impressions do indeed become more accurate, but at the cost of seeing others less normatively and, in particular, less positively”, p. 589). Is intimacy also a strong predictor of DNI as it is in the personality domain (Connelly & Ones, 2010)? Extending work by Law, Wong, and Song (2004) to the prediction of behavior and goal achievement, do others’ ratings of social network role activations explain additional variance in a target behavior or goal achievement over and above self-reports of intention/goal striving, and could this further depend on cultural characteristics (Atwater, Wang, Smither, & Fleenor, 2009)?

Finally, toward the end of the survey, researchers could include various measures to tap emotional outcomes, which may provide insight into the network rippling of emotions and could also be used as an additional DNI dimension. The following items provide a general assessment of the positive or negative emotions associated with a specific communication. These items should be theoretically related to the goal achievement/performance variable according to the theory:
ITEM 1 (SELF): I was very satisfied with this communication.
ITEM 2 (SELF): I was very happy with this communication.
ITEM 3 (OTHER): The other person was very satisfied with this communication.
ITEM 4 (OTHER): The other person was very happy with this communication.
ITEM 5 (COMBINED): Both of us were very satisfied with this communication.
ITEM 6 (COMBINED): Both of us were very happy with this communication.

Additional demographic and control variables could also be assessed at the end of the survey, such as each participant’s age, gender, and ethnicity (and their partner’s demographics). Another important diagnostic or control variable would be to ask who started or initiated the communication or interaction.

ALTERNATIVE VERSION: ASSESSING GENERALIZED COMMUNICATIONS WITH OTHERS

The items in the above dynamic network survey of communication could also be transformed to assess generalized communications between people, such as the typical communications that occur between a focal person and the other main people in the focal person’s social network, group, or organization. To illustrate, instead of asking “I was extremely committed to the goal of this communication” for the goal striver question above, researchers could generalize the question as follows: “I am usually extremely committed to the goal of my communications with person X.” The other items would be transformed in a similar manner.

PART 3: ANALYZING RELIABILITY AND VALIDITY IN DYNAMIC NETWORK SURVEYS

This section articulates how researchers can combine items in dynamic network surveys to test the theory. Theoretically, given sufficient internal consistency (i.e., a high alpha) and a unidimensional factor representation, the first four items for each concept (self item 1, self item 2, other item 3, and other item 4) can be averaged / aggregated (or formed through factor analyses) to create an overall score for each concept. For example, the average goal striver activation score for a person would result from adding the values across the first four items and then dividing by 4 (i.e., average goal striver activation score = goal striver item 1 + item 2 + item 3 + item 4 / 4). Such unidimensional findings psychologically suggest that the social network role activations are perceived to be working the same way for both the focal individual and other people in his or her dynamic network schema. This theoretically provides support for the notion that survey respondents perceive a “partner” or “collective identity” for the given social network role. Instead of the person acting alone for the given social network role, the person is perceived to be jointly fused with relevant others in the social network. This represents a fundamentally different approach to the quantitative prediction and theoretical understanding of human behavior in contrast to classic individually oriented questions in behavioral intention theories (Ajzen, 1991; Westaby, 2005; Westaby, Probst, & Lee, 2010).

However, if there is low internal consistency for the four items in the scale (and/or a multiple factor representation), but high internal consistency among the subset of items in the scale (i.e., a high alpha for self item 1 with self item 2 and another high alpha for other item 3 with other item 4, resulting in a clear two factor solution), it demonstrates that the participants

2 All items could be combined to represent a more general satisfaction, affect, or positive emotion construct, if statistical results indicate a uni-dimensional factor with sufficient internal consistency. This is also true for the satisfaction items in the dynamic network survey of full systems. See Part 3 of this Online Resource for more theoretical and statistical rationale.
are reliably perceiving different activation levels of their roles versus others in the system. Theoretically, this illustrates that individuals are maintaining strong independent social network roles and are not fused or tightly bonded with each other in the same behavioral manner. When both *self* and *other* dimensions are found, researchers would be justified to further differentiate those variables in their analyses to capture the motivational complexities in the system.

Researchers can also examine additional construct validity analyses that are grounded in the theory as discussed in Chapter 2. First, researchers can examine if goal striver and system supporter items statistically load on the broader *network motivation* factor with high reliability. If system competency items load with these items, it would support the even broader *network power* factor. Although likely a rare finding, researchers could further examine if goal striver, system supporter, and system reactor items load on the even broader *network affirmation* factor in the theory. Lastly, if all of these items also load with the system competency items, it supports the broadest *network power affirmation* factor in the theory.

Second, researchers can examine if the goal preventer and supportive resistor items statistically load on the broader *network resistance* factor with high reliability. If system competency resistance items also load with these items, it supports the notion of a *network power resistance* factor forming in the given sample. Researchers can further examine if goal preventer, supportive resistor, and system negator items all load on the broad *network de-affirmation* factor in the theory. In contrast, if system reactor and system negator items load on the same factor, it suggests that a lot of mutual conflict is swirling around the communication goal pursuit and hence a broader *network reactance* factor could be formed in the statistical model to see if this is having a positive or negative effect on motivation and performance. If broader factors are discovered in the analyses, their use in the predictive validity analyses below would be justified.

Theoretically, the construct validity analyses also allow researchers to examine the motivational characteristics emerging in the given samples. For example, in some studies, factor analyses may show that the entities are activating a global and cohesive form of network motivation (e.g., G and S merged into a unidimensional network motivation factor across both *self* and *other* items). In other studies, researchers may find that the entities are differentiating very refined social network role activations in the system (e.g., G and S roles are clearly differentiated for both *self* and *other* items). Additional research needs to explore these possibilities.

As for predictive validity, researchers could use various statistical techniques to empirically examine the key theoretical relationships shown in Online Figure B1. For example, these statistical techniques could include correlational analyses, multiple regression analyses, path analyses, structural equation modeling (SEM), and hierarchical linear modeling (HLM). Based upon the mediation model proposed in Chapter 2, Online Figure B1 shows how secondary roles influence primary goal roles which in turn influence the overall target goal achievement/performance/behavior dependent variable. To illustrate, in Type I surveys, goal striver activation would first be used to predict the performance dependent variable. Then, system supporter activation, interactant activation, and observer activation would be used to predict goal striver activation. If a Type II survey is used, goal preventer activation would be

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3 Researchers could use the standard default Eigenvalue of 1 in exploratory factor analyses to justify the existence of a multiple factor representation (or use comparative model tests in confirmatory factor analyses).

4 Linear and non-linear functions could also be tested, such as examining the efficacy of “sigmoidal (S-shaped) functions” given their theoretical utility in modeling neural network activations (Monroe & Read, 2008, p. 737).
added to the first analysis above to also predict the performance dependent variable. Then, system reactor and system negator variables would be added to the other analyses to further predict goal striver and goal preventer activations. In both types of surveys, researchers can further examine the direct relationship between the secondary variables and the performance dependent variable. In Online Figure B1, system competencies are also added to the model in an exploratory fashion as both a direct predictor of the dependent variable and as a mediator in the model as well. Future research needs to explore these possibilities as well as its potential to act as a moderator in the model.

To note, as discussed in Chapter 2, not all secondary roles are expected to independently predict primary goal roles via beta weights or path coefficients. The lack of independent association for all secondary roles on primary goal roles across contexts is expected, because various dynamics can dictate which of the secondary roles are more important to help people adapt to their pursuits. For example, in some situations, system support may be the key independent predictor of goal striving, such as for samples engaged in learning a new behavior. In other situations, the observer role may be a powerful independent predictor, such as for samples heavily engaged in the monitoring and feedback process. Nonetheless, the zero-order correlation between $S$ and $G$ (or $S'$ and $G'$) is always hypothesized to be positive across target behaviors or goal pursuit systems as a bedrock prediction in the theory. Moreover, at least one of the secondary roles is always expected to independently predict the primary goal roles to support the mediation model in dynamic network theory. In terms of mediation, the goal striver role (or goal preventer role) is also expected to directly predict goal achievement/performance/behavior as well as partially or fully mediate the effect of secondary role variables in the system. Lastly, system competency (or system competency resistance) is expected to correlate with the goal achievement/behavior/performance criterion and/or the primary goal roles.

It is important to note that sufficient statistical variance is needed to provide a fair test of the theory in field studies. For instance, if almost all of the participants strongly disagreed with the $G'$ and $S'$ items, this restriction of range in the sample would methodologically attenuate statistical relationships and hence not provide a fair test of these constructs in the given context.

Of course, other variables could be examined in the analyses, such as demographics, control variables, or other theoretically external variables that researchers may expect can contribute to the prediction of the target behavior, goal achievement, or performance criterion. If multilevel data is available, such as data collected from multiple individuals in different organizations (or multiple individuals in a repeated measures design), researchers could further use hierarchical linear modeling (HLM) or related multilevel statistical techniques to account for the within and between-system covariation (Hofmann, 1997; Morgeson & Hofmann, 1999).
Online Figure B1. Statistical model testing elements of dynamic network theory. + and - denotes zero-order relationships that are expected to be positive and negative across empirical studies, respectively. Various secondary roles (not all) could be independent predictors depending on the study. This illustrates that people can adapt to different behavioral or goal pursuits in various ways depending on the situation. See the text in Online Resource B for additional rationale. In field studies, sufficient variance is needed to adequately test hypotheses (especially among network de-affirmation variables, which may have lower base rates for some behaviors). Covariances would normally be estimated between each of the secondary roles and each of the primary goal roles when using structural equation modeling.
REFERENCES


