

Article

Using Computer-Aided Text Analysis to Elevate Constructs: An Illustration Using Psychological Capital

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Abstract

Applying individual-level constructs to higher levels of analysis can be a fruitful practice in organizational research. Although this practice is beneficial in developing and testing theory, there are measurement and validation concerns that, if improperly addressed, may threaten the validity and utility of the research. This article illustrates how computer-aided text analysis might be utilized to facilitate construct elevation while ensuring proper validation. Specifically, we apply a framework to develop organizational-level operationalizations of individual-level constructs using the psychological capital construct as an example.

Keywords

content analysis, level of analysis, multilevel, psychological capital, construct measurement, computer-aided text analysis

Macro organizational research often “borrows” constructs and associated theories from micro disciplines to investigate how they might apply at higher levels of analysis (Whetten, Felin, & King, 2009). There seems to be good reason for this practice as several micro-level theories and constructs have helped explain phenomena occurring at higher levels (Staw, 1991). For example, the concept of “learning,” once reserved for individuals (e.g., Gagné, 1965), has been expanded by organizational theorists to apply to teams (e.g., Brooks, 1994), organizations (e.g., Huber, 1991), networks (e.g., Knight, 2002), and even institutions (e.g., Siebenhüner & Suplie, 2005).

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Despite the clear benefits of borrowing constructs and theories from lower levels, doing so with rigor involves a number of theoretical and methodological complexities (Morgeson & Hoffman, 1999; Rousseau, 1985). The complexities of using a construct or theory at multiple levels have led to concerns about construct validity and a corresponding scholarly call for more work in multilevel construct measurement and validation (Bliese, Chan, & Ployhart, 2007). One potential hazard is attempting to generalize findings from analyses at one level of analysis to another, which can lead to specification errors that threaten the validity of the research (Kozlowski & Klein, 2000; Payne, Moore, Griffis, & Autry, 2011). For instance, some scholars looking at psychological and organizational climate have been criticized for aggregating individual-level data to the organizational level and then using these to test hypotheses at the individual level, resulting in the “fallacy of the wrong level” (Glick, 1985, p. 602).

Problems can occur when constructs developed at one level of analysis are not systematically developed for use at other levels of interest. Such problems include disagreements regarding the meaning and nature of the constructs, how they should be operationalized, and the contents of their nomological networks (Klein & Kozlowski, 2000). For example, one construct that scholars have suggested should be elevated to aggregate levels of analysis is optimism (Gabris, Maclin, & Ihrke, 1998; Green, Medlin, & Whitten, 2004). However, initial conceptualizations of organizational optimism have not caught on in the broader organizational studies literature despite calls for research examining the organizational outcomes of cognitive processes (e.g., Walsh, 1995). One possible reason for the lack of adoption of the organizational optimism construct could be issues surrounding construct definition. For example, one study identified optimism subcultures as those that “encourage innovation, focus on results rather than activities, consider the effect of outcomes on employees, and stress teamwork” (Green et al., 2004, p. 110). This definition of collective-level optimism differs significantly from the individual-level definitions of optimism used in the psychology literature that emphasize positive expectancies of future outcomes (e.g., Scheier & Carver, 1985; Seligman, 1990). By deviating significantly from the individual-level definition of optimism, it is unclear how optimism subcultures are related to individual-level optimism and to what extent the nomological networks of the construct at both levels should overlap (cf. Chan, 1998b; Klein & Kozlowski, 2000).

To provide guidance for organizational researchers aspiring to apply constructs developed at the individual level to measures relevant at the organizational level, Chen, Mathieu, and Bliese (2004) suggested a five-phase framework for the validation of multilevel constructs. This framework presents a step-by-step list of conceptual and methodological considerations to incorporate when applying constructs conceptualized at the individual level to higher levels of analysis, or “elevating” the construct, to maximize construct validity. This framework was developed to be independent of a specific method of measurement, enabling it to be applied broadly.

We build on Chen and colleagues’ (2004) framework to demonstrate how computer-aided text analysis might be used to elevate constructs from the individual to the organizational level. Computer-aided text analysis has the potential to overcome some of the challenges associated with conducting large-scale interorganizational research using techniques historically used to capture individual-level phenomena. Specifically, computer-aided text analysis of organizational narratives may be preferable to surveys when measuring elevated constructs across multiple organizations for several reasons. First, organizational narratives are a valuable source from which to measure phenomena directly at the organizational level (Duriiau, Reger, & Pfarrer, 2007). Thus, where survey methods would require the collection and aggregation of many surveys of employees for each organization in the sample, computer-aided text analysis requires only one data point per organization. Second, the organizational sciences generally have a relatively low response rate to surveys (Bartholomew & Smith, 2006; Baruch, 1999), which reduces power and discourages longitudinal research. By contrast, current and historical organizational narratives, such as annual reports, are commonly available on corporate websites and archived in third-party databases. This enables

researchers to collect larger, more representative samples of data quickly, thus facilitating longitudinal analyses. The ability to generate adequate sample sizes becomes even more difficult when sufficient individual-level measures must be collected and then aggregated to allow for analyses comparing multiple organizations (Cohen, 1988; Snijders & Bosker, 1999). Finally, the collection of organizational narratives is relatively unobtrusive and is less likely to contain biases from recall or demand characteristics (e.g., Barr, Stimpert, & Huff, 1992).

Despite the appeal of computer-aided text analysis to examine constructs borrowed from lower levels of analysis, no guidance exists in regard to using content analysis in a manner consistent with the multilevel construct validation guidance offered by Chen and colleagues (2004). The lack of such guidance represents a gap in the literature because previous empirical work focuses on using content analysis to measure constructs originally conceptualized at the organizational level of analysis (e.g., Short, Broberg, Coglisier, & Brigham, 2010). Filling this gap provides value for organizational scholars engaged in macro-level research (e.g., entrepreneurship, organizational theory, and strategy) because a number of reviews have found construct measurement and validation in these domains to be less than ideal (Boyd, Gove, & Hitt, 2005; Crook, Shook, Morris, & Madden, 2009). To bridge this methodological gap and facilitate rigorous multilevel research in these fields, we adapt Chen and colleagues' (2004) framework to accommodate best practices for creating and validating measures using computer-aided text analysis.

To illustrate the use of this framework, we develop a measure of organizational psychological capital building on the individual-level conceptualization in the organizational behavior literature. Psychological capital at the individual level is defined as "an individual's positive psychological state of development" (Luthans, Youssef, & Avolio, 2007, p. 3) and is composed of the individual's level of optimism, hope, resilience, and self-efficacy/confidence (Luthans, Avolio, Avey, & Norman, 2007). An individual's psychological capital has been linked to several business phenomena including employee performance (Walumbwa, Peterson, Avolio, & Hartnell, 2010), job satisfaction (Luthans, Avolio, et al., 2007), and employee work attitudes and behaviors (Avey, Luthans, & Youssef, 2010). The influence of individual psychological capital in organizational settings has caused scholars to begin looking for it at collective levels as well (e.g., Walumbwa, Luthans, Avey, & Oke, 2011); however, no validated measures of organizational psychological capital have been created.

To build knowledge concerning the elevation of individual-level constructs to the organizational level using content analysis, our article makes three principal contributions to organizational research methods. First, in keeping with other *Organizational Research Methods* articles (e.g., Karren & Barringer, 2002; Short et al., 2010), we provide a user's guide, synthesizing the most salient recommendations for ensuring theoretical and methodological rigor in construct elevation when using computer-aided text analysis to measure constructs directly at the organizational level. Second, we illustrate our approach by developing and validating a measure of the organizational psychological capital construct. Psychological capital is a key construct in the positive organizational behavior literature and has been suggested to exist at aggregate levels of analysis (Luthans, Youssef, et al., 2007; Walumbwa et al., 2011). Third, this article responds to recent calls for more longitudinal research in positive organizational behavior by examining the extent to which organizational psychological capital changes in organizations over time in a 10-year sample of large, publicly-traded organizations (cf. Avey, Luthans, & Mhatre, 2008). In short, this article aims to provide guidelines outlining best practices for elevating the level of a construct from the individual to the organizational level of analysis when computer-aided text analysis is the analytical technique of choice.

Elevating the Level of Constructs Using Computer-Aided Text Analysis

Elevating the level of a construct presents a number of challenges that potentially threaten construct validity. For instance, when the level of theory and level of measurement are not aligned, statistical

analyses produce results at the level of measurement (Klein, Dansereau, & Hall, 1994). When the level of statistical analysis differs from the level of theory, the analyses do not adequately test the theory used to justify the analysis (Klein et al., 1994). In addition, there are multiple statistical techniques available with which to justify the aggregation of individual-level data to the organizational level, each of which can produce different results, making selection of the appropriate technique important (George & James, 1993). To guide researchers in applying constructs to different levels of analysis, Chen and colleagues (2004, pp. 277-278) proposed a five-step framework for validating multilevel constructs. These steps are the following:

1. Define the focal construct at each relevant level of analysis,
2. Specify the nature and the structure of the construct at higher levels of analysis,
3. Test the psychometric properties of the construct across and/or at different levels of analysis,
4. Estimate the extent to which the construct varies between levels of analysis, and
5. Test the function of the focal construct across different levels of analysis.

This framework is valuable because it has researchers explicitly consider the construct validity of multilevel constructs, where previous frameworks focused on validation of constructs at a single level (e.g., Hinkin, 1995, 1998; Nunnally & Bernstein, 1994). This framework is also valuable in that it addresses theoretical and methodological validation elements, arguing that careful consideration of theory is key in attaining methodological rigor (Bacharach, 1989; Kerlinger & Lee, 2000). However, despite broad appeal and usefulness, Chen and colleagues' (2004) work does not address important nuances that are needed to apply their ideas to the use of content analysis.

Content analysis is a class of research methods for analyzing texts that has been growing in popularity in the organization studies (Duriau et al., 2007). Computer-aided text analysis, a form of content analysis, has proven particularly useful in its ability to measure constructs directly at the organizational level by analyzing organizational texts such as annual reports (e.g., Short et al., 2010), website content (e.g., Zachary, McKenny, Short, Davis, & Wu, 2011), and IPO prospectuses (Hanley & Hoberg, 2012). The benefit of such techniques is that they can be applied to hundreds of documents of interest to compare organizations with nearly perfect reliability (Duriau et al., 2007).

We illustrate the construct elevation process using the psychological capital construct. Psychological capital is an attractive construct to examine at the organizational level. Scholars have argued that psychological capital is a strategic resource of a firm that can lead to sustainable competitive advantages (cf. Luthans & Youssef, 2004). However, resource-based theory, the theory with which this would most likely be examined, looks at firm-level resources (Barney, 1991). Thus, to enable the examination of this important firm-level outcome of psychological capital, an organizational-level representation of the construct must be developed.

Computer-aided text analysis is a valuable method with which to assess organizational psychological capital. Computer-aided text analysis focuses on how language is used to convey a message to an audience rather than assessing the content of the message itself (Hart, 2001; Pennebaker, Mehl, & Niederhoffer, 2003). Consequently, organizational psychological capital—a construct concerned with positively-oriented psychological phenomena—should be measurable in narratives independent of the surface-level themes of the message. Indeed, computer-aided text analysis has been used to measure positively-oriented constructs such as optimism (e.g., Hart, 2000) and positive emotion (e.g., Pennebaker et al., 2003). Computer-aided text analysis has been used to measure psychological processes of individuals such as charisma (e.g., Bligh, Kohles, & Meindl, 2004), emotion (Kahn, Tobin, Massey, & Anderson, 2007), and cognitive styles (e.g., Boals & Klein, 2005).

The procedures for developing and validating content analytic measures for use in computer-aided text analysis may differ from those used in survey research and/or scale development. For instance, to assess content validity in computer-aided text analysis, one systematically develops a

Table 1. Framework for Elevating Constructs Using Computer-Aided Text Analysis.

| Phases | Steps |
|--|---|
| 1. Definition of construct and development of deductive word lists | <ol style="list-style-type: none"> 1. Ground individual-level construct definition in extant theory 2. Develop organizational-level construct definition based on individual-level construct 3. Identify dimensionality of constructs 4. Develop deductive word lists based on construct definition |
| 2. Specification of the theoretical nature of the elevated construct | <ol style="list-style-type: none"> 5. Provide a theoretical explanation for the existence of the elevated construct 6. Identify whether the elevated construct is isomorphic or a fuzzy composition 7. Select the appropriate measurement model for the construct |
| 3. Selection of appropriate texts and finalization of word lists | <ol style="list-style-type: none"> 8. Select an appropriate text to analyze 9. Collect a sample of the selected texts 10. Develop inductive word lists based on sample 11. Solicit additional words from judges |
| 4. Assessment of psychometric properties | <ol style="list-style-type: none"> 12. Measure elevated construct in sample texts and prepare data for analysis 13. Assess the factor structure 14. Address reliability 15. Assess the extent of change over time |
| 5. Examination of construct relationships | <ol style="list-style-type: none"> 16. Assess concurrent validity 17. Assess predictive validity 18. Assess discriminant validity 19. Assess convergent validity |

Source: Adapted from Chen, Mathieu, and Bliese (2004, p. 278).

list of words that experts believe are associated with the construct (Short et al., 2010). In survey validation, questions thought to reflect the constructs being measured are presented along with the construct name and definition to respondents who determine whether and how closely each question relates to each construct (Hinkin, 1998). Because of the differences in these methods, we adapt Chen and colleagues' (2004) framework to the needs of researchers developing computer-aided text analytic measures. A summary of our process is presented in Table 1.

1. Definition of Construct and Development of Deductive Word Lists

The first step in elevating a construct to a higher level of analysis is to define the focal construct (Chen et al., 2004). This step is particularly important in computer-aided text analysis as the construct definition is used directly in the development process of the content analytic measure. Thus, if the definition of the construct is overly general or not explicitly stated, the words selected for the content analytic word list may not accurately reflect the intended content domain. The definition of the individual-level construct should serve as a starting point from which the organizational-level construct is developed (George & James, 1993; Klein & Kozlowski, 2000).

For our illustrative example, we examine the psychological capital construct. Psychological capital can be defined as "an individual's positive psychological state of development" (Luthans, Youssef, et al., 2007, p. 3). As part of the positive organizational behavior literature, psychological

capital focuses on the positive resources of individuals (Luthans, 2002). Psychological capital, as defined in positive organizational behavior, specifically focuses on characteristics of individuals that are state-like and thus malleable (Luthans, 2002).

The psychological capital construct is associated with four positively-oriented characteristics of individuals: hope, resilience, optimism, and self-efficacy/confidence (Luthans & Youssef, 2004; Luthans, Youssef, et al., 2007). Hope has been defined as the motivation to pursue one's goals while holding the belief that one will find a way to accomplish them (e.g., Snyder, 2000; Snyder et al., 1996). The hope construct was primarily developed in the psychology literature where it has been linked to academic success (e.g., Snyder et al., 2002), athletic performance (e.g., Curry, Snyder, Cook, Ruby, & Rehm, 1997), and health outcomes (Snyder, Irving, & Anderson, 1991). Resilience can be defined as the ability to cope and adapt to negative or positive stressors (Luthans, Norman, Avolio, & Avey, 2008; Masten & Reed, 2002). Resilience research has been linked to positive outcomes such as life satisfaction (e.g., Cohn, Fredrickson, Brown, Mikels, & Conway, 2009) and affective recovery from anticipated threats (e.g., Waugh, Fredrickson, & Taylor, 2008). Optimism can be defined as the attribution of positive outcomes to internal, pervasive, and permanent causes, and negative outcomes to external, situation-specific, and temporary causes (Seligman, 1990). In the psychology literature, optimism has been associated with psychological well-being (e.g., Cheng & Furnham, 2003), physiological health (e.g., Bennett & Elliot, 2005; Jackson, Sellers, & Peterson, 2002), and work outcomes (e.g., Schulman, 1999). Finally, self-efficacy is defined as an individual's confidence in himself or herself and ability to find a way to complete a specific task in a specific situation (Bandura, 1977). Self-efficacy has been broadly used in both the psychological and organizational behavior literatures and has been shown to influence phenomena ranging from academic attainment (e.g., Zimmerman, Bandura, & Martinez-Pons, 1992) to work-related performance (e.g., Stajkovic & Luthans, 1998).

The second step is to select a construct name and adapt the individual-level construct definition to the organizational level. The construct name or definition should also make clear the unit of analysis to signal how the construct should be used in future research (cf. Klein et al., 1994). In our example, we draw directly from the individual-level construct definition to introduce a new construct "organizational psychological capital," which we define as *the organization's level of positive psychological resources: hope, optimism, resilience, and confidence*.

The third step is to determine the dimensionality of the organizational-level construct and provide a definition for each dimension at the organizational level (Short et al., 2010). We suggest that organizational psychological capital is a superordinate construct, consisting of organizational-level analogs of the four dimensions of the individual-level construct. Superordinate constructs are those where the higher order construct (e.g., organizational psychological capital) manifests as a set of lower order constructs (e.g., organizational hope, organizational optimism, organizational confidence, and organizational resilience; Edwards, 2001). The organizational-level definitions of the four dimensions were derived directly from those used in the individual-level conceptualization of psychological capital to maintain an alignment across levels of analysis. Organizational hope is defined as the common goal-directed energy and belief that pathways exist with which to accomplish the organization's goals (cf. Luthans, Avolio, et al., 2007, pp. 545-546). Organizational optimism is defined as the commonly held "explanatory style that attributes positive events to internal, permanent, and pervasive causes and negative events to external, temporary, and situation-specific causes" (Luthans & Youssef, 2004, p. 153). Organizational resilience is defined as the commonly held assumption that the organization will "bounce back from adversity, conflict, failure, or even positive events, progress, and increased responsibility" (Luthans, 2002, p. 702). Organizational confidence is defined as the commonly held belief in the ability of the organization and its members to mobilize resources to obtain specific outcomes (cf. Luthans & Youssef, 2004, p. 152).

The fourth step is to develop one deductive word list for each of the elevated construct's dimensions. We advocate following the deductive word list development process outlined by Short and colleagues (2010) in this step. This process begins by generating initial word lists based on the construct's entry in a synonym finder or thesaurus and supplemented by relevant words from previously validated scales (Short et al., 2010). We leverage Rodale's (1978) *The Synonym Finder* in the development of our initial word list for each dimension of organizational psychological capital.¹

In developing initial word lists, variability in the thoroughness of the synonym finders' entries may present a threat to the content validity of the deductive word list. Content validity assesses the extent to which a measure taps the entire content domain of the construct being measured (Kerlinger & Lee, 2000). Underspecified entries—entries where the listed synonyms do not cover the entire content domain of the construct—are potentially very problematic. If missed synonyms are not found in the inductive word list development process or suggested by the judges in Step 10, the synonym will not be included in the final word list. Such omissions will result in an underspecified word list that is suggestive of suboptimal content validity. By contrast, overspecified entries—entries that include synonyms that are not representative of the underlying construct—are less problematic because judges can identify and remove words that are only loosely associated with the focal construct (Short et al., 2010).

To mitigate the impact of underspecified entries on the content validity of the word lists, researchers should take an iterative approach to generating the initial deductive lists. Specifically, we suggest that researchers identify one to three closely related words from the construct's initial list of synonyms and include the synonyms associated with those words in the list as well. Accordingly, we augmented the initial word lists for organizational psychological capital with synonyms of closely related words. For organizational optimism, we included words synonymous with *expect*. For organizational hope, we included words synonymous with *believe*. For organizational resilience, we included words synonymous with *perseverance* and *persistence*. For organizational confidence, we included words synonymous with *conviction* and *resolve*. This resulted in a deductively generated list of 360 words for organizational optimism, 506 words for organizational hope, 648 words for organizational resilience, and 444 words for organizational confidence. Although this iterative approach increases the number of words for judges to evaluate, it also enhances the content validity of the measure.

With multidimensional constructs, researchers need to determine whether word lists should be allowed to overlap. This determination should be made based on the extent to which the definitions of the dimensions overlap or where colloquial usage of the word could be interpreted as being representative of more than one dimension. For instance, there is significant definitional overlap among the dimensions of psychological capital. Hope is frequently conceptualized as having an agency (willpower) and pathways (waypower) component (Snyder, 1994). The agency component of hope reflects individuals' belief that their goals will be achieved (Snyder, 1994). This definition is similar to the dimension of optimism, which asserts that an individual has positive expectations for the future and attributes these positive events to internal causes (Peterson, 2000). Likewise, the pathways component of hope reflects individuals' belief that they can create plans that will lead to success (Snyder, 1994). As such, hope is reflective of self-efficacy/confidence, which suggests that individuals have confidence that they can do what is necessary to complete a task in a certain environment (cf. Stajkovic & Luthans, 1998). Furthermore, in Rodale's (1978) *The Synonym Finder*, the entry for *optimism* contains the word *hope*, and the entry for the word *hope* contains the word *optimism*. This suggests that the colloquial use of *optimism* might be used to reflect what scholars label *hope*, and vice versa. Accordingly, in the development of initial deductive word lists for organizational psychological capital we allowed the word lists to overlap.

After developing the initial deductive word lists, judges should evaluate the alignment of each word with the definition of the dimension for which it is being proposed. In this step, the selection

of two or more knowledgeable judges can improve the face validity of the final measure. Face validity can be defined as the extent to which experts believe that the word lists reflect the meaning of the construct (Krippendorff, 2004). One way of establishing face validity is to have experts participate in the development of the word list itself. For example, one study looking at the role of harsh language in sensitive contexts had experts in the context (Asian culture) evaluate the word lists to identify words that are related to conflict (Doucet & Jehn, 1997). Following this approach, expert knowledge is incorporated into each list, and interrater reliability is calculated to assess the extent to which the judges agreed on the words to be included (Short et al., 2010).

To begin the word list evaluation for organizational psychological capital, one of the authors conducted an independent evaluation of the word lists prior to soliciting expert input. To assess the face validity of the word list, we solicited six independent experts who had published in scholarly journals using the psychological capital construct to participate in the word list evaluation process. Two of these experts agreed and evaluated each word for fit with the definitions of the dimensions of organizational psychological capital. Based on initial interrater reliability calculations, we were able to include only one independent expert in the word list development process.² Thus, the final word lists were developed using input from one expert and one author.

Of the 1,834 original words, 402 were selected by the judges as representative of organizational psychological capital (organizational optimism = 85 words, organizational hope = 73 words, organizational resilience = 179 words, organizational confidence = 118 words). Some words were identified as being appropriate for more than one list, resulting in the total number of words associated with organizational psychological capital being less than the sum of the words associated with each of the dimensions. We assessed interrater reliability using Holsti's (1969) formula. The interrater reliability for each deductively generated word list was greater than .75 (organizational optimism = .82, organizational hope = .88, organizational resilience = .87, organizational confidence = .87), which is suggestive of high interrater reliability (cf. Ellis, 1994). This high level of agreement on the contents of the content analytic measure suggests that the deductively generated measure has face and content validities.

2. Specification of the Theoretical Nature of the Elevated Construct

The second phase of the construct elevation process focuses on identifying the appropriate way to measure the construct (cf. Chen et al., 2004). The first step in this phase (Step 5) is to provide a theoretical explanation for the existence of the organizational-level construct. The individual- and organizational-level definitions of the construct should drive the theory used to provide this explanation. Elevating states and state-like constructs might draw on theories relying on social comparison processes to show the emergence of a collective-level construct such as organizational psychological capital. In general, the four dimensions of psychological capital share underlying features of positivity and agency (Avey et al., 2008). Theories of social comparison suggest that organizations' members may converge on a shared level of positivity and agency through their interactions with others in the workplace (cf. Salancik & Pfeffer, 1978; Sullins, 1991). For instance, the positive emotion and mood of individuals have been shown to be contagious, resulting in a shared group level of positivity that can influence group-level outcomes (Barsade, 2002). This environment of positivity can then influence the organization's members' assessments of efficacy (Baron, 1990). Verbal interactions and vicarious experience in organizational settings can also influence individuals' assessments of self-efficacy (Bandura, 1977). Taken together, this suggests that the prolonged interaction of individuals in an organization will tend to homogenize its members' assessments of positivity and agency, resulting in the emergence of an organizational level of psychological capital. The notion of an aggregate level of psychological capital is consistent with existing studies that have found evidence of psychological capital at collective levels of analysis (Walumbwa et al., 2011).³

Step 6 of the adapted construct elevation process calls for researchers to determine whether the construct is thought to be isomorphic or a fuzzy composition (Chen et al., 2004). Isomorphism suggests that the “meaning” of the construct is the same at both the individual and organizational levels even though the focal entity is different (Morgeson & Hoffman, 1999). Staw, Sandelands, and Dutton’s (1981) conceptualization of threat rigidity at the individual, group, and organizational levels is a commonly used example of an isomorphic construct. In fuzzy composition constructs, despite being closely related, the meanings of the constructs at various levels differ (Bliese, 2000).

We argue that organizational psychological capital is a fuzzy composition construct. Individual psychological capital implies that the individual has a positive outlook and goal-directed energy (cf. Youssef & Luthans, 2007). However, attributing positivity to organizations risks anthropomorphism, suggesting that the meaning of the construct differs across levels (cf. Bliese, 2000). Specifically, organizational psychological capital is concerned with the aggregate level of individual psychological capital within the organization. Furthermore, the dimensions of individual-level psychological capital have been associated with physical health outcomes for which there can be no direct organizational-level analog (e.g., Jackson et al., 2002; Snyder et al., 1991).

The seventh step of our adapted procedure is to identify the most appropriate measurement model based on the construct definition and theory. Chen and colleagues (2004) identify six potential measurement models that can be used with elevated constructs. The selected score model uses a specific individual’s measurement to represent the score for the elevated value. The summary index model suggests that the value of the elevated construct is represented by a summary statistic of individual-level measurements. The consensus model suggests that within a collective, the individual-level measurements of a construct become homogeneous and that the collective measurement is the point where there is consensus of the individual-level measurements. The referent-shift measurement model is similar to the consensus model. However, with referent shift the individual respondents would be making assessments about the organization (e.g., “we are hopeful”) rather than themselves (e.g., “I am hopeful”). The dispersion model measures variation in individual-level responses rather than agreement. Finally, the aggregate properties model represents constructs that are not based on individual-level measurements.

Good theory specifies the relationships among constructs (Whetten, 1989). In traditional self-report research (e.g., surveys), the data provider is an individual respondent and generally provides measurements at the individual level. This imposes a one-to-one alignment between the theory explicating the emergence of an aggregate-level construct and the method of measurement (cf. Chen et al., 2004). For example, using the consensus model with a survey instrument would necessitate the collection of surveys from multiple individuals in each organization, the statistical justification of aggregation, and the combination of individual measurements to form the aggregate-level construct (Chen et al., 2004). Computer-aided text analysis of individual-level narratives can be used in the same manner. For example, a computer-aided text analysis of interview transcripts could be used to generate measurements for multiple individuals in each organization. These measurements could then be subjected to statistical tests to justify aggregation, followed by the aggregation of the measurements to the organizational level.

A key benefit of computer-aided text analysis is its ability to analyze documents reflecting various levels of analysis (e.g., speeches, team meeting minutes, business unit reports, and letters to shareholders). Enabling the direct measurement of constructs at aggregate levels aligns with the theoretical level of the aggregate construct, but it does not align with the theory explicating the emergence of an aggregate-level construct. In other words, the aggregate properties model can be used with computer-aided text analysis to measure a construct where the emergence is best described using an alternative measurement model (e.g., consensus or referent shift). However, by using the aggregate properties model, measurements of the aggregate construct cannot be disaggregated to the individual level to empirically examine its emergence (Chen et al., 2004).

When measuring the construct at the individual level and justifying aggregation to aggregate levels of analysis, only one measurement model needs to be specified because the model aligns with the theory explaining the emergence of the aggregate construct and the measurement of the construct. However, when an aggregate properties model is used to measure the aggregate construct at the organizational level, both the aggregate properties model and the model that aligns with the theory of emergence should be explicitly specified. It is important to consider and explicitly state the measurement models associated with the elevated construct for three key reasons. First, in computer-aided text analysis, the measurement model influences the level of text to be used with the measure. Second, identifying the measurement model will help to identify holes or inconsistencies in the definition and theory before the measure is developed and validated. Finally, explicitly stating the measurement model associated with the construct helps to communicate to researchers wishing to use the construct how the construct should be handled both theoretically and methodologically.

In this study, we use the aggregate properties measurement model to assess organizational psychological capital directly at the organizational level. This implies that we must use a sample of narratives reflective of the organizational level (cf. Chen et al., 2004). This also suggests that we cannot empirically examine the emergence of the organizational-level construct without collecting a second measure from a random sample of employees throughout each organization. Although we use the aggregate properties measurement model, the consensus measurement model most closely aligns with our theory of emergence, suggesting that individuals will converge on a shared level of individual-level psychological capital over time (cf. Chen et al., 2004).

3. Selection of Appropriate Texts and Finalization of Word List

The third phase focuses on the finalization of the computer-aided text analytic measure. The first step in this phase (Step 8) involves selecting a text with which to complete the word lists. The selection of the text to use in the computer-aided text analysis is an important decision (Krippendorff, 2004). The appropriate text will depend on the research question being asked, the level and definition of the construct, and the measurement model selected. For instance, CEO letters to shareholders are likely to contain language associated with organizational psychological capital because managers have a vested interest in communicating all resources to shareholders that convey that the company's securities remain sound investment vehicles. By contrast, operating or training manuals may be inappropriate because words associated with organizational psychological capital may not be present in these texts even if there is a high level of organizational psychological capital within the organization.

To measure organizational psychological capital, we rely on CEO letters to shareholders. CEO letters to shareholders are a valuable text with which to measure organizational psychological capital. First, as organizational-level texts, letters to shareholders have been shown to accurately portray organizational phenomena such as quality and innovation (Michalisin, 2001; Michalisin & White, 2000). As a result, these texts are commonly used to assess organizational-level constructs such as firm reputation and strategic orientations (e.g., Geppert & Lawrence, 2008; Short, Payne, Brigham, Lumpkin, & Broberg, 2009). Second, letters to shareholders are commonly included in the annual reports of large, publicly-traded firms and are used by management to communicate issues salient to the firm (Barr et al., 1992). In addition, laws like Sarbanes–Oxley in the United States now force the CEO to attest to the accuracy and completeness of the annual reports' contents (Geiger & Taylor, 2003). Finally, as part of the annual report, these documents are also frequently archived in third-party databases (e.g., Mergent WebReports) and on company websites, facilitating the collection of longitudinal data at consistent intervals.

Step 9 is to collect a sample of texts with which to finalize the word list. To examine our organizational psychological capital measure in a sample of interest to organizational scholars,

we rely on the S&P 500, which is a popular sampling frame for the examination of macro-level phenomena (e.g., Carpenter & Sanders, 2002; Dyer & Whetten, 2006). The S&P 500 represents 75% of U.S. publicly-traded equity (Standard & Poor's, 2009) and provides a large cross section of different industries, strategic orientations, and other characteristics of interest to organizational researchers. Since the S&P 500 is made up of publicly-traded companies, researchers can expect regular communications with shareholders, including CEO letters to shareholders that are consistently sent out with the annual report. We were able to collect a total of 4,350 shareholder letters from 664 companies over the period 2001–2010 for use in developing and validating our measure.

Step 10 is to develop inductive word lists with which to supplement the deductive word lists. We advocate following the process outlined by Short and colleagues (2010) to complete this step. To develop the initial inductive word lists, programs like DICTION 5 (Hart, 2000) and NVivo 9 (QSR International, 2010) can be used to generate a list of the most frequently used words from the sampled texts. This list can then be culled by the researcher to eliminate proper nouns, structural words, or other words that clearly do not reflect the construct of interest to produce the initial list of inductive words that will be assessed by the judges. We used DICTION to identify a list of 2,902 words that were used at least three times in at least one shareholder letter (Hart, 2000).

To identify words that are appropriate for the final measure, the list of inductive words should be evaluated by a process analogous to the evaluation of the deductive word lists. To maximize face validity, the same judges who evaluated the deductive word lists should also evaluate the inductive word list. Where nonauthor experts are used, it may be advisable to either secure commitment that they will participate in both evaluations or wait until both the deductive and inductive word lists are ready for evaluation before soliciting expert input. We used the same two judges to evaluate the inductive word lists. The judges identified 37 additional words as representative of organizational psychological capital (organizational optimism = 1 word, organizational hope = 16 words, organizational resilience = 8 words, organizational confidence = 12 words). Interrater reliability for the inductively generated word lists was calculated using Holsti's (1969) formula and found to be very high (organizational optimism = .99, organizational hope = .92, organizational resilience = .97, organizational confidence = .95).

Step 11 is to solicit additional words from the judges that they feel represent the construct of interest but that were not present in either the deductive or inductive word lists to maximize content validity. In the development of the computer-aided text analysis measure of organizational psychological capital, neither judge identified any additional words. Accordingly, the deductive and inductive lists were combined to form the final word lists for each dimension. The final word lists are presented in Table 2.

4. Assessment of Psychometric Properties

The fourth phase involves assessing the empirical properties supporting the assumptions the researcher made about the nature of the construct (cf. Chen et al., 2004). The first step in this phase (Step 12) is to use the word lists to measure the elevated construct in the selected sample of texts and prepare the data for validation. To measure organizational psychological capital, we created custom dictionaries in DICTION for each dimension. To validate and assess the psychometric properties of our measure of organizational psychological capital, we relied on 5-year (2004–2008) averages for firms that were members of the S&P 500 all 5 years and for which shareholder letters were available in each year (cf. Zachary, McKenny, Short, & Payne, 2011). By taking a 5-year average we reduce the influence of single-year shocks that may influence the firm's performance, level of organizational psychological capital, or other variables in that year. This 5-year period is also valuable as it reflects approximately one economic cycle, containing periods of both economic growth and downturn. In addition, all content analytic variables were standardized on a per-word basis to

Table 2. Computer-Aided Text Analysis Word Lists for Organizational Psychological Capital Dimensions.

| Organizational Psychological Capital Dimension | Computer-Aided Text Analysis Words With Expert Validation |
|--|---|
| Organizational optimism | Aspire, Aspirer, Aspires, Aspiring, Aspiringly, Assurance, Assured, Assuredly, Assuredness, Assuring, Auspicious, Auspiciously, Auspiciousness, Bank on, Beamish, Believe, Believed, Believes, Believing, Bullish, Bullishly, Bullishness, Confidence, Confident, Confidently, Encourage, Encouraged, Encourages, Encouraging, Encouragingly, Ensuring, Expectancy, Expectant, Expectation, Expectations, Expected, Expecting, Faith, Good omen, Hearten, Heartened, Heartener, Heartening, Hearteningly, Heartens, Hope, Hoped, Hopeful, Hopefully, Hopefulness, Hoper, Hopes, Hoping, Ideal, Idealist, Idealistic, Idealistically, Ideally, Looking up, Looks up, Optimism, Optimist, Optimistic, Optimistical, Optimistically, Outlook, Positive, Positively, Positiveness, Positivity, Promising, Propitious, Propitiously, Propitiousness, Reassure, Reassured, Reassures, Reassuring, Roseate, Rosy, Sanguine, Sanguinely, Sanguineness, Sanguinity, Sunniness, Sunny |
| Organizational hope | Accomplishments, Achievements, Approach, Aspiration, Aspire, Aspired, Aspirer, Aspires, Aspiring, Aspiringly, Assurance, Assurances, Assure, Assured, Assuredly, Assuredness, Assuring, Assuringly, Assuringness, Belief, Believe, Believed, Believes, Believing, Breakthrough, Certain, Certainly, Certainty, Committed, Concept, Confidence, Confident, Confidently, Convinced, Dare say, Deduce, Deduced, Deduces, Deducing, Desire, Desired, Desires, Desiring, Doubt not, Energy, Engage, Engagement, Expectancy, Faith, Foresaw, Foresee, Foreseeing, Foreseen, Foresees, Goal, Goals, Hearten, Heartened, Heartening, Hearteningly, Heartens, Hope, Hoped, Hopeful, Hopefully, Hopefulness, Hoper, Hopes, Hoping, Idea, Innovation, Innovative, Ongoing, Opportunity, Promise, Promising, Propitious, Propitiously, Propitiousness, Solution, Solutions, Upbeat, Wishes, Wishing, Yearn, Yearn for, Yearning, Yearning for, Yearns for |
| Organizational resilience | Adamant, Adamantly, Assiduous, Assiduously, Assiduousness, Backbone, Bandwidth, Bears up, Bounce, Bounced, Bounces, Bouncing, Buoyant, Commitment, Commitments, Committed, Consistent, Determination, Determined, Determinedly, Determinedness, Devoted, Devotedly, Devotedness, Devotion, Die trying, Died trying, Dies trying, Disciplined, Dogged, Doggedly, Doggedness, Drudge, Drudged, Drudges, Endurance, Endure, Endured, Endures, Enduring, Grit, Hammer away, Hammered away, Hammering away, Hammers away, Held fast, Held good, Held up, Hold fast, Holding fast, Holding up, Holds fast, Holds good, Immovability, Immovable, Immovably, Indefatigable, Indefatigableness, Indefatigably, Indestructibility, Indestructible, Indestructibleness, Indestructibly, Intransigence, Intransigency, Intransigent, Keep at, Keep going, Keep on, Keeping at, Keeping going, Keeping on, Keeps at, Keeps going, Keeps on, Kept at, Kept going, Kept on, Labored, Laboring, Never-tiring, Never-wearying, Perdure, Perdured, Perduring, Perseverance, Persevere, Persevered, Persevering, Persist, Persisted, Persistence, Persistent, Persisting, Pertinacious, Pertinaciously, Pertinacity, Rebound, Rebounded, Rebounding, Rebounds, Relentlessness, Remain, Remained, Remaining, Remains, Resilience, Resiliency, Resilient, Resolute, Resolutely, Resoluteness, Resolve, Resolved, Resolves, Resolving, Robust, Sedulity, Sedulous, Sedulously, Sedulousness, Snap back, Snapped back, Snapping back, Snaps back, Spring back, Springing back, Springs, Springs back, Sprung back, Stalwart, Stalwartly, Stalwartness, Stand fast, Stand firm, Standing fast, Standing firm, Stands fast, Stands firm, Stay, Steadfast, Steadfastly, |

(continued)

Table 2. (continued)

| Organizational Psychological Capital Dimension | Computer-Aided Text Analysis Words With Expert Validation |
|--|--|
| Organizational confidence | <p>Steadfastness, Stood fast, Stood firm, Strove, Survive, Surviving, Surviving, Tenacious, Tenaciously, Tenaciousness, Tenacity, Tough, Uncompromising, Uncompromisingly, Uncompromisingness, Unflinching, Unflinchingly, Unflinchingly, Unrelenting, Unrelentingly, Unrelentingness, Unshakable, Unshakably, Unshakeable, Unshaken, Unshaking, Unswervable, Unswerved, Unswerving, Unswervingly, Unswervingness, Untiring, Unwavering, Unwaveringly, Unweariedness, Unyielding, Unyieldingly, Unyieldingness, Upheld, Uphold, Upholding, Upholds, Zeal, Zealous, Zealously, Zealousness</p> <p>Ability, Accomplish, Accomplished, Accomplishes, Accomplishing, Accomplishments, Achievements, Achieving, Adept, Adeptly, Adeptness, Adroitly, Adroitness, All-in, Aplomb, Arrogance, Arrogant, Arrogantly, Assurance, Assured, Assuredly, Assuredness, Backbone, Bandwidth, Belief, Capable, Capableness, Capably, Certain, Certainly, Certainness, Certainty, Certitude, Cocksurely, Cocksureness, Cocky, Commitment, Commitments, Committed, Compelling, Competence, Competency, Competent, Competently, Confidence, Confident, Confidently, Conviction, Effective, Effectively, Effectiveness, Effectual, Effectually, Effectualness, Efficacious, Efficaciously, Efficaciousness, Efficacy, Equanimity, Equanimous, Equanimously, Expertise, Expertly, Fortitude, Fortitudinous, Forward, Forwardness, Know-how, Knowledgeability, Knowledgeable, Knowledgeably, Masterful, Masterfully, Masterfulness, Masterly, Mastery, Overconfidence, Overconfident, Overconfidently, Persuasion, Power, Powerful, Powerfully, Powerfulness, Prevailed, Prevailing, Prevails, Prevalence, Prevalent, Reassurance, Reassure, Reassured, Reassures, Reassuring, Self-assurance, Self-assured, Self-assuring, Self-confidence, Self-confident, Self-dependence, Self-dependent, Self-reliance, Self-reliant, Stamina, Steadily, Steadiness, Steady, Strength, Strong, Stronger, Strongish, Strongly, Strongness, Superior, Superiority, Sure, Surely, Sureness, Unblinking, Unblinkingly, Undoubtedly, Undoubting, Unflappability, Unflappable, Unflinching, Unflinchingly, Unhesitating, Unhesitatingly, Unwavering, Unwaveringly</p> |

Source: Developed using Rodale's (1978) *The Synonym Finder*.

eliminate confounding factors arising from the varying lengths of shareholder letters (cf. Payne, Brigham, Broberg, Moss, & Short, 2011).

Step 13 is to examine the factor structure of the measure if the elevated construct is conceptualized with more than one dimension (Chen et al., 2004).⁴ In content analysis, dimensionality may be assessed via an examination of a correlation matrix (cf. Hair, Black, Babin, & Anderson, 2010). If the correlations between hypothesized dimensions of the construct are greater than .50, the construct's dimensions might need to be collapsed into fewer dimensions (Short et al., 2010).

To assess the dimensionality of organizational psychological capital, we examined the correlations among the dimensions of organizational hope, organizational optimism, organizational resilience, and organizational confidence measured in Step 12. We found that the highest correlation was .40, which suggests that the four-dimensional conceptualization may be appropriate and that no dimensions need to be combined. Despite being composed of multiple dimensions, psychological capital is concerned with the shared variance among these dimensions and is generally calculated as the sum of its dimensions when using regression-based techniques (e.g., Luthans et al., 2008; Walumbwa et al., 2010). Thus, we summed the four dimensions to obtain our final measure of organizational psychological capital. This is similar to the treatment of strategy-related constructs such as market orientation, which

Table 3. Descriptive Statistics and Correlations Among the Dimensions of Organizational Psychological Capital.

| | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------|----------|-----------|-------|-------|-------|-------|------|
| Organizational confidence | 0.009 | 0.003 | 1.00 | | | | |
| Organizational optimism | 0.003 | 0.001 | .16** | 1.00 | | | |
| Organizational hope | 0.008 | 0.003 | .40** | .17** | 1.00 | | |
| Organizational resilience | 0.004 | 0.001 | .38** | .17** | .16** | 1.00 | |
| Organizational psychological capital | 0.025 | 0.006 | .79** | .43** | .79** | .54** | 1.00 |

Note: Organizational psychological capital = organizational confidence + organizational optimism + organizational hope + organizational resilience.

***p* < .01.

is operationalized as the sum of its customer orientation, competitor orientation, interfunctional coordination, long-term focus, and profitability dimensions (cf. Narver & Slater, 1990).

The descriptive statistics and correlation matrix of the dimensions of organizational psychological capital and organizational psychological capital itself are presented in Table 3. Descriptive statistics of computer-aided text analytic variables are presented in standardized (per-word) format. For example, the mean value of 0.025 for psychological capital indicates that, on average, 2.5% (36.8) of words in each letter to shareholders were reflective of organizational psychological capital.

Step 14 calls for researchers to address issues of reliability in computer-aided text analysis. Reliability is a psychometric property of an instrument that indicates its stability and dependability to measure the same value across measurements and across raters (Kerlinger & Lee, 2000). Using computer-aided text analysis is advantageous in its ability to provide reliable measurements. Computer-aided text analyses generally result in near-perfect levels of test–retest reliability (Rosenberg, Schnurr, & Oxman, 1990). This differs from other forms of content analysis that rely on human judgment to apply more complex coding rules (cf. Krippendorff, 2004). Furthermore, because interrater reliability is assessed during the development of the word lists, so long as the word lists are unaltered the interrater reliability of the computer-aided text analytic measure will not vary from use to use. Thus, because our interrater reliability for our measure of organizational psychological capital was high, the reliability of the measure will also be high in future applications of the measure.

Step 15 involves examining the extent to which the construct changes over time (Chan, 1998a). Examining the extent to which the construct changes over time provides valuable insight into whether it is best characterized as a state or trait at the organizational level and provides an initial assessment of isomorphism. For example, a construct that exhibits significant change over time at the individual level may not change significantly at the organizational level. If this is the case, the organizational-level construct may be best characterized as a trait. Furthermore, because the “meaning” of the construct at the organizational level is different, initial evidence would suggest that the construct is not isomorphic (cf. Bliese, 2000).

Assessing change over time using surveys presents practical difficulties because multiple waves of surveys must be collected, resulting in additional cost and time loss and an increased probability of problems arising from nonresponse. Computer-aided text analysis, as applied in this study, facilitates the measurement of change over time by reducing the amount of data needed at each point in time by measuring the construct directly at the organizational level. Furthermore, by using frequently distributed, archived, and publicly available texts such as shareholder letters and press releases, the researcher can collect data from multiple points of time all at once and without relying on responses from each organization.

At the individual level, psychological capital is a statelike construct and by extension is thought to be malleable and change over time (Luthans, 2002). However, as a fuzzy composition construct,

Table 4. Validation Variable Descriptive Statistics and Correlation Matrix.

| | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|--------|-------|-------|-------|-------|------|------|--------|------|
| 1. Organizational psychological capital | 0.025 | 0.006 | 1.00 | | | | | | |
| 2. DICTION optimism | 0.048 | 0.018 | .14* | 1.00 | | | | | |
| 3. DICTION satisfaction | 0.002 | 0.002 | .25** | .53** | 1.00 | | | | |
| 4. DICTION ambivalence | 0.003 | 0.002 | .02 | .46** | .21** | 1.00 | | | |
| 5. LN (employees) | 10.149 | 1.261 | -.01 | -.13* | .11 | -.04 | 1.00 | | |
| 6. Return on assets (0-year lag) | 0.066 | 0.060 | -.07 | .05 | .01 | -.06 | .03 | 1.00 | |
| 7. Return on assets (1-year lag) | 0.062 | 0.059 | -.02 | .06 | .01 | -.04 | .04 | 0.97** | 1.00 |

* $p < .05$. ** $p < .01$.

or a construct with different meanings at different levels of analysis, organizational psychological capital may be more stable than its individual-level analog. To assess the level of change in organizational psychological capital over time, we use hierarchical linear modeling, a technique commonly used to examine change in organizational phenomena over time (Raudenbush & Bryk, 2002; Short, Ketchen, Bennett, & Du Toit, 2006; Short, McKelvie, Ketchen, & Chandler, 2009). Specifically, we examine the extent to which organizational psychological capital varies within organizations (resulting from year-to-year changes) and between organizations (resulting from consistency in organizational psychological capital over time) across the entire 10-year sampling frame (2001–2010).

We find that 33.33% of the variance in organizational psychological capital is the result of stable differences over time ($p < .01$). This suggests that there is a relatively stable core level of organizational psychological capital within organizations. However, we also found that the level of organizational psychological capital changed considerably over time as well. This lends support to our assertion that organizational psychological capital is appropriately specified as a fuzzy composition construct.

5. Examination of Construct Relationships

The fifth phase in elevating a construct is to examine the relationships that make up the nomological network of the constructs at both the individual and organizational levels (Chen et al., 2004). In cases where the elevated construct is thought to be isomorphic with a similar meaning across level, the nomological networks should be very similar (Rousseau, 1985). However, despite the similarity of isomorphic constructs, it is still important to consider other relationships that may not be shared across levels (Chen et al., 2004; Morgeson & Hoffman, 1999). Compared to those of isomorphic constructs, the nomological networks of fuzzy composition constructs may differ significantly from the individual-level construct. For example, the consequences of cultural background and those of organizational cultural diversity are likely to have overlapping, yet distinct, relationships with other organizational constructs of interest. Nevertheless, researchers should still assess where constructs from the individual-level construct's nomological network might relate to the organizational-level construct.

In this phase, to further validate our measure, we examine the relationship of organizational psychological capital with satisfaction, ambivalence, firm performance, and an alternate measure of optimism. The descriptive statistics and correlations among the variables used in the validation process are presented in Table 4. Descriptive statistics of computer-aided text analytic variables are presented in standardized (per-word) format.

Step 16 calls for an assessment of the measure's concurrent validity. Concurrent validity is concerned with the extent to which the measure correlates with another construct that it theoretically

should correlate with at the same point in time (Kerlinger & Lee, 2000). Tests of concurrent validity should use external constructs in the nomological network of the focal construct. To assess the concurrent validity of our measure, we examined its relationship with the DICTION satisfaction score (Hart, 2000). The concept of satisfaction, job satisfaction in particular, has been popular in the management literature (Judge, Thoresen, Bono, & Patton, 2001). For example, Luthans, Avolio, Avey, and Norman (2007) found that individual-level psychological capital was related to job satisfaction. Similar to organizational psychological capital, in shareholder letters, language consistent with satisfaction is likely to represent a broadly held positive evaluation of the current state of the organization. Our measure of organizational psychological capital was positively correlated with satisfaction ($\rho = .25, p < .01$), which suggests that our measure has concurrent validity with this construct.

Step 17 calls for a test of the discriminant validity of the measure. Discriminant validity is the extent to which the construct being measured is discernible from other constructs that should be different (Campbell & Fiske, 1959). Evidence of discriminant validity exists if other constructs do not correlate strongly enough with the construct of interest to suggest that they measure the same construct. Establishing the concurrent validity of a measure can also be a partial test of the discriminant validity of the measure. Organizational psychological capital is significantly correlated with satisfaction, but not so highly as to suggest that they are measuring the same thing. However, it is also important to establish that our measure correlates either weakly or not at all with measures thought to be unrelated to psychological capital. We examine the correlation between our measure of organizational psychological capital and ambivalence.

The ambivalence dictionary measures language conveying uncertainty or hesitation (Hart, 2000). The role of uncertainty is particularly important in the entrepreneurship domain (Zahra & Dess, 2001) and is frequently referenced in studies looking at optimism, a component of psychological capital (e.g., Fraser & Greene, 2006; Hmieleski & Baron, 2009). Although uncertainty provides meaning to constructs that are contingent on the inability to predict the future (e.g., optimism and hope), it does not necessitate a positive or negative evaluation of the future. Thus, we would expect that ambivalence would be weakly correlated with psychological capital, if at all, because organizational psychological capital is concerned with positive evaluations (Avey et al., 2008). As predicted, we find that organizational psychological capital is not significantly correlated with ambivalence ($\rho = .02, p > .05$). These tests suggest that our measure demonstrates discriminant validity with respect to these constructs.

Step 18 is concerned with assessing the measure's convergent validity. Convergent validity examines the extent to which the computer-aided text analytic word lists measure the construct of interest similarly to other validated measures of the same or a closely related construct (Campbell & Fiske, 1959). Evidence of convergent validity exists if the computer-aided text analytic measure has a significant positive correlation with the alternate measure. We assess convergent validity by examining the relationship of our measure with a computer-aided text analytic measure of optimism developed by another source. The DICTION 5 software package includes a capability to calculate an optimism score (Hart, 2000). The optimism score calculated by the DICTION software reflects "language endorsing some person, group, concept or event or highlighting their positive entailments" (Hart, 2000, p. 43). Although this definition differs from the organizational optimism definition used in the development of our measure of organizational psychological capital, a significant correlation with our measure would provide preliminary evidence of convergent validity. To test for convergent validity, we assessed the relationship between organizational psychological capital and the DICTION optimism scores and found that they were significantly correlated ($\rho = .14, p < .05$). Thus, we found support for the convergent validity of the organizational psychological capital measure with another measure of optimism.

The final step in elevating a construct (Step 19) is to assess the predictive validity of the construct. Predictive validity is concerned with the measure's correlation with external criteria at a future point

Table 5. Predictive Validity Hierarchical Regression Results.

| | Return on Assets (1-year lag) | |
|--------------------------------------|-------------------------------|----------------------|
| | Model 1 | Model 2 |
| Control variables | | |
| LN (employees) | 7.5×10^{-4} | 7.6×10^{-4} |
| Return on assets (0 year lag) | 0.97** | 0.97** |
| Organizational psychological capital | | 0.48** |
| F | 2863.9** | 2023.77** |
| R ² | .952 | .955 |
| Change R ² | .952 | 0.003** |
| N | 291 | 291 |

** $p < .01$.

in time (Kerlinger & Lee, 2000). In strategy research, firm performance and corporate social performance may provide a valuable test of predictive validity (cf. Short & Palmer, 2008; Wong, Ormiston, & Tetlock, 2011), particularly for individual-level constructs that influence individual performance or organizational citizenship behaviors. To assess the predictive validity of our measure, we assessed its relationship with organizational performance. Extant studies have found that individual-level psychological capital influences individual performance and that group-level psychological capital influences group performance (Walumbwa et al., 2010; Walumbwa et al., 2011). In addition, previous studies have advanced the view that psychological capital may be a strategic resource capable of creating sustainable competitive advantages that lead to superior organizational performance (Luthans & Youssef, 2004).

We assessed the relationship between organization psychological capital and organizational performance using hierarchical regression. The results of this analysis are presented in Table 5. We operationalized organizational performance as return on assets (ROA) lagged by one year. ROA is one of the most common measures of organizational financial performance in the management literature (Gómez-Mejía & Palich, 1997). In the first model, we entered two control variables: organization size and past performance. The strategy literature has found that organization size, measured as the natural log transformation of the organization employee count (cf. Powell, 1992), is positively related to organizational performance (Gooding & Wagner, 1985), and an organization's past performance, measured as the ROA at Time 0, has been argued to be one of the best predictors of its future performance (Naser, Karbhari, & Mokhtar, 2004). Our results show that past performance has a strong relationship with organizational performance ($\beta = .97, p < .01$), but organization size does not show a significant relationship.

In the second model, we retained the control variables and added our measure of organizational psychological capital. Model 2 explained more variance than the first model ($\Delta R^2 = .003, p < .01$) and shows a positive relationship between organizational psychological capital and organizational performance ($\beta = .48, p < .01$). This finding suggests that our measure of organizational psychological capital has predictive validity with organizational performance and lends initial empirical support to the assertion that psychological capital may be a strategic organizational resource.

Post Hoc Analyses

One concern with using shareholder letters to measure organizational constructs is that the language used may not reflect the position of the entire organization. To partially address this issue, we analyzed CEOs' use of pronouns in shareholder letters. If CEOs view shareholder letters as outlets

for their personal thoughts, the language they use should contain more first-person singular pronouns than first-person plural pronouns. We used DICTION to identify the number of each type of pronoun in our sample of shareholder letters. We standardized each data point by dividing by the total number of words in the shareholder letter and calculated an average over all letters from each organization. A paired-samples *t* test demonstrated that CEOs use significantly more first-person plural pronouns than first-person singular pronouns ($t = 97.25, p < .001$). This suggests that CEOs do not use the shareholder letter as a venue for espousing their personal views.

To further assess whether or not the first-person plural pronouns referred to the organization, one author manually coded a random sample of 25 shareholder letters. Each shareholder letter was coded using NVivo 9, which enabled the author to highlight all first-person plural pronouns for manual coding (QSR International, 2010). Each pronoun was coded as referring to one of three collectives: organization, top management team, and other. When no noun was used in the sentence, the pronoun was coded based on context. In some instances there was insufficient information to identify the collective; these instances were coded as unclear. Of the more than 2,500 first-person plural pronouns, the vast majority (78%) refer to the organization as a whole. By contrast, 20% were unclear, and only 2% referred to the top management team or other collectives. This assessment lends support to our assertion that top management views their role in preparing shareholder letters as writing on behalf of the organization.

A second concern with the use of computer-aided text analysis to measure organizational psychological capital is that this method does not consider the context in which the words associated with the construct are used (Krippendorff, 2004). To identify whether the use of words out of context is likely to influence the results of our study, we conducted an additional post hoc test to identify the prevalence of out-of-context word usage. One of the authors manually coded a random sample of 25 shareholder letters for level of organizational optimism, hope, resilience, and confidence. The coder used NVivo 9 to highlight all occurrences of the words on the organizational psychological capital word lists in each letter, then assessed whether the word accurately reflected the associated dimension of organizational psychological capital. We found that the hand-coded levels of organizational optimism, hope, resilience, and confidence were significantly correlated with the computer-aided text analytic scores (optimism $\rho = .94, p < .01$; hope $\rho = .80, p < .01$; resilience $\rho = .92, p < .01$; confidence $\rho = .77, p < .01$). This suggests that our results are relatively robust to the usage of words out of context.

Discussion

We provide a framework for elevating the level of a construct using computer-aided text analysis. Using this framework, researchers will be able to develop and validate constructs at the organizational level based on individual-level constructs, then measure these constructs directly at the organizational level by selecting the appropriate text for analysis. We illustrate this process by elevating psychological capital to the organizational level and developing a computer-aided text analytic measure with which to measure organizational psychological capital. In doing so, we make three key contributions to organizational research. First, we outline a framework for ensuring theoretical and methodological rigor when using computer-aided text analysis to elevate constructs to the organizational level. Second, we apply this framework to develop and validate a measure of organizational psychological capital. Finally, we address recent calls for longitudinal research in positive organizational behavior by examining the extent to which organizational psychological capital changes in organizations over time in a 10-year sample of large, publicly-traded organizations (cf. Avey et al., 2008).

Limitations and Directions for Future Research

Our study's contributions should be considered while understanding the extent of its limitations. Recognizing the importance of selecting the appropriate text for content analysis (Krippendorff, 2004), a limitation of this study is the use of shareholder letters to assess organizational psychological capital. We selected CEO shareholder letters, a valuable organizational text, to measure organizational psychological capital for a number of reasons. First, the shareholder letters' contents may be influenced by public relations personnel, legal staff, and the top management team, providing a broader perspective than just the CEO (Barr et al., 1992). Second, our post hoc analysis suggests that CEOs use shareholder letters as a venue to communicate with shareholders on behalf of the whole organization. Finally, CEO shareholder letters have been shown to accurately represent organizational phenomena (Michalisin, 2001). Nevertheless, few organizational texts are written or contributed to directly by a broad range of authors at all levels of the organization. Specifically, it is unlikely that lower level employees will see the letter before publication. Thus, there is a possibility that management may not accurately portray the organization in these documents.

The limitations of shareholder letters as an organizational text suggest opportunities for the use of alternate texts to measure organizational phenomena. For instance corporate website content (e.g., McKenny, Short, Zachary, & Payne, 2012), mission statements (e.g., Palmer & Short, 2008), and press releases (e.g., Henry, 2008) have all been used in content analytic research to measure organizational-level phenomena. Future studies might look at organizational psychological capital using these texts to unpack different aspects of the construct. For example, mission statements are frequently used by managers to influence and motivate employees (Klemm, Sanderson, & Luffman, 1991). Future studies might look at how changes to mission statements influence the level of individual-level psychological capital within the organization. Alternately, because mission statements change less frequently than shareholder letters, these texts are valuable for assessing stable organizational differences.

Our computer-aided text analytic measure for organizational psychological capital may also be adapted to measure organizational psychological capital based on individual-level narratives. For instance, future studies might assess the level of psychological capital of employees by applying our measure to emails (cf. Indulska, Hovorka, & Recker, 2012). The researcher may then determine whether it is appropriate to aggregate to the organizational level using the r_{wg} and intraclass correlation coefficient statistics (James, 1982; James, Demaree, & Wolf, 1984; LeBreton & Senter, 2008).⁵ Once aggregation is deemed appropriate, comparing the aggregated values with those obtained directly from organizational-level sources (e.g., shareholder letters) would provide a valuable additional test of convergent validity and identify further the extent to which the contents of organizational narratives align with phenomena across all levels of the hierarchy.

The potential presence of impression management is another limitation of our approach. Our goal was to limit this potential by relying on CEO letters to shareholders since managers are incented to convey accurate information in such letters because of auditor and SEC oversight (Short & Palmer, 2008). Nevertheless, these documents serve a dual purpose of providing information and persuading stakeholders of the virtues of the organization, incenting a level of impression management as well (Barr & Huff, 1997; Staw, McKechnie, & Puffer, 1983). Impression management biases are also present in other forms of data collection including surveys (e.g., Booth-Kewley, Edwards, & Rosenfeld, 1992), interviews (e.g., Locander, Sudman, & Bradburn, 1976), and participant observation (Barr & Huff, 1997). Furthermore, organizations that convey accurate information in these documents tend to be rewarded (Barr & Huff, 1997; Salancik & Meindl, 1984). Accordingly, although impression management is likely contained in shareholder letters, we believe the benefit of using these documents represents an acceptable trade-off given the ability to assemble a multiple-year database with a relatively large sample size.

Organizational research commonly uses the CEO of an organization as a key informant from which to assess organizational-level constructs (Phillips, 1981; Seidler, 1974). This reflects the difficulty of obtaining a large enough sample size to conduct organizational-level research using individual-level responses from many individuals in an organization. One risk of gathering data only from top-level managers is that that top management teams may hold a different view of the organization than do lower level employees (Corley, 2004). Where this is the case, management may inadvertently present a view of organizational psychological capital that better reflects the top management team than the organization. Although computer-aided text analysis does not resolve this issue, it does provide an improvement on current practices because CEO shareholder letters may be contributed to by multiple individuals within the company (cf. Barr et al., 1992). To examine the impact of managerial disconnect with lower levels of management, future research might measure the psychological capital of individuals throughout the organization using the psychological capital questionnaire (Luthans, Avolio, et al., 2007) and organizational psychological capital using our computer-aided text analytic measure, then examine the extent to which the level of organizational psychological capital is aligned. Such a test would also provide further evidence of the convergent validity of the organizational psychological capital construct.

If differences in perspectives exist between top management and other organizational members, researchers should adapt their measure to investigate more nuanced forms of organizational psychological capital. For example, a CEO might use language indicative of organizational psychological capital in personal communications to convey an espoused level of organizational psychological capital to employees. In personal communications, CEOs are more likely to convey their opinions and attempt to influence the level of organizational psychological capital. Our word lists could be adapted to examine how the espoused organizational psychological capital conveyed in CEO e-mails, speeches, and presentations influences the organization-wide level of actual organizational psychological capital. Another opportunity might be to adapt our word lists to examine situations where the organization does not reach a consensus level of organizational psychological capital. For example, in large multinational companies, the employees of one unit may not interact with employees in other units as frequently as they do with those within their unit (e.g., Mascarenhas, 1984). This may result in each business maintaining a distinct level of organizational psychological capital. Future studies might examine how these discrepancies in psychological capital at the business level influence business-level outcomes such as performance and budget allocation.

Although we selected to use DICTION in our study, other computer-aided text analytic tools are available and may also be used following the process outlined in this article. Linguistic Inquiry and Word Count (LIWC) is another common computer-aided text analysis software title in the organizational studies (Pennebaker, Booth, & Francis, 2007). LIWC benefits from being able to use wildcards to create word stems (e.g., *optimis**, which would identify any word beginning with *optimis*), reducing the work required to generate the word list; however, we suggest that DICTION is better suited for the initial development of word lists. First, DICTION produces a list of the most commonly used words in each text that can be analyzed as part of the inductive word list generation process (Hart, 2000). Second, the PC version of LIWC 2007 cannot handle phrases (Pennebaker et al., 2007, p. 6), should phrases be identified as appropriate.

One limitation of DICTION (and other word-count programs) is that it is unable to capture contextual cues that might be interpreted differently by a human coder. For example, if an individual coded the phrase “we are not optimistic,” he or she would state that the phrase does not reflect optimism. However, using our measure, DICTION would identify the word *optimistic* and increment the level of the organizational optimism dimension attributed to the text by one. This limitation of DICTION represents an opportunity to use other content analytic techniques in future research.

Other forms of content analysis enable the computer to assist the researcher in manual coding, which generally results in rich and precise coding that is more robust to contextual factors

(Neuendorf, 2002). For instance, NVivo 9 is a computer-assisted coding program that can help to identify linkages in a broad range of media including audio files, photographs, word processing documents, and video clips (QSR International, 2010). Research in positive organizational behavior has found that micro-intervention sessions, which make use of exercises and video clips, can influence employees' level of psychological capital (Luthans, Avey, Avolio, Norman, & Combs, 2006). Future research might use NVivo, or other manual coding techniques, to analyze the content of the videos, exercises, participant feedback, and other media generated for and from the micro interventions to determine how these interventions influence the development of organizational psychological capital.

A final limitation of this study is that we were able to include only one of the two experts who participated in the word list development process because of concerns related to interrater reliability. Although a significant body of methodological research has looked at how to design and deliver surveys to maximize validity and reliability (e.g., Dillman, 1991; Fowler, 2009), scholars have yet to identify how these techniques can be adapted to facilitate the inclusion of expert judges in computer-aided text analysis word list development with high interrater reliability. For example, the total design method for surveys (e.g., Dillman, 1972) suggests that the layout, wording, and formatting of the questionnaire can all influence survey responses. Future research might identify how these design considerations translate to the evaluation of computer-aided text analytic word lists. Furthermore, the Delphi method (e.g., Dalkey & Helmer, 1963) takes an iterative approach to the inclusion of expert judgments in consensus decision making and could be adapted to facilitate the creation of computer-aided text analytic word lists where experts have reached a consensus regarding its face validity.

We illustrate the use of our framework by elevating the psychological capital construct to the organizational level of analysis. Future research might use this framework to elevate other individual-level constructs. For instance, scholars have called for trust research at both the group and organizational levels of analysis (McEvily, Perrone, & Zaheer, 2003; Schoorman, Mayer, & Davis, 2007). Some organizations may be perceived as more trustworthy than others, which may affect stakeholder interactions and ultimately influence performance (Gulati & Nickerson, 2008; Zaheer, McEvily, & Perrone, 1998). Although content analysis has been valuable in identifying the determinants and conditions of trust (e.g., Butler, 1991; Sargeant & Lee, 2002), no studies have leveraged computer-aided text analysis to measure accounts of organizational trustworthiness. Specifically, future research might apply the process identified in this article to develop measures for the three components of trustworthiness: ability, integrity, and benevolence (cf. Mayer, Davis, & Schoorman, 1995). These measures might then be used to analyze conference calls to identify if linkages exist between perceptions of trustworthiness and the formation of strategic alliances.

The passion construct also offers promise for elevation to collective levels of analysis. Passion is a construct closely related to the optimism and confidence dimensions of psychological capital (Cardon, 2008). In a work context, passion can be defined as a strong motivational predisposition toward activities that one finds enjoyable and important (cf. Vallerand et al., 2003). Like psychological capital, passion may also be valuable at collective levels of analysis. Scholars have argued that emotional contagion can facilitate the transfer of passion among individuals (e.g., Cardon, 2008). As people interact over time, contagion may result in a convergence of passion at a collective level. Scholars might use content analysis of meeting minutes, leaders' motivational speeches, or transcripts of interviews with employees to examine the extent to which passion becomes a characteristic of a group or organization.

We illustrate the potential to elevate individual-level constructs to the organizational level; however, our procedure is equally applicable to elevate to other levels. For example, dyads, groups and teams, business units, interorganizational networks, and institutions are all levels of interest to organizational scholars and may be used with the suggestions presented here regarding elevating the

level of constructs (e.g., Hitt, Beamish, Jackson, & Matthieu, 2007). There may also be opportunities in organizational research to take constructs developed at an aggregate level and lower them to the individual level. Entrepreneurial orientation is an organizational-level construct looking at the behaviors and decision-making styles of existing organizations that make them similar to new ventures (Lumpkin & Dess, 1996). However, there has been interest in taking the entrepreneurial orientation measure and lowering it to the individual level (e.g., Kollmann, Christofor, & Kuckertz, 2007). However, the assumptions and suggestions of Chen and colleagues' (2004) framework do not necessarily apply when lowering the level of analysis. For example, within-unit reliability would not be a prerequisite for lowering the level of analysis; however, demonstrating sufficient variability at the individual level would be. Thus, future research might outline processes by which researchers might develop and validate constructs that have been lowered in level of analysis.

The process outlined in this article might also be followed for constructs at different points along the state–trait continuum. For instance, organizations have been characterized as being virtuous (e.g., Payne et al., 2011), which at the individual level is considered a trait (Williams, 1985). But although the virtuosity of an organization's members can shape the virtue of the overall organization (Chun, 2005), traits are relatively stable over time and may follow different pathways than do states. Thus, explaining the emergence of organizational virtue requires a theory of homogenization through personnel flow rather than the social comparison processes that might operate on state-like constructs. For instance, since ethical fit is a salient aspect of person–organization fit (cf. Sims & Kroeck, 1994), the attraction–selection–attrition framework and notion of person–organization fit (e.g., Kristof, 1996; Kristof-Brown, Zimmerman, & Johnson, 2005; Schneider, Goldstein, & Smith, 1995) would be valuable in explaining the emergence of organizational virtue. Furthermore, studies looking at ethical climate have found a positive relationship between ethical climate and satisfaction (Schwepker, 2001), a salient outcome of person–organization fit (Kristof, 1996). Thus, a valuable test of the predictive validity of the organizational virtue computer-aided text analytic measure might be to examine its influence on satisfaction. Generally speaking, although some individual-level traits may be relevant at collective levels of analysis, researchers should be judicious in identifying which traits to elevate and carefully describe the process by which individual-level processes lead to the emergence of the organizational-level construct.

By providing a process for elevating constructs to aggregate levels of analysis, our study also suggests ways in which scholars can make contributions to the multilevel methods literature. This article demonstrated how Chen and colleagues' (2004) framework for validating multilevel constructs provides a valuable base from which to build a method-specific construct development and validation guide. We have integrated best practices from the content analysis literature to enable the rigorous development and validation of computer-aided text analytic measures (Short et al., 2010). Future studies might adapt the framework to work with other means of data collection such as surveys (e.g., Hinkin, 1998), experiments (e.g., Highhouse, 2009), and simulations (e.g., Gist, Hopper, & Daniels, 1998). These would help to promote construct validity and sound measurement in organizational research (cf. Boyd et al., 2005).

The primary use of the framework outlined in this study is to elevate constructs from the individual to aggregate levels of analysis. However, this framework can also be used to develop valid measures of constructs that have already been elevated to the organizational level. For example, organizational-level narcissism has been used conceptually (e.g., Brown, 1997; Hatch & Schultz, 2002) and in a few instances has been empirically measured using qualitative methods (e.g., Ganesh, 2003). However, the construct has yet to be used in large-scale quantitative research. One reason for this may be that very little attention has been given to empirically validating the construct at collective levels of analysis (e.g., Lyons, Kenworthy, & Popan, 2010). Measurement of narcissism in inter-organizational research has been particularly questionable where proxies such as prominence of the CEO in photographs and their compensation have been used as indicators of CEO narcissism (e.g.,

Chatterjee & Hambrick, 2011). Leveraging the ability of computer-aided text analysis to measure organizational-level constructs directly using organizational narratives, future studies might develop and validate a measure for organizational narcissism with which to test the conceptual propositions being advanced in this literature.

Implications for Positive Organizational Behavior Research and Practice

The psychological capital construct is a relatively new construct in the organizational behavior literature (Luthans, 2002). Although several studies have demonstrated initial construct validity of psychological capital at individual and collective levels (e.g., Luthans, Avolio, et al., 2007; Walumbwa et al., 2011), further refinement of the construct at the individual level is needed (cf. Little, Gooty, & Nelson, 2007). For example, Little and colleagues (2007) highlight potential discriminant validity issues among the dimensions of psychological capital, suggesting that the dimensions of psychological capital may need to be refined to improve discriminant validity. As these and other refinements to the individual-level psychological capital construct are made, scholars using the elevated construct should assess how these changes affect the decisions made in each phase of the construct elevation process and thus what changes should be made to the elevated construct to maintain the link between the constructs at each level.

Although the positive organizational behavior literature has traditionally attended more to the individual level of analysis than the positive organizational scholarship, positive organizational behavior is increasingly interested in including team- and organizational-level constructs (Luthans & Avolio, 2009). The conceptualization and measure of organizational psychological capital offered here thus presents an opportunity for future studies looking at collective levels of positive organizational behavior. For instance, although our analyses suggest that 66% of variance in organizational psychological capital is attributable to firm-year fluctuation, we do not know whether it fluctuates more over the short or long term. Although less frequently archived than annual reports, quarterly reports and transcripts of quarterly conference calls might be valuable texts with which to use our measure to gather multiple data points to conduct such a study using computer-aided text analysis.

We conceptualize organizational psychological capital as a four-dimensional construct comprising organizational hope, organizational optimism, organizational resilience, and organizational confidence. In developing the organizational psychological capital construct, we are primarily concerned with the shared variance among these dimensions (e.g., Walumbwa et al., 2011). However, hope, optimism, resilience, and confidence are also widely used independently to examine organizational phenomena (e.g., Schulman, 1999; Stajkovic & Luthans, 1998). Although additional validation of each list would be required for use outside of the organizational psychological capital context, future research might use these lists independently to examine their independent effects on organizational outcomes such as performance. For example, a future study might examine how organizational confidence influences organizational responses to external threats (cf. Staw et al., 1981).

Our study found a statistically significant positive relationship between organizational psychological capital and firm performance ($\beta = .48, p < .01$). This finding is in line with theorists who suggest that psychological capital may be a strategic resource (e.g., Luthans & Youssef, 2004). However, after controlling for past performance, organizational psychological capital explains only an additional 0.3% of variance in ROA. This may suggest that organizational psychological capital may not have enough influence on organizational performance in large, publicly-traded companies to be of concern to practitioners hoping to improve the performance of these large organizations. Future studies might examine whether there is a stronger relationship between organizational psychological capital and performance in samples of smaller, privately held businesses where each individual may have a bigger impact on the performance of the organization.

The elevation of psychological capital to the organizational level may also have practical implications for managers beyond the possible relationship with performance. The practitioner-oriented strategic management literature has highlighted the importance of establishing strategic intent, characterized by ambitious long-term organizational goals coupled with an organization-wide obsession with their pursuit (e.g., Hamel & Prahalad, 1989; Hitt, Tyler, Hardee, & Park, 1995). Although strategic intent is a much broader concept, organizational psychological capital may play a significant role in enabling an organization's strategic intent. For example, Hamel and Prahalad (1989) suggest that developing employees, launching one challenge at a time, and establishing milestones that facilitate the development are pivotal in the successful development of strategic intent. These techniques are likely to increase employees' positivity and agency by increasing their self-efficacy and perception that the ambitious goal is accomplishable. Since organizational psychological capital reflects the shared level of positivity and agency among employees in a company, this suggests that organizations with higher levels of organizational psychological capital may be better able to implement and maintain strategic intent. Thus, managers of organizations pursuing strategic intent might monitor the level of organizational psychological capital and attempt to raise it should it fall to a point where generating buy-in for ambitious organizational goals become difficult.

Conclusion

Elevating the level of constructs with rigor can be a complicated and labor-intensive process. Nevertheless, as organizational theories continue to more accurately reflect the reality of embeddedness in organizational life, rigorous measures of elevated constructs will become even more important. We hope that the framework presented in this article will aid researchers in the development of theoretically and methodologically rigorous content analytic measures of elevated constructs.

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Notes

1. The software we use in this article, DICTION 5 (Hart, 2000), includes an "optimism" score in its standard output. Although optimism is a dimension of organizational psychological capital, we elected to create a custom dictionary for two reasons. First, there are significant differences between the definition of optimism used in this study and that used to develop the DICTION measure. Our definition draws directly from the psychology/positive organizational behavior literature on attributional/explanatory-style optimism (e.g., Seligman, 1990), whereas Hart's (2000, p. 43) definition is "[L]anguage endorsing some person, group, concept or event or highlighting their positive entailments" deviates markedly from this definition. Because the validity of a computer-aided text analytic measure depends on the definition with which the word list was generated, word lists developed from two divergent definitions would measure a different, but perhaps similar, content domain. Had we used Hart's definition of optimism in the development of our conceptualization of organizational optimism, the use of the DICTION optimism measure might be more appropriate. Second, directly measuring optimism through a list of words that are indicative of optimism is more interpretable

than DICTION's indirect calculation of optimism. DICTION calculates an optimism score for a text as a function of the values calculated for five other dictionaries, specifically "OPTIMISM = [PRAISE + SATISFACTION + INSPIRATION] – [ADVERSITY + NEGATION]" (Hart, 2000). As a result of the indirect calculation, words such as *happy* (praise dictionary), *funny* (satisfaction dictionary), and *responsibility* (inspiration dictionary) increase the optimism score, and *false* (adversity dictionary) and *no* (negation dictionary) decrease the optimism score. Furthermore, the words *optimism* and *optimistic* are not contained in these dictionaries, and thus, their occurrences in shareholder letters would not count toward the overall level of optimism score using the DICTION calculation.

2. The interrater reliability between the two experts for the word lists was above the .67 benchmark for reliability in the early stages of construct validation in content analysis (Krippendorff, 2004). However, we noticed differences between the two experts' evaluations in regard to their level of conservatism. Specifically, one of the experts selected an average of 112.5 more words per list as being representative of the definition provided. Because our goal is to provide a conservative measure of organizational psychological capital, we decided to proceed by including only the judgment of the more conservative expert. The interrater reliability was well above the .75 benchmark for strong interrater reliability in content analysis (Ellis, 1994) when the conservative expert and author's evaluations were combined.
3. Individual traits and individual differences that are stable over time might draw on theories used to show how the flow of employees into and out of organizations leads to homogeneity within the firm. For instance, the notion of supplementary person–organization fit suggests that individuals will feel like they fit in organizations where they are similar to others in the organization (Kristof, 1996; Kristof-Brown, Zimmerman, & Johnson, 2005). Thus, when the goals, values, needs, and personality of an individual are aligned with those of the rest of the organization, they will tend to be more committed to the organization and have reduced intent to quit (Kristof, 1996). The Attraction-Selection-Attrition (ASA) framework also draws from the concept of fit, suggesting that individuals are more likely to seek employment in and be hired by organizations with which they fit. Individuals in these organizations who do not share salient characteristics with their coworkers are more likely to leave and join an organization with which they have a better fit (Schneider, Goldstein, & Smith, 1995). Shared attributes from the ASA cycle become part of the organization's culture and influence organizational behavior (Schneider, 1987). These processes create homogeneity within the organization and result in differences between organizations.
4. Unlike multidimensional constructs, unidimensional constructs cannot be meaningfully assessed for dimensionality when using computer-aided text analysis. Constructs suggested to be unidimensional will have one word list developed for its measurement. Because computer-aided text analysis reports only one value per word list–narrative combination, insufficient data are generated to examine correlations with other variables (Hair, Black, Babin, & Anderson, 2010). This differs from methods such as surveys where multiple items are generated per dimension (Fowler, 2009).
5. The r_{wg} statistic measures the level of within-group agreement of raters (James, Demaree, & Wolf, 1984; Lüdtke & Robitzsch, 2009). Thus, when seeking to justify aggregating individual-level data to the organizational level, r_{wg} may be used to identify whether the individuals within the organization display more or less variance than would be expected to justify aggregation. Intraclass correlation coefficients look at the relative reliability or consistency among raters (James, 1982; Lüdtke & Robitzsch, 2009). This is analogous to interrater reliability in content analysis. When the raters' level of agreement and reliability are both high, the researcher may be justified in aggregating level of analysis (LeBreton & Senter, 2008).

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