

## The role of trait core confidence higher-order construct in self-regulation of performance and attitudes: Evidence from four studies



Alexander D. Stajkovic<sup>a,\*</sup>, Dongseop Lee<sup>b,\*</sup>, Jessica M. Greenwald<sup>c</sup>, Joseph Raffiee<sup>a</sup>

<sup>a</sup> Department of Management and Human Resources, University of Wisconsin, Madison, 975 University Avenue, Madison, WI 53706, United States

<sup>b</sup> Business School, Korea University, 145, Anam-ro, Seongbuk-gu, Seoul 136-701, Republic of Korea

<sup>c</sup> College of Business, St. Ambrose University, 518 W. Locust Street, Davenport, IA 52803, United States

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### ABSTRACT

Self-regulation theories explain how psychological processes translate into action. We conceptualize the role of the trait core confidence higher-order construct in self-regulation processes and hypothesize its positive relationships with performance, satisfaction with life, and job satisfaction. On the basis of meta-analytic data (*studies* = 141, *k* = 226, *N* = 82,692), one student sample from the United States (*n* = 339), another student sample from Republic of Korea (*n* = 181), and field data from an auto group (20 car dealerships in 16 cities, *n* = 142 car sales associates), complementary analyses were conducted to examine convergent and predictive validities of the trait core confidence higher-order construct. Meta-analyses of the relationships among its four trait manifest variables (hope, general-efficacy, optimism, resilience) revealed that they are highly correlated. Confirmatory factor analyses in three studies indicated convergent validity. Predictive validity of the trait core confidence higher-order construct was supported in two studies.

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### Introduction

Self-regulation, at the level of psychological abstraction, relates to processes that underlie behavior and attitudes – i.e., how behaviors and attitudes happen (Baumeister & Vohs, 2012; Carver & Scheier, 1998; Kahneman & Tversky, 2000). Through psychological (cf., mechanical, chemical) self-regulation processes, human psychosomatic resources are gauged, allocated, and recalibrated given the activity demands. From the vantage point of work motivation research, skill is a basic component of action, beyond which employees act in various ways because they are motivated to do so (Pinder, 2008; Porter & Lawler, 1968). Although this view has served the field well, it leaves a lot unsaid theoretically about the self-regulatory processes that enable or abandon action beyond motives (e.g., I am motivated to... but *doubt* I can), especially during the current times of accelerated organizational changes that can tersely dislocate careers and livelihoods (Cappelli, 2006). As Carver and Scheier (1998, pp. 6–7) have long argued in this regard:

“Questions that surround persistence and abandonment of efforts are among the most fundamental to the psychology of human behavior... where the issues of confidence versus doubt appear to play a very important (though often unrecognized) role.”

Fewer employers today and in the future are going to take on the responsibility for employee occupational development (Cappelli, 2012), making self-regulation important for successful work functioning going forward (Lord, Diefendorff, Schmidt, & Hall, 2010). Support for self-regulation in the contemporary workplace has been offered for self-regulation and technology tasks (Bell & Kozlowski, 2002), self-regulation in teams (DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004), and self-regulation of citizenship behaviors in organizations (Bolino, Harvey, & Bachrach, 2012). Building upon extant confidence research (Greenwald, 2010; Kay & Shipman, 2014; Slaughter, Cable, & Turban, 2014; Stajkovic, 2003, 2006; Wenzel, 2014), we contribute to the growing stream of research on self-regulation at work by examining the role of trait core confidence in self-regulation of performance, satisfaction with life, and job satisfaction.

Core confidence is a higher-order construct proposed by Stajkovic (2003, 2006). Trait core confidence is defined as a certainty can-do belief that spans across related domains of activity.

\* Corresponding authors.

E-mail addresses: [astajkovic@bus.wisc.edu](mailto:astajkovic@bus.wisc.edu) (A.D. Stajkovic), [dongseoplee@korea.ac.kr](mailto:dongseoplee@korea.ac.kr) (D. Lee), [greenwaldjessica@sau.edu](mailto:greenwaldjessica@sau.edu) (J.M. Greenwald), [jraffieeshirazi@bus.wisc.edu](mailto:jraffieeshirazi@bus.wisc.edu) (J. Raffiee).

Stajkovic (2003, 2006) conceptualized confidence as a higher-order construct representing a “latent commonality underlying the dimensions” (Law, Wong, & Mobley, 1998, p. 747). Core confidence higher-order construct is manifested by four variables: hope (Snyder, 2000), efficacy (Bandura, 1997; Chen, Gully, & Eden, 2001), optimism (Peterson, 2000), and resilience (Coutu, 2002). They manifest core confidence in a person who knows what and how to do (agency and pathways of hope), believes that s/he can perform those tasks (efficacy), keeps positive outcome expectations (optimism), and feels that s/he can “bounce back” if failure occurs (resilience).

The hallmark of successful human functioning is adaptive self-regulation (Carver & Scheier, 1999; Higgins, 1997, 2000; Lord & Levy, 1994; Powers, 1973; Simon, 1967). Self-regulation is involved in various domains of human activities ranging from simple (e.g., getting out of bed) to complex (e.g., maintaining cognitive fortitude and emotional composure during the next round of lay-offs). Although self-regulation is involved in a multitude of tasks and domains of functioning, attempts to self-regulate often fail, typically because processes that were needed for success were not considered (Baumeister & Heatherton, 1996; Baumeister, Heatherton, & Tice, 1994; Damasion, 1994; DeShon, Brown, & Greenis, 1996; Heatherton & Baumeister, 1996).

We argue that core confidence’s role in adaptive self-regulation is that of psychologically enabling the potential that is already present (skill and motivation) to unfold, and its antonym, doubt, keeps such potential easily disengaged and unrealized. High core confidence makes it more likely that individuals will engage and regulate action as needed because they are certain that they can handle what needs to be done. Conversely, low core confidence makes it less likely that people will initiate action and more likely that they will disengage from it because they have doubt that they can handle what needs to be done. As stated by Carver and Scheier (1998, p. 174): “the linking of confidence to action is an especially important connection in its own right.”

Establishing this link is important and timely because contemporary organizations have gone through significant changes (Cappelli, 2006, 2012). The conglomeration of emerging workplace demands (Ang & Van Dyne, 2008; Early & Erez, 1997; Erez, Kleinbeck, & Thierry, 2001; Kanfer, Chen, & Pritchard, 2008; Natemeyer & Hersey, 2011; Pinder, 2008; Zedeck, 2010) may translate into employees’ concerns over their capacity to handle them. We argue that confidence is needed for effective self-regulation because employees riddled by doubt are unlikely to be effective. That is, without confidence, even skilled and motivated employees may doubt that they can effectively self-regulate performance and attitudes to handle the jobs they face.

We proceed as follows. We first discuss higher-order constructs in terms of the bandwidth prediction fit. Then, drawing from multiple theoretical viewpoints on self-regulatory processes (Baumeister & Heatherton, 1996; Carver & Scheier, 1998; Higgins, 1997; Kahneman & Tversky, 2000; Karoly, 1993; Lord et al., 2010; Powers, 2005; Simon, 1967), we develop hypotheses of the positive relationships between trait core confidence and performance, satisfaction with life, and job satisfaction. Complementary analyses examined convergent and predictive validities of this higher-order construct. Study 1 provides evidence of convergence in meta-analyses of the relationships among the four manifest variables. Study 2 reports confirmatory evidence of convergence. Studies 3 and 4 replicate confirmatory evidence supporting the higher-order core confidence construct and provide predictive evidence of its role in self-regulation by testing our hypotheses. Supplemental analyses with data from all four studies provide additional answers.

## Theoretical background

### *Higher-order constructs, prediction fit, and the hierarchy of inclusiveness*

Higher-order and multidimensional constructs are being increasingly proposed and tested in organizational literature (e.g., Ang, Van Dyne, & Koh, 2006; Barrick & Mount, 2005; Judge, Locke, & Durham, 1997; Marinova, Moon, & Van Dyne, 2010). When their existence is justified by theoretical rationale and methodological criteria (Law et al., 1998), multidimensional constructs can offer greater theoretical and empirical utility than their manifest variables because they can offer a more parsimonious explanation of outcomes. Parsimony is recognized as facilitative to the process of cumulative knowledge building and theory development (Edwards, 2001).

Specifically, “multidimensional constructs have been recommended for matching general predictors with general outcomes” (Edwards, 2001, p. 149), outcomes such as job performance (Schmidt, Viswesvaran, & Ones, 2005) and general attitudes (Hanisch & Hulin, 1991; Spearman, 1927; Titchener, 1910). Consequently, one of the initial questions in research based on higher-order constructs is which ones matter in what circumstances (Edwards, 2001; Johnson, Rosen, Chang, Djurdjevic, & Taing, 2012; Judge & Kammeyer-Mueller, 2012).

Beliefs vary in specificity (Armor & Taylor, 1998; Ones & Viswesvaran, 1996), and psychology research has demonstrated that beliefs matching the outcomes in the level of specificity show the best prediction – broad beliefs best predict broad outcomes and specific beliefs best predict specific outcomes (Heberlein & Black, 1976; Weigel & Newman, 1976; Weigel, Vernon, & Tognacci, 1974). In organizational behavior research, similar arguments have been extended under the names of the bandwidth-fidelity paradox (John, Hampson, & Goldberg, 1991) or dilemma (Ones & Viswesvaran, 1996), and principle of compatibility (Ajzen, 2005). The underlying proposition that the broader constructs are better predictors of broader criteria such as job performances, and more specific constructs are better predictors of specific tasks has also generated substantial meta-analytic support (Barrick & Mount, 1991; Judge, Bono, Ilies, & Gerhardt, 2002; Judge & Ilies, 2002; Stajkovic, Lee, & Nyberg, 2009; Stajkovic & Luthans, 1998). Taken together, this research recommends matching the levels of specificity between predictors and outcomes where “specific criteria favor specific predictors, and general criteria favor general predictors” (Judge & Kammeyer-Mueller, 2012, p. 168).

Broader appraisals tend to encompass the more specific ones, in what Carver and Scheier (1998) call, the hierarchy of inclusiveness. Judge and Kammeyer-Mueller (2012) provided a related discussion of broad and specific traits in the context of higher-order constructs in applied psychology. Core confidence higher-order construct is a broader trait than its four indicators which represent more specific traits. The theoretical view of confidence as a latent commonality, or core, is what causes variance overlap among its four proposed indicators. Consequently, trait core confidence higher order construct should relate to broader domains of activity and general criteria more than its specific indicators, which represent more narrow beliefs.

Theory determines when broad higher-order constructs versus more specific indicators should be examined. In the work context characterized by a plethora of job types, circumstances, and behaviors needed for success (Lord et al., 2010; Natemeyer & Hersey, 2011), context-general traits have demonstrated predictiveness of broad criteria (Judge, Thoresen, Pucik, & Welbourne, 1999; Schmidt et al., 2005; Zedeck, 2010). Trait core confidence is a context-general higher-order construct that is parsimonious for the

study of context-general criteria based on context-general inquiries, and theoretical arguments we develop regarding the role of core confidence in adaptive self-regulation are not intended to be context- or task-specific. Thus, on the basis of the research reviewed in this section, core confidence is argued to predict job performance and general attitudes such as satisfaction with one's life and job satisfaction.

#### *Core confidence and self-regulation of performance*

In the conceptualization of the role of core confidence in self-regulation of performance that we propose, meeting changing circumstances and requirements of job performances is not a matter of reenacting ready-made behaviors and habits from one's repertoire of previous endeavors. Rather, it is a self-regulatory process of acquiring behavioral trajectories necessary to establish control over changing organizational demands. The guiding theoretical premise in the present research is that successful performance is partly based on how confident employees are about what they believe they can or cannot do. It is unlikely to find many successful employees in today's organizations who are doubtful that they can effectively self-regulate behavioral and attitudinal aspects of the job, especially when work presents frequent challenges to adapt.

The extant literature suggests that self-regulation of performance unfolds as follows. People set their psychosomatic effort in accordance to what actions they anticipate are needed for a given performance type and level (Austin & Vancouver, 1996; Bandura & Jourden, 1991; Campion & Lord, 1982; Kruglanski et al., 2002; Shah & Kruglanski, 2000; Shah, Kruglanski, & Friedman, 2003). It is not adaptive for self-regulation of performance to allocate less effort than is needed, nor is it adaptive to waste too many resources for performance that can be accomplished with less effort (Heatherton & Baumeister, 1996; Higgins, 2000; Simon, 1967). Adaptive self-regulation allocates resources as needed for a certain calibrated level of performance, following the principle of least necessary effort (Kukla, 1972).

The nature of processes guiding adaptive self-regulation is to be specified next. To that end, a number of wide-ranging answers have been put forth (Powers, 1991). Our take modifies principles of feedback control (henceforth "control") theory (Carver & Scheier, 1981; Powers, 1973) by addressing reservations over the automated responses (e.g., a process analogous to a thermostat automatically engaging when temperatures exceed or fall below preset thresholds), incorporating volitional response, and adding core confidence to the model of self-regulation. In doing so, we integrate a number of points made previously in a way that is internally consistent.

The idea of feedback regulating, or controlling, responses to some pre-established value has been around physics, cybernetics, and psychology for decades (Miller, Galanter, & Pribram, 1960; Tolman, 1932; Wiener, 1948). Powers (1973), a physicist turned psychologist, further developed this idea and described processes involved with dominant references to a control of mechanical systems (e.g., thermostat). Carver and Scheier (1981, 1985) focused these thoughts to psychology of human self-regulation. The model has multiple names,<sup>1</sup> but four fundamental parts sequentially situated: input function, a reference value, a comparator (process that makes a comparison), and an output function. In psychology of human self-regulation, an input function is incoming information or perception of it. As the information is cognitively processed, it encounters the reference value (e.g., some standard, personal value, goal, attitude) to which it is then compared. An output function is

subsequent behavior, regulated by the discrepancies from the preceding comparison, often referred to as negative (if input is below a reference value) or positive (if input is above a reference value) feedback loops (Carver & Scheier, 1986, 1998).

Some clarifications to this basic model are offered here. First, not all standards are goals. As described by Carver and Scheier (1998, p. 35):

"Many types of standards exist. Instructions, social comparison information, the norms of society or group, a person's attitudes – all these are standards. Consider attitudes. A person's belief that something is desirable or undesirable can serve as a point of reference for that person, value around which to regulate behavior."

We agree with defining a goal as a desired end state (Stajkovic, Locke, & Blair, 2006), but note that the term goal is not a semantic for every desired end state. As 'theory of goal systems' in social psychology clarifies (Kruglanski et al., 2002), the hallmark of goals is a pursuit of new social behaviors positively valenced for any given individual (see also Aarts, Gollwitzer, & Hassin, 2004). This is important because a reference point can drive different interpretations of a negative feedback loop. For example, if a reference point is an attitude or a personal value (e.g., I want to be just like my mom/dad in life), that may drive different responses compared to when a reference point is a goal at work (e.g., I want to get promoted). Closing the negative feedback loop and not exceeding the reference point may be just what the person wants in the former example, whereas not only closing the negative feedback loop but also exceeding the reference point with a new goal of next-level promotion may be what the person desires in the latter example. Consequently, we modify this mechanism of control theory model by suggesting that the psychological reaction to the negative feedback loop is not always unidirectional, and that it varies depending on the nature of the reference point.

Second, we further suggest that human reactions to the input function and negative feedback loop are not necessarily automatic, as control theory model has been criticized for (see Carver & Scheier, 1998, 1999; Lord et al., 2010, for reviews). Rather, whether these reactions are mechanic/automatic or volitional depends on the circumstances. For example, one would arguably want the navigation instruments on the aircraft in flight to automatically align the referent parameters (e.g., of wind speed, aircraft speed, altitude, engine temperature) with what is needed to keep the plane in the air. However, such automatic comparisons and responses are not necessarily the case in human self-regulation. For example, a promotion standard for assistant professors in a school may be a certain number of "top-tier" articles. An assistant professor is provided with feedback that his/her current record is below that standard and is allowed another year to improve. The effort is volitionally regulated in a way of a personal perception: improvement if a person agrees with the input and wants to stay at the institution, or not if s/he prefers to debate it and/or leave. A personal choice is involved in these responses and it is willful.

Third, and perhaps most importantly for building the case for the role of core confidence in self-regulation, although a reference standard and a comparison may guide behavior, we argue that confidence determines it. This point is at the heart of the processes we put forth next.

In the near-perfect world of mechanical comparisons, a thermostat senses a change in the temperature in a room from the preset value, and adjusts automatically (Powers, 1973). In a perfect world of human functioning, we would need to hear, see, and experience something once (input), compare that information with what needs to be done (standard), and estimate exactly what resources are needed to proceed (output). However, in the reality

<sup>1</sup> Cybernetic model, control theory, principles of feedback control, negative feedback loop.

of the workplace, employees often have fears, misunderstandings, and doubts about what is needed to handle their jobs (Kanfer et al., 2008; Zedeck, 2010). During such times of adjustment, core confidence plays an important role in regulating resource allocations to keep the employee moving forward. That is, after receiving feedback and making a comparison to the standard, a person's confidence for handling what is ahead of him/her will determine whether or not s/he reacts by initiating subsequent performance. Returning to the example above, the assistant professor who receives negative evaluation may want to increase his/her performance in order to stay at the institution (close the negative feedback loop) but doubt that s/he will be able to. Such doubt may lead to lack of an attempt to close the feedback loop, despite desire to do so. A more confident assistant professor would be more likely to reallocate resources and effort aimed at closing the feedback loop by trying to improve the performance. This process is proposed for many reference points in human functioning and the process is not automatic but volitional, as we discussed. Fig. 1 summarizes control theory model of self-regulation, our modifications, and assumptions of both.

How does core confidence account for the variety of comparisons generated by a host of feedbacks and standards in different organizational contexts? Self-regulation through trait core confidence does not suggest that people disregard contextual influences, temporary setbacks or uptakes, or situational circumstances (see Osman, 2010). Drawing from Karoly's (1993) research on mechanisms of self-regulation, the argument extended here is that contextual, occasional, and probabilistic impediments are considered, but trait core confidence allows people to overcome temporal influences and determines if and how they continue the undertaking (i.e., how they react to reference comparison). This capacity to rely on trait core confidence as more solidified performance memories may guide self-regulation away

from potential press of situational forces toward engagement and continued performance (see Meyer & Schvaneveldt, 1976). Trait core confidence is a continuous belief with many degrees of confidence. A person may range from having doubt to over-confidence, and the most adaptive self-regulation would result from the appraisal that is firmly grounded in the reality of the undertaking.

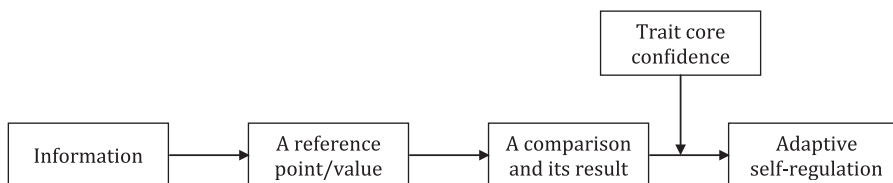
Being riddled by doubt, especially at work where consequences are often career straining, may cause one to worry about what went and what may go wrong, which can lead to the withdrawal of effort and disengagement behaviors (Magnus, Hellgren, & Näswall, 2002). Such individuals are likely to elicit evaluative responses to problems they face (i.e., negative feedback loop) and overly concern themselves with their weaknesses about which they harbor doubt. In other words, they will become preoccupied with worry that their behavior may be unsuccessful. Research has demonstrated that lingering on personal deficiencies leads to a self-debilitating spiral of stress, anxiety, and depression (Greenberger, Strasser, Cummings, & Dunham, 1989; Lazarus & Launier, 1978; Xie, Schaubroeck, & Lam, 2008). More confident employees will be more likely to focus on the performance aspect of the problems they face rather than on themselves, and try to solve performance uncertainty problems.

To summarize, people adopt various standards that can serve as a point of reference around which to self-regulate behavior, and comparisons to those standards inform behavioral response. Core confidence determines it. Doubt will emphasize personal deficiencies, adverse outcomes, and personal rumination over them. Core confidence will enable employees to remain focused on the undertaking and strategies needed to tackle and adaptively handle even adverse situations.

**Hypothesis 1.** Core confidence is positively related to performance.



Input is automatic, as is the comparator/comparison. Result of comparison “controls” the output function, where the negative feedback loop (comparison value is below the reference value) automatically drives an output function (subsequent adjustment).



Input function, feed-back, feed-front are different ways of saying information.

Information is not always automatic in daily human functioning, but it may be perceived and thus available. In organizations, information is often (but not always) provided as various feedback processes and performance reviews. It may not be automatic as in mechanical systems, but we consider it readily available at work for purposes of discussing and applying this model to organizations.

A reference point/value can be a personal value, attitude, goal, social norm, various comparison and other preference one has. Differentiation among them is important because reactions may differ notably; for example, to personal values and to work goals.

Comparison is not always automatic in human functioning (e.g., I am pretty sure my health exam numbers are not good as compared to what they should be and will delay facing them/opening that email). As in the previous argument regarding information, the comparison is often made for employees by management and thus we consider it and its results mostly available at work.

Result of comparison does not control the subsequent regulation automatically. The result of the comparison guides the adaptive self-regulation, but core confidence determines it, as described.

**Fig. 1.** Control theory model of self-regulation and modified model of the role of trait core confidence in self-regulation.

### Core confidence and self-regulation of satisfaction with life

“People sometimes talk as though feelings and thoughts were totally distinct, but that’s not true. Sadness connects to doubt, and happiness to confidence . . .”

[Carver & Scheier, 1998, p. 171]

Satisfaction with life is an often appraised aspect of life that has been studied frequently in social psychology (Diener, 1984; Diener, Emmons, Larsen, & Griffin, 1985; Kahneman, Diener, & Schwarz, 2003; Nickerson, Schwarz, Diener, & Kahneman, 2003), but rarely in organizational literature (Natemeyer & Hersey, 2011). In the context of organizational behavior, insight into prediction of satisfaction with life is important because many aspects of one’s job may end up being less relevant if one is dissatisfied with life given that dissatisfaction with life can lead to “dark sides” of mental functioning (see Nickerson et al., 2003).

Satisfaction with life is defined as an individual’s subjective evaluation regarding one’s satisfaction with life as a whole (Diener, 1984, 2000). Research in social psychology has established that situational factors (Diener, Suh, Lucas, & Smith, 1999) and individual personality characteristics (Lucas, Diener, & Suh, 1996; Steel, Schmidt, & Shultz, 2008) are both relevant in determining satisfaction with life. Although early research to explain satisfaction with life primarily focused on situational factors (e.g., income, marital status), more recent research has demonstrated that “personality appears to account for a substantial proportion of individual variation” (Pavot & Diener, 2011, p. 700). We extend this research and propose that trait core confidence’s role in adaptive self-regulation is important for satisfaction with life.

Self-regulation literature has asserted that cognitive assessments are related to affective ones (Carver & Scheier, 1998, 1999; Higgins, 1997; Kahneman & Tversky, 2000; Simon, 1967). For example, Carver and Scheier (1998, p. 171) quote the following passage from Axlina (1981, p. 104, *emphasis in the original*) illustrating how confidence may influence an affective assessment: “But they did find their mountain. And they did climb it . . . And for a while they *thought* they would get up to the top. And while they *thought* they could, they were happy.” This and other research shows that can-do beliefs often relate to how we feel (Forgas & Moylan, 1987; Johnson & Tversky, 1983). Correspondingly, when confidence facilitates positive cognitive evaluations of ability to handle life (e.g., I believe I can handle life), it can lead to positive affective evaluations of life (e.g., Because I believe I can handle life, I feel satisfied with life). In this general sense, trait core confidence regulates one’s evaluation of his/her belief to handle life’s twists and turns, which can influence the evaluation regarding how satisfied one feels with his or her life.

In particular, if a confident person encounters a negative feedback loop in life, s/he is more likely to believe that s/he can make the necessary life changes aimed at moving subsequent input functions closer to the reference value. In addition, trait confidence should predispose people to take initiative and go after things they want in life in the first place. In turn, the engagement in activities that represent progress towards one’s life preferences (reference point) creates a positive emotional response, which then results in subsequent increases in satisfaction with life. However, if people are committed to reference points in life that are positively valenced for them but do not believe that they can effectively pursue them (e.g., perhaps due to repeated negative feedback loops), their satisfaction with life will suffer. That is, if a person lacks confidence s/he will be less likely to initiate action even when s/he still *wants* to make the life changes (i.e., close the negative feedback loop). As a result, if people continue to want things in life but give up on trying to accomplish them due to low core confidence, dissatisfaction with life is likely to ensue. Trait core confidence influences satisfaction with life by operating as an enabler of potential

that must be self-regulated to handle the multitude of activities needed for prosperous life functioning.

Although life preferences vary from person to person (Kahneman et al., 2003), at some point people encounter problems (i.e., negative feedback loops) which must be addressed (Baumeister et al., 1994). Returning to Fig. 1, consider a person who has a reference value regarding what s/he wants in life but encounters a negative feedback loop in that the input function is below the reference value. In the control theory model, such a comparison would automatically result in behaviors aimed at closing the negative feedback loop. In the model of self-regulation through core confidence that we propose, core confidence will play a role in determining whether or not the person decides to initiate action targeted at closing the negative feedback loop in life.

In such adverse situations, core confidence allows for effective self-regulation because it enables people to persist rather than give up. A generally confident person who experiences divergence (negative feedback loop) between their actual life situation (input) and their desired life preferences (reference value), is likely to believe s/he can take steps to remedy the life’s predicaments faced. Importantly, as noted, trait core confidence will likely predispose people to engage in preferred endeavors to begin with (see also Barrick & Mount, 2005; McCrae & Costa, 1991), but as importantly enable them to act to make the necessary life changes if they encounter adverse situations. Thus, individuals with core confidence will believe they can self-regulate their actions to move closer to their desired situation in life and satisfaction with life need not be low. In contrast, it is harder (albeit not impossible) to think of instances in which the opposite would hold, where an individual has chronic doubt and yet is satisfied with life.

**Hypothesis 2.** Core confidence is positively related to satisfaction with life.

### Core confidence and self-regulation of job satisfaction

Job satisfaction is an affective component of work-related attitudes that captures how employees feel about their jobs. Job satisfaction can be described as an employee response to this question: *Am I satisfied with my job* (Hackman & Oldham, 1980)? Individuals who are satisfied with their job tend to perform better (Judge, Thoresen, Bono, & Patton, 2001), engage in more organizational citizenship behaviors (Ilies, Fulmer, Spitzmuller, & Johnson, 2009), and are less likely to voluntarily quit (Lee, Gerhart, Weller, & Trevor, 2008). Indeed, based on several decades of research (Judge et al., 1997, 2001; Smith, Kendall, & Hulin, 1969), there appears to be a high level of agreement that job satisfaction is an important variable at work.

Arguments substantiating the predictive power of trait core confidence with regard to job satisfaction are similar to those for satisfaction with life. Drawing upon research that people are differentially attracted to careers as a function of their personality (Schneider, 1987; Schneider, Goldstein, & Smith, 1995; Tom, 1971; Vroom, 1966), trait core confidence has an instrumental effect on job satisfaction as it will guide employees to select into challenging jobs that they believe they can handle rather than settle for less desired jobs due to doubt. Again, this occurs because confidence will likely predispose people to make career decisions which are in line with their career and life preferences, and, give them the cognitive propensity to act. Conversely, a person with low core confidence whose comparator process suggests job dissatisfaction will be less likely to take action to move the subsequent input function closer to the reference value.

In addition, employees are likely to experience set-backs, problems, and uncertainty in work settings which they need to overcome for adaptive self-regulation. The frequency of negative feedback loops increases with the frequency of changes in

contemporary organizations. Whereas control theory suggests that such feedback loops will result in automatic output reactions, our model suggests that such adjustments will depend on the individual's core confidence. High core confidence allows employees to effectively self-regulate the resources needed to reduce or close the encountered negative feedback loops, whereas employees who doubt their capabilities will be more likely to under-allocate resources, underperform, and give up – resulting in exacerbation of job dissatisfaction (Lord et al., 2010). These individuals will tend to mainly notice the negative aspects of the work context, ruminate over the job potential pitfalls, and feel that their efforts at work are likely to be futile (Higgins, 1989), resulting in less satisfaction about their job.

**Hypothesis 3.** Core confidence is positively related to job satisfaction.

### Study 1: meta-analyses of the relationships among the four manifest variables

In Study 1, two sets of analyses were conducted. First, six meta-analyses were conducted to determine the magnitudes of average correlations among the four trait manifest variables of the core confidence higher-order construct. The higher the average correlations among the manifest variables, the greater the likelihood that they share a common core. Correlational overlaps among variables have been discussed in the literature:

“Distinct and segregated literatures have developed around a number of personality traits, that despite different names, nevertheless intercorrelate so highly that they must be considered measures of the same construct”.

[Watson & Clark, 1984, p. 465]

About a decade later, Dawis (1992, p. 16) reiterated the argument:

“One has to wonder how much of the effort is overlapping and redundant. Only occasionally does someone . . . attempt to assess the overlap among measures . . . psychologists may be charting the same area but with instruments of different names.”

If different measures are empirically shown to be independent, overlap is not an issue for they relate to different phenomena. However, if measures are shown to share a substantial portion of the variance, it may point to the existence of their common core by which they are influenced at the higher level of abstraction. The meta-analytic correlations from this study offer an initial indication of whether the relationships among the four manifest variables are strong enough to implicate the existence of a higher-order construct and whether they justify further examination of their common core via confirmatory procedures such as confirmatory factor analysis (CFA).

Second, corresponding to the upcoming Studies 2–4 that utilize primary data collected in both lab and field settings, study setting (coded as lab and field) was a moderator meta-analytically examined in this study. This allowed us to test if the bivariate average correlations among the four manifest variables of core confidence higher-order construct were influenced by study setting. As recently documented, it is important to rule out the influences of the setting when interpreting average meta-analytic correlations (Vanhove & Harms, 2014).

### Method

#### Literature search

Studies that reported bivariate correlations for the four manifest variables were examined. We conducted a search of the

PsycINFO database (from 1965 to 2012) for published articles and unpublished dissertations that reported relationships between the four manifest variables. Six sets of searches (one for each pair of variables) returned 1552 published articles and dissertations.<sup>2</sup> Of these 1552, 638 were irrelevant because they were qualitative studies or because they used variable names as casual language (e.g., we “hope” that these results . . . , we are “optimistic” that . . . ). Although narrower searches of “in-subject” terms would have eliminated these studies, we chose broader “in-abstract” searches, erring on the side of caution.

Further, 497 studies either measured only one variable in the pair, or addressed both but did not provide a correlation between them or the information required to compute it. This was common because these four manifest variables were often used to describe each other (e.g., efficacious people are resilient, those with hope are optimistic), or were used interchangeably (e.g., measuring resilience with optimism scale, measuring hope with optimism scale, or measuring efficacy with hope scale). 193 studies used state measures of the variables and 82 studies showed up under more than one search. The remaining 141 studies generated 227 bivariate correlations. Among the six correlation pairings of the four manifest variables, we found the greatest number of correlations between optimism and general-efficacy ( $k = 65$ ), and the smallest number of correlations between hope and resilience ( $k = 16$ ). Following Meta-Analysis Reporting Standards (MARS) of the American Psychological Association (2008), we provide comprehensive information on the studies included in the meta-analyses in Appendix A.

#### Primary meta-analysis

We used the Hunter and Schmidt (2004) meta-analytic procedures, and their respective software program. Inputs into the program included effect sizes (correlations), sample sizes, and reliabilities (available in most studies) for each variable. In cases where reliabilities were not reported, we substituted the mean reliability estimates based on the values provided in the other studies, as recommended by Hunter and Schmidt (2004). For studies in which repeated measures, multiple measures for a single variable, or components instead of a composite measure are reported (e.g., hope as an agency and pathways versus overall hope), Hunter and Schmidt (2004) provide adjustment equations (p. 435) which produce one composite correlation, preventing multiple correlations from a single study from being double counted. We calculated the reliabilities of the composite correlations with the Spearman–Brown formula. We identified and removed one outlier using the sample-adjusted meta-analytic deviancy (SAMD) procedure (Huffcutt & Arthur, 1995), which resulted in lower residual variability of the remaining data.

#### Moderator meta-analysis

Theoretical and methodological accounts of the differences between lab and field settings, and related coding of this moderator, have been presented in previous meta-analytic research (e.g., Stajkovic & Luthans, 1997, 1998). We followed these definitional and coding procedures where a lab setting was defined as “controlled conditions in laboratories or similar settings that are not

<sup>2</sup> The specifics of the literature search to facilitate replication are as follows. Six in-abstract searches were conducted, one for each pair of the four words/variables (hope, self-efficacy, optimism, resilience). Apply related words was checked as an expander. Limiters added were: published date 1/1965 to 12/2012 and English. For example, hope and self-efficacy was entered into search fields, in abstract was selected, advanced search was then clicked and the above expander and limiters were added. This particular search resulted in 203 journal articles and dissertations. Replicating this search for the additional five pairs of variables resulted in a total of 1552 journal articles and dissertations (hope and optimism = 390; hope and resilience = 243; self-efficacy and optimism = 300; self-efficacy and resilience = 215; and optimism and resilience = 201).

**Table 1**  
Population correlations among four manifest variables.

Variable	Hope				General-efficacy				Optimism			
	$\rho$	95% CI	<i>k</i>	<i>N</i>	$\rho$	95% CI	<i>k</i>	<i>N</i>	$\rho$	95% CI	<i>k</i>	<i>N</i>
Hope	–				–				–			
General-efficacy	.71	.66, .75	23	4091	–				–			
Optimism	.65	.62, .68	63	17,925	.62	.58, .65	65	25,795	–			
Resilience	.73	.70, .76	16	4620	.66	.61, .72	19	9847	.74	.70, .79	40	20,414

Note.  $\rho$  = population correlation; 95% CI = 95% confidence interval around the population correlation; *k* = number of correlations; *N* = total sample size for all studies combined.

naturally conducive to the activity performed (e.g., managerial decision making simulations in college classrooms),” and a field setting was defined as “actual settings in which activities are naturally expected to be performed (e.g., managerial decision making in practicing organizations)” (Stajkovic & Luthans, 1998, p. 248). Applying these definitions resulted in the deletion of 4 studies that reported only summary results based on a mix of lab and field settings.

## Results

### Primary meta-analysis

Table 1 reports bivariate weighted average correlations (henceforth correlations) among the four manifest variables and the 95% confidence intervals. All correlations were homogeneous (see Stajkovic et al., 2009 for extensive discussion of heterogeneity implications for interpreting meta-analytic findings). Using the *Q*-statistic, for all six correlations we failed to reject the null test of homogeneity (hope and general-efficacy,  $Q = 20.33$ ,  $df = 23$ ,  $p > .05$ ; hope and optimism,  $Q = 53.66$ ,  $df = 62$ ,  $p > .05$ ; hope and resilience,  $Q = 4.31$ ,  $df = 15$ ,  $p > .05$ ; general-efficacy and optimism,  $Q = 65.91$ ,  $df = 63$ ,  $p > .05$ ; general-efficacy and resilience,  $Q = 10.35$ ,  $df = 18$ ,  $p > .05$ ; and optimism and resilience,  $Q = 41$ ,  $df = 39$ ,  $p > .05$ ).

Of the six correlations, only one included an outlier value (hope and general-efficacy), as identified by SAMD procedure (Huffcutt & Arthur, 1995). The correlation between hope and general-efficacy before outlier removal was .66, and after outlier removal .71, and this outlier removal reduced the standard deviation from  $SD = .17$  to  $SD = .09$ . The six correlations ranged from  $r = .62$  to  $r = .74$ , and their average was  $r = .69$ . On the basis of evidence from past research (Judge, Bono, et al., 2002), this average correlation magnitude indicates the presence of sufficient variance overlap among the manifest variables to warrant further confirmatory investigation of a second-order core confidence factor by CFA, as conducted in Studies 2–4 in this research.

### Moderator meta-analysis

Table 2 reports correlations on the basis of the lab versus field moderation. Two pairs of manifest variables have higher correlations in lab studies (hope and general-efficacy; hope and resilience) and four pairs of manifest variables have higher correlations in field studies (hope and optimism; general-efficacy and optimism; general-efficacy and resilience; optimism and resilience). Despite some correlation differences between lab and field settings, the magnitudes of bivariate correlations remained high in both settings. These results indicate that the setting in which the correlations were observed is unlikely to be the cause of their large magnitudes.

## Study 2: confirmatory factor analysis of the second-order core confidence factor

This CFA examined if the second-order core confidence factor explains the empirical relationships among the four manifest

**Table 2**  
Moderator analysis: study design.

Variable	Lab				Field			
	$\rho$	95% CI	<i>k</i>	<i>N</i>	$\rho$	95% CI	<i>k</i>	<i>N</i>
	<i>Hope</i>							
General-efficacy	.68	.60, .76	7	1710	.62	.52, .72	16	2381
Optimism	.63	.60, .68	35	13,399	.69	.65, .72	25	3904
Resilience	.75	.70, .79	5	1513	.72	.68, .76	11	3107
	<i>General-efficacy</i>							
Optimism	.51	.46, .56	29	7713	.66	.63, .69	36	18,082
Resilience	.64	.59, .69	11	3930	.68	.58, .78	8	5491
	<i>Optimism</i>							
Resilience	.52	.45, .59	10	2495	.77	.72, .82	30	17,919

Note.  $\rho$  = lab or field population correlation; *k* = number of correlations; *N* = sample size for all studies combined.

variables. A high level of convergence would point to an overlap among them and the existence of a higher-order construct. We tested and compared two models with different factor structures: a correlated first-order model and a latent second-order model. We also controlled for the effects of an unmeasured latent common method factor.

## Method

### Participants

The participants were 339 undergraduate students at a Midwestern university in the United States. The students were taking Organizational Behavior classes, their average age was 21.09 years ( $SD = 1.53$ ), and 52% were female. Extra class credit was given for their participation.

### Measures of the manifest variables

Trait hope was measured with the 8-item trait hope scale developed by Snyder, Cheavens, and Sympson (1997). General-efficacy was assessed with the 8-item general-efficacy (trait self-efficacy) scale (Chen et al., 2001). Trait optimism was measured with the Scheier and Carver's (1985) 8-item optimism scale, known as the Life Orientation Test (LOT). Trait resilience was assessed with the 25-item Wagnild and Young (1993) scale. All scale items for the manifest variables are listed in Appendix B. Reliabilities (Cronbach's alpha) in this study were:  $\alpha = .89$  for hope,  $\alpha = .93$  for general-efficacy,  $\alpha = .80$  for optimism, and  $\alpha = .90$  for resilience.

### Confirmatory factor analysis

To examine the construct structure underlying the four measures, a CFA (LISREL 8) was conducted with a covariance matrix as an input matrix. The maximum-likelihood method was applied to the factor extraction and parameter estimation – the maximum-likelihood estimators are consistent, asymptotically unbiased, and asymptotically accurate (Bollen, 1989). Fitting a measurement model with a large number of indicators (and items) can adversely affect model fit (Hall, Snell, & Foust, 1999; Judge, Erez, Bono, &

Thoresen, 2002). Following the procedure by Judge, Erez, et al. (2002), we used item parcels, where we randomly assigned items to three sets of item-parcel indicators per variable. We tested and compared two models: the correlated first-order factor model in which the four manifest variables (first-order factors) are allowed to be correlated to one another, and the latent second-order factor model in which the four manifest variables are specified to relate to one another through associations with a latent second-order factor. The latent second-order factor model is predicted in the core confidence theoretical framework, and is conceptually more parsimonious (Bollen, 1989; Gerbing & Anderson, 1984). As the latent second-order factor model is nested within the correlated first-order factor model, a statistical model comparison was made between the two. A not significant fit difference indicates no difference in explaining the estimated construct covariances between the two models.

*Controlling for common method variance in confirmatory factor analysis*

To assess the degree to which the empirical associations among the four manifest variables are due to common method variance, we controlled for the effects of an unmeasured latent method factor (Johnson, Rosen, & Djurdjevic, 2011; Podsakoff, MacKenzie, & Podsakoff, 2012). We added an unmeasured latent method factor to the second-order model, specifying each indicator to load on the method factor as well as on its first-order theoretical factor. To examine statistical significance of the difference in magnitudes of factor loadings between the model without and the model with the latent common method variance factor, a 95% confidence interval around each of the factor loadings was calculated based on its standard error. If a factor loading value from the proposed model falls outside the confidence interval around the value from the

model including the latent common method variance factor, it was concluded that the two values are significantly different (Johnson, 2014, personal communication, August 9, 2014).

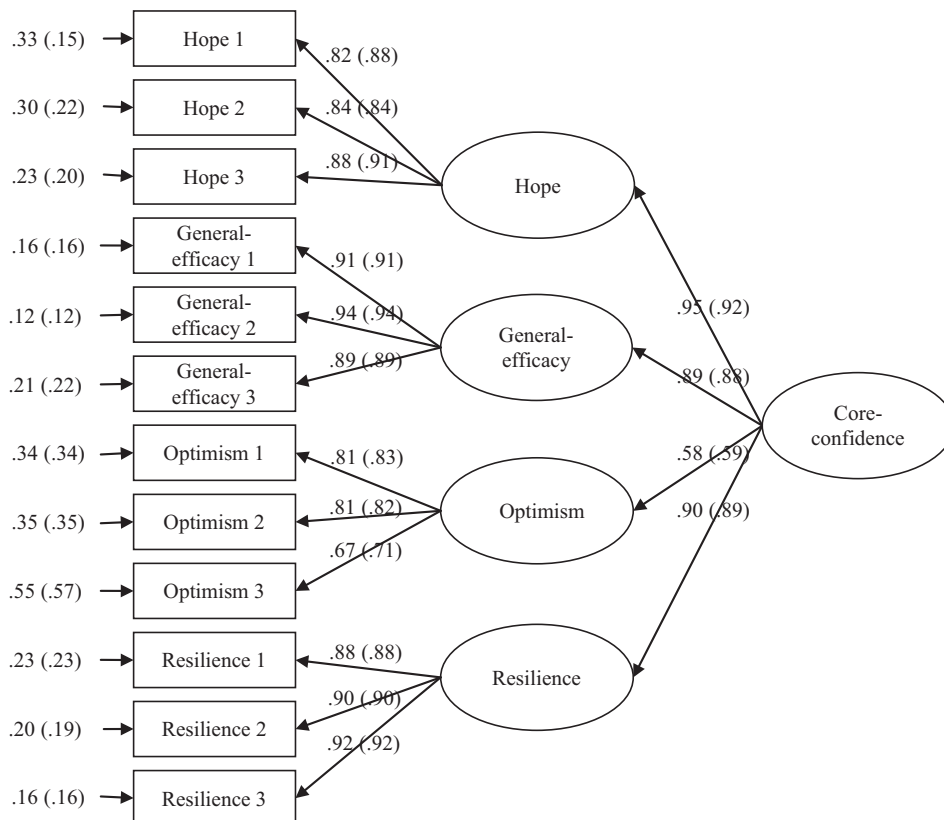
*Results*

*Confirmatory factor analysis*

Multiple model fit indices were used to evaluate model fit: a chi-square ( $\chi^2$ ) with degrees of freedom (*df*), a non-normed fit index (NNFI), an incremental fit index (IFI), a goodness of fit index (GFI), a root-mean-square error of approximation (RMSEA), and a standardized root-mean squared residual (SRMR). The fit indices for the correlated first-order model were:  $\chi^2 = 81.58$  (*df* = 48),  $p < .01$ ; NNFI = .99; IFI = .99; GFI = .96; RMSEA = .045; and SRMR = .024. The correlations among the manifest variables ranged from .53 to .86, with an average of .68. The fit indices for the latent second-order model were:  $\chi^2 = 87.13$  (*df* = 50),  $p < .01$ ; NNFI = .99; IFI = .99; GFI = .96; RMSEA = .047; and SRMR = .030. The loadings of the four manifest variables on the latent second-order factor were .95 for hope, .89 for general-efficacy, .58 for optimism, and .90 for resilience, with an average of .83. The  $\chi^2$  difference test between the two models was not significant ( $\Delta\chi^2 = 5.55$ ,  $\Delta df = 2$ , *ns*), favoring the latent second-order model. This result statistically shows that the latent second-order model provides as good of an empirical approximation to these data as does the correlated first-order model, but is more parsimonious. Fig. 2 (numbers outside of parentheses) presents the results of the latent second-order model.

*Controlling for common method variance in confirmatory factor analysis*

Although this stringent statistical correction has the potential to overstate the effects of method variance (Johnson et al., 2011), it



**Fig. 2.** Confirmatory factor analysis of core-confidence latent construct model (Study 2). Values outside parentheses are from the proposed second-order model; values inside parentheses are from a model that also includes the latent common method factor. All estimates are significant at  $p < .01$ .



**Table 3**  
Descriptive statistics and bivariate correlations (Study 3).

Variables	M	SD	1	2	3	4	5	6	7	8	9	10
1. Age	26.22	6.48	–									
2. Gender	0.68	0.47	.26**	–								
3. Academic year	3.59	1.17	.73**	.07	–							
4. GPA	3.58	0.63	.22**	–.05	.12	–						
5. Hope	5.32	0.89	.09	.09	.09	.06	(.90)					
6. General-efficacy	3.88	0.63	.06	.13	.05	.11	.80**	(.95)				
7. Optimism	3.54	0.52	–.00	.07	–.01	.12	.63**	.71**	(.76)			
8. Resilience	5.12	0.66	.08	.05	.03	.09	.72**	.74**	.58**	(.91)		
9. Academic performance <sup>a</sup>	0.00	1.00	.03	.06	–.12	.32**	.19*	.29**	.26**	.21*	–	
10. Satisfaction with life	4.59	0.99	–.08	–.05	–.06	–.04	.61**	.54**	.39**	.55**	–.01	(.80)

Note.  $N = 181$ . Cronbach's alphas are shown on the diagonal for multiple-item measures.

<sup>a</sup> Performance scores were standardized within each of the three classes from which the data were obtained.

\*  $p < .05$ .

\*\*  $p < .01$ .

did not alter the results substantially. The inclusion of the method factor improved model fit ( $\Delta\chi^2 = 36.02$ ,  $\Delta df = 12$ ,  $p < .01$ ), but the four loadings of the manifest variables on the latent second-order factor as well as the twelve loadings on the first-order theoretical factors remained without statistically significant changes (Fig. 2, numbers in parentheses). These results suggest that common method variance is not a likely alternative explanation of the associations observed among the four manifest variables.

### Study 3: CFA and predictive validity of the second-order core confidence factor in a cross-cultural sample

We first substantiate the CFA convergent validity findings in a cross-cultural sample of college students in Republic of Korea. Second, we statistically control for common method variance, as described and performed in Study 2. Third, we examine the predictive validity of the second-order core confidence factor with regard to performance (H1) and satisfaction with life (H2).

#### Method

##### Participants

The study participants were 181 undergraduate and graduate students taking Organizational Behavior classes at a private university in Republic of Korea. Their average age was 26.2 years ( $SD = 6.49$ ), and 32% were female. Extra class credit was given for their participation.

##### Measures of manifest variables and outcomes

We used the same measures of the four trait manifest variables as in Study 2. Cronbach's alphas in this study were:  $\alpha = .90$  for hope,  $\alpha = .95$  for general-efficacy,  $\alpha = .76$  for optimism, and  $\alpha = .91$  for resilience. Satisfaction with life was measured with Diener's et al. (1985) 5-item scale ( $\alpha = .80$ ). Performance in this study was that of students in class over a whole semester. It was the sum of scores, rather than categorical grades, each participant earned in four areas: mid-term exam (30%), final exam (30%), a team case analysis (30%), and class participation (10%). All evaluations were made by one professor for all participants. A three-phased data collection unfolded: the four trait manifest variables were assessed in the fourth week of the 16-week semester, and satisfaction with life was measured in the 16th week. Class performance data were obtained when the semester ended and the professor completed the grading for the entire class.

On the basis of arguments we presented earlier with regard to matching the bandwidth of predictors and outcomes, trait measures match the generality of this academic performance over time and should be an effective predictor. Students spend time studying, consult with peers, attend classes and participate in classroom

discussions, complete a variety of assignments, and perform on exams. Thus, consistent with prior studies that invoked similar bandwidth arguments (e.g., Harrison, Newman, & Roth, 2006; Li, Barrick, Zimmerman, & Chiaburu, 2014), the final grade (measured as total scores) earned over the course of the semester is a broad criteria that encompasses multiple more specific outcomes (e.g., each exam grade) and should be significantly predicted by a broad predictor (Judge & Kammeyer-Mueller, 2012).

#### Analyses

We performed CFA as described in Study 2. To assess the degree to which the associations among the four manifest variables are due to common method variance, we again included in the CFA a latent common method variance factor. We then conducted a principal component analysis (PCA) to establish if the common factor emerges, and the hypotheses testing followed.

#### Results

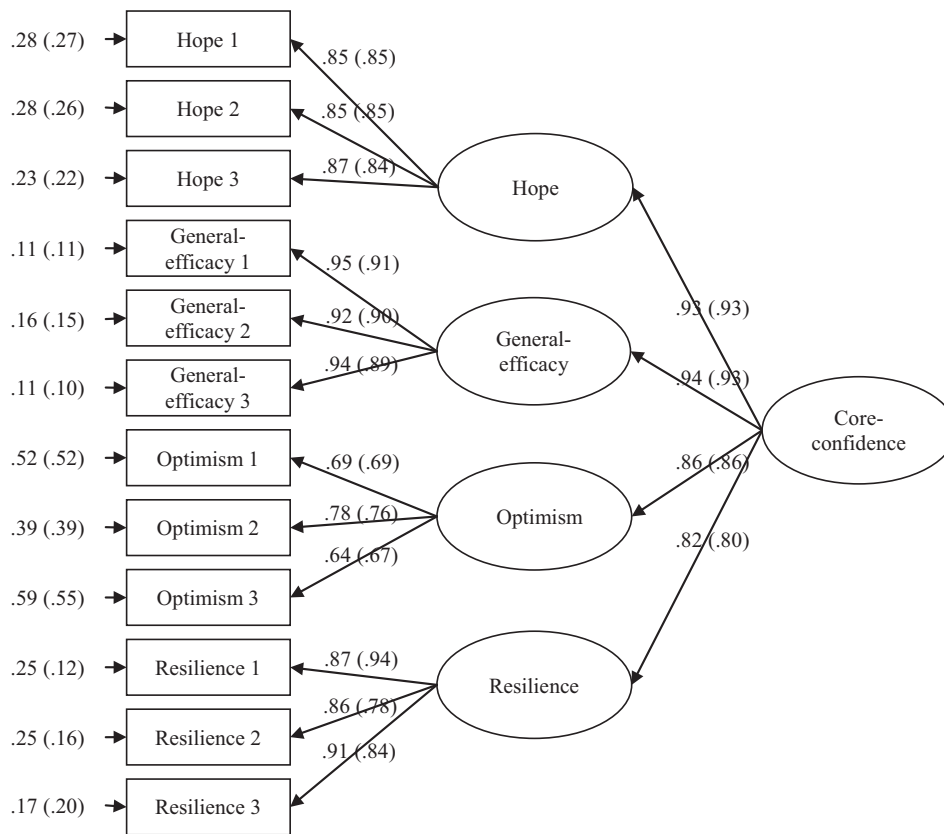
Descriptive statistics and bivariate correlations of study variables are shown in Table 3.

##### Confirmatory factor analysis

The fit indices for the correlated first-order model were:  $\chi^2 = 74.57$  ( $df = 48$ ),  $p < .01$ ; NNFI = .99; IFI = .99; GFI = .94; RMSEA = .056; and SRMR = .026. The correlations among the manifest variables ranged from .67 to .87, with an average of .78. The fit indices for the latent second-order model were:  $\chi^2 = 78.29$  ( $df = 50$ ),  $p < .01$ ; NNFI = .99; IFI = .99; GFI = .93; RMSEA = .056; and SRMR = .030. The loadings of the four manifest variables on the latent second-order factor were .93 for hope, .94 for general-efficacy, .86 for optimism, and .82 for resilience, with an average of .89. The  $\chi^2$  difference test between the models was not statistically significant ( $\Delta\chi^2 = 3.72$ ,  $\Delta df = 2$ ,  $ns$ ). These fit index values and the  $\chi^2$  difference test replicated the results from Study 2 in a cross-cultural sample. The latent second-order model provided more parsimonious but equally good approximation to the data compared to the correlated first-order model. Fig. 3 (numbers outside of parentheses) shows the results of the second-order model.

##### Controlling for common method variance in confirmatory factor analysis

The results of this analysis were consistent with those obtained in Study 2. When the latent method factor was included in the model, the overall model fit improved ( $\Delta\chi^2 = 22.85$ ,  $\Delta df = 12$ ,  $p < .05$ ), but no changes in the magnitude of the first-order or second-order factor loadings were statistically significant (Fig. 3, numbers in parentheses). Thus, the associations among the variables are unlikely due to method variance.



**Fig. 3.** Confirmatory factor analysis of core-confidence latent construct model (Study 3). Values outside parentheses are from the proposed second-order model; values inside parentheses are from a model that also includes the latent common method factor. All estimates are significant at  $p < .01$ .

**Table 4**  
Regression results for predictive validity (Study 3).

Variable	Academic performance		Satisfaction with life		Midterm exam score		Final exam score	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	.15	.14	-.04	-.05	.17	.14	.21	.21
Gender	.04	.02	-.04	-.10	.06	.02	.09	.08
Academic year	-.27*	-.28**	-.02	-.03	-.29**	-.28**	-.31**	-.31**
GPA	.32**	.30**	-.03	-.09	.26**	.30**	.33**	.32**
Common factor		.25**		.63**		.13		.11
R <sup>2</sup>	.14**	.21**	.01	.39**	.11**	.13**	.17**	.18**
ΔR <sup>2</sup>		.06**		.38**		.02		.01

Note. N = 181. Standardized coefficients are reported.

\*  $p < .05$ .

\*\*  $p < .01$ .

**Hypotheses testing**

A PCA indicated the existence of one factor with an Eigenvalue greater than 1.0, and each manifest variable was weighted by its component loading to form a common core factor. The common factor accounted for 77.3% of the shared variance in the four manifest variables.

The core confidence factor predicted students' performance in class over one semester ( $\beta = .25, p < .01$ ) and their satisfaction with life ( $\beta = .63, p < .01$ ). These results were obtained after controlling for Grade Point Average (GPA) as an indicator of past performance and several other control variables (see Table 4). GPA ( $\beta = .30, p < .01$ ) and academic year in college ( $\beta = -.28, p < .01$ ) were significant covariates of performance in class. These results provide support for H1 and H2. In addition, for comparison purposes with regard to the bandwidth of predictors and outcomes, we applied the same regression model for predicting more specific

performance measures than the semester-long, overall performance: midterm and final exam.<sup>3</sup> As shown in Table 4, the common factor failed to predict students' midterm exam score ( $p > .05$ ) or the final exam score ( $p > .05$ ). These results corroborate our preceding discussion regarding the predictor-outcome bandwidth for the core confidence higher-order construct.

**Study 4: CFA and predictive validity of the second-order core confidence factor in an organizational setting**

We strengthen the validity of inferences in the previous three studies by conducting a set of complementary analyses in a field setting. First, we conduct CFA and further substantiate results by

<sup>3</sup> We thank an anonymous reviewer for this suggestion to add tests of bandwidth-fidelity.

statistically controlling for common method variance, both by using an unmeasured latent method factor as in Studies 2 and 3, and by including a theoretically unrelated construct in CFA. Second, we test hypotheses with regard to employee job performance assessed with two measures (H1), satisfaction with life (H2), and job satisfaction (H3) in an organizational setting.

## Method

### Participants

The participants were sales associates ( $n = 142$ ) employed by a retail auto group. The auto group owns and operates 20 car dealerships located in 16 cities in the Midwest and Eastern United States and one in Canada. The auto group is privately held, sells 17 makes of cars, and had annual revenues that exceeded \$500 million in 2012. We consulted with general managers of the dealerships and the corporate Human Resources (HR) department on multiple aspects of the data collection. One of the decisions of such conversations was to survey only sales associates because their job is similar across dealerships, and selling cars is the lifeblood of the organization.

Using company provided e-mail addresses, we distributed an electronic survey to all 189 sales associates employed by the organization. 142 of the 189 provided usable responses, representing a 75% response rate. Their average age was 44.2 years ( $SD = 12.49$ ), their average tenure with the company was 4.16 years ( $SD = 4.72$ ), and 89% of the respondents were male.

### Measures of manifest variables, criteria, and task interdependence

The four manifest variables were assessed with the same scales as in Studies 2 and 3. Cronbach's alphas in this study were:  $\alpha = .79$  for hope,  $\alpha = .92$  for general-efficacy,  $\alpha = .81$  for optimism, and  $\alpha = .90$  for resilience. Satisfaction with life was measured with the same Diener et al. (1985) scale ( $\alpha = .85$ ) as in Study 3. Job satisfaction was measured with the Hackman and Oldham's (1980) 3-item scale ( $\alpha = .84$ ). Task interdependence was measured with the Van der Vegt, Emans, and Van de Vliert (1998) 4-item scale ( $\alpha = .91$ ).

Our conversations with the corporate HR department and dealership general managers informed us that performance of sales associates is assessed via two metrics: number of cars sold (henceforth sales volume) and commission earned (sales commission). Sales volume reflects an associate's ability to close deals and sell cars. Sales commission reflects an ability to generate value for the dealership as it is directly tied to the amount of profit the sales associate creates. That is, not every car sold generates the same amount of profit for the organization, which is reflected in the sales commission. Given the importance of these metrics to this organization, we examined both performance measures. Objective data on sales volume and sales commission were collected for the month subsequent to the month our survey was distributed. These data were obtained directly from dealership general managers via the corporate HR department. As expected, these two job performance measures are significantly correlated ( $r = .66, p < .01$ ).

As discussed earlier concerning the bandwidth match between predictors and criteria, broad core confidence trait matches the generality of these two job performance outcomes. Car dealerships are high volume, fast-paced work settings characterized by frequent ups and downs. Daily workflow is guided by dealership foot traffic and phone inquiries, much of which may be outside the control of the sales associates. For example, sales associates may be feeling down if dealership foot traffic is slow, they are unable to reach their pipeline deals via telephone, or if they had "sure deals" fall through due to the increasing propensity of customers to price-shop cars. On the other hand, an influx in walk-in foot traffic, phone inquiries, or "gimmies" – situations where a customer walks in and just buys a car with little to no salesmanship needed – can

lead sales associates to feel excited and believe they can close many deals that month. These factors can influence "here and now" beliefs. Broad traits are less susceptible to such influences.

In addition, dealership general managers in our study were quick to note that performance metrics they rely on to assess employee performance such as sales volume and sales commission implicitly encompass and reflect a wide-range of skills and behavioral breadth. Associates who are successful at selling cars tend to be those who work long hours, study in advance (e.g., the current and future inventory levels, pricing, technical features of cars on the lot and competitor models), establish positive rapport with customers and maintain them by responding to customer service calls, and score well on informal metrics of customer evaluations.

### Analyses

We performed CFA as described in Studies 2 and 3. In addition, we assessed the degree to which common method variance is responsible for the relationships observed among the four manifest variables by: (a) controlling for the effects of a latent method factor, as in Studies 2 and 3, and (b) including in the CFA a theoretically unrelated variable (task interdependence). Then, after performing PCA, as described in Study 3, we conducted hypotheses testing in this work setting.

### Results

Descriptive statistics and bivariate correlations of study variables are reported in Table 5.

### Confirmatory factor analysis

The fit indices for the correlated first-order model were:  $\chi^2 = 64.50$  ( $df = 48$ ),  $p < .01$ ; NNFI = .99; IFI = .99; GFI = .93; RMSEA = .049; and SRMR = .031. The correlations among the manifest variables ranged from .55 to .82, with an average of .69. The fit indices for the latent second-order model were:  $\chi^2 = 66.14$  ( $df = 50$ ),  $p < .01$ ; NNFI = .99; IFI = .99; GFI = .93; RMSEA = .048; and SRMR = .032. The loadings of the four manifest variables on the latent second-order factor were .88 for hope, .92 for general-efficacy, .67 for optimism, and .87 for resilience, with an average of .84. The  $\chi^2$  difference between the two models was not significant ( $\Delta\chi^2 = 1.64$ ,  $\Delta df = 2$ ,  $ns$ ), favoring the latent second-order model due to its greater parsimony. Fig. 4 reports the results for the latent second-order model (numbers outside of parentheses).

### Controlling for common method variance in confirmatory factor analysis

*Adding the latent factor to the model.* When the latent method factor was added to the second-order model, it improved the overall model fit ( $\Delta\chi^2 = 36.63$ ,  $\Delta df = 12$ ,  $p < .01$ ). However, the four second-order factor loadings and the twelve first-order factor loadings did not drop or change significantly (Fig. 4, numbers in parentheses). Despite the relatively small sample size in the field Study 4, these results appear to be consistent with those observed in Studies 2 and 3.

*Adding the unrelated factor to the model.* An inclusion of task interdependence, a perceived property of a task that is theoretically unrelated to the four manifest variables, did not alter the results considerably either. CFA of the five variables (four manifest and task interdependence) showed that the four correlations between the four manifest variables and task interdependence ranged from  $-.19$  to  $-.14$ , three of which were not statistically significant. Removal of all four correlations with task interdependence did not statistically worsen the model fit ( $\Delta\chi^2 = 4.81$ ,  $\Delta df = 4$ ,  $ns$ ). The correlations between the four manifest variables and task interdependence did not contribute to explaining these data,

**Table 5**  
Descriptive statistics and bivariate correlations (Study 4).

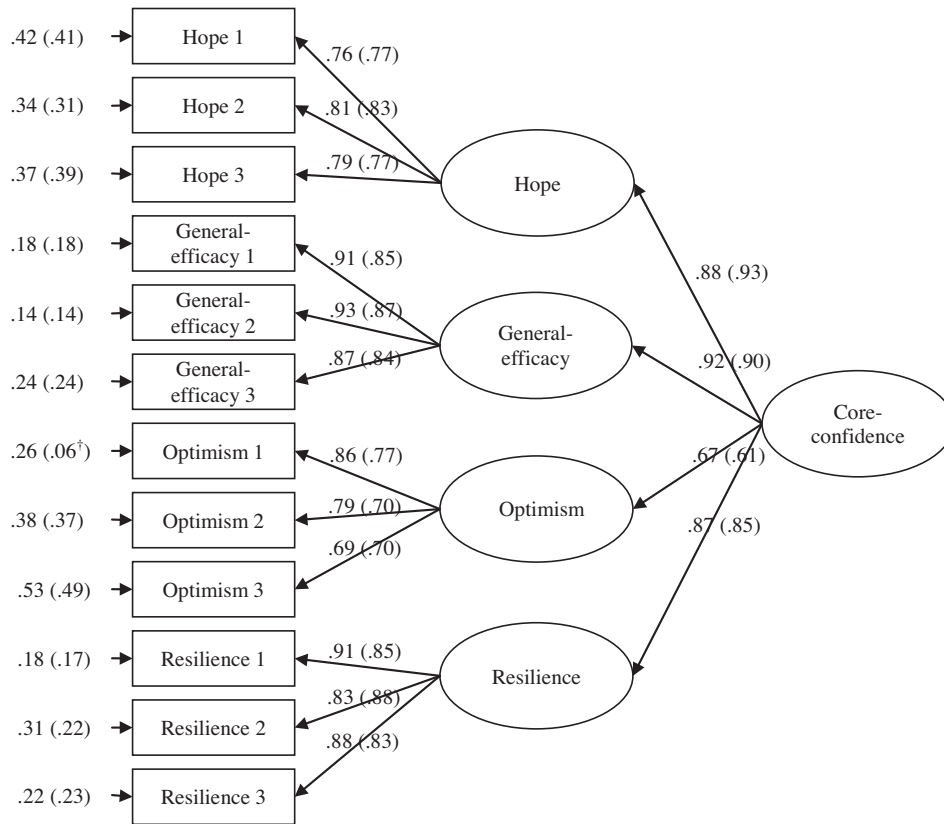
Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	44.20	12.49	–													
2. Gender	0.89	0.31	.18*	–												
3. Tenure	4.16	4.72	.26**	.08	–											
4. Years in industry	12.40	10.47	.60**	.14	.40**	–										
5. Sales in 2012	9.15	3.58	–.20*	.16	.25**	.01	–									
6. Hope	7.04	0.74	–.09	–.07	–.26**	–.10	–.07	(.79)								
7. General-efficacy	4.46	0.48	–.16	–.13	–.16	–.12	–.03	.72**	(.92)							
8. Optimism	3.15	0.61	–.02	–.08	–.16	.04	–.13	.47**	.50**	(.81)						
9. Resilience	6.12	0.56	.01	–.03	–.08	–.02	–.03	.66**	.71**	.52**	(.90)					
10. Task interdependence	2.25	0.91	–.14	–.01	–.16	–.15	–.02	–.11	–.19*	–.12	–.15	(.91)				
11. Sales volume	10.09	4.05	–.30**	.07	.15	–.02	.63**	.16	.14	–.01	.10	.06	–			
12. Sales commission <sup>a</sup>	3.61	0.34	–.11	.03	.31**	.09	.44**	.17	.16	.00	.11	–.01	.66**	–		
13. Job satisfaction	6.02	1.03	–.03	–.11	–.13	–.02	–.04	.44**	.34**	.41**	.42**	–.01	.05	.08	(.84)	
14. Satisfaction with life	5.44	1.10	–.10	–.20*	–.03	–.02	.11	.38**	.44**	.40**	.44**	–.18*	.17	.22*	.55**	(.85)

Note. N = 120–142 for the correlations. Cronbach's alphas are shown on the diagonal for multiple-item measures.

<sup>a</sup> Scores for sales commission were log-transformed.

\* p < .05.

\*\* p < .01.



**Fig. 4.** Confirmatory factor analysis of core-confidence latent construct model (Study 4). Values outside parentheses are from the proposed second-order model; values inside parentheses are from a model that also includes the latent common method factor. All estimates are significant at  $p < .01$  except for the error variance of the indicator, optimism 1 ( $p > .05$ , denoted by a dagger).

suggesting that empirical associations among the manifest variables were due to their conceptual convergences not method variance (Johnson et al., 2011; Podsakoff et al., 2012).

**Hypotheses testing**

In the PCA, only one factor emerged with an Eigenvalue greater than 1.0, and it accounted for 69.9% of the shared variance in the four manifest variables. The results of the predictive validity analysis are reported in Table 6. Performance measures were not available for 15 of 142 sales associates because they quit (voluntarily or

involuntarily), or were on leave in the month in which measures were collected. No statistically significant difference was found between the 15 participants without and the 127 with performance data in terms of age, gender, organizational and industry tenure, and average sales in the previous year of 2012.

The core confidence factor significantly predicted sales volume ( $\beta = .15, p < .05$ ) and sales commission ( $\beta = .20, p < .05$ ). These results were obtained after controlling for past performance (average monthly car sales in the previous year of 2012) and demographic variables, providing support for H1 in a field sample.

**Table 6**  
Regression results for predictive validity (Study 4).

Variable	Sales volume		Sales commission		Job satisfaction		Satisfaction with life	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	-.27**	-.27**	-.16	-.16	.01	.00	-.09	-.10
Gender	.01	.03	-.02	-.01	-.11	-.06	-.21*	-.16*
Tenure	.05	.08	.23**	.28**	-.15	-.05	-.08	.03
Years in industry	.11	.11	.09	.08	.05	.04	.13	.13
Sales in 2012	.53**	.52**	.32**	.31**	.02	-.02	.13	.10
Common factor		.15*		.20*		.46**		.47**
R <sup>2</sup>	.40**	.42**	.22**	.26**	.03	.23**	.07	.28**
ΔR <sup>2</sup>		.02*		.04*		.20**		.21**

Note.  $N = 127$  for sales volume and sales commission;  $N = 142$  for job satisfaction and life satisfaction. Standardized coefficients are reported.

\*  $p < .05$ .

\*\*  $p < .01$ .

Among control variables, past performance ( $\beta = .52$ ,  $p < .01$ ) and age ( $\beta = -.27$ ,  $p < .01$ ) were significant covariates of sales volume, and past performance ( $\beta = .31$ ,  $p < .01$ ) and tenure ( $\beta = .28$ ,  $p < .01$ ) were significant covariates of sales commission. The core confidence factor also predicted employee satisfaction with life ( $\beta = .47$ ,  $p < .01$ ) and their job satisfaction ( $\beta = .46$ ,  $p < .01$ ), providing support for H2 and H3 in an organizational sample.

### Supplemental comparative analyses using data across the four studies reported

These supplemental analyses report results that were obtained on the basis of using and comparing data from the four studies to strengthen the overall conclusions of this research.

#### Parallel second-order test of meta-analytic data

A second-order test could be conducted on meta-analytic data from Study 1 and compared to CFA results from Studies 2–4 that used primary data collected for the purposes of this research.

One way to conduct CFA with meta-analytic data is by using a simplified measurement model in which each construct has only one indicator (e.g., Stajkovic et al., 2009). For such model, the factor loading of an indicator on its respective construct is fixed to the values of the square root of the sample-size weighted mean reliability estimates from the meta-analytic data (Hunter & Schmidt, 2004). Although such a model (either first-order or second-order) based on the meta-analytic correlation matrix can be evaluated on its own, it is not possible to statistically compare the first-order model and the second-order model the same exact way as in Studies 2–4 because the second-order model had fewer degrees of freedom ( $df = 2$ ) than the first-order model ( $df = 4$ ). That is because for the second-order model with one second-order factor and four first-order factors to be nested within the correlated first-order model (so that a direct statistical test of fit difference can be made), it is necessary that each of the four first-order factors have multiple indicators, which is not practically plausible with our meta-analytic data. Thus, we conducted CFA for the two models focusing on comparing the path or correlation coefficients instead of examining the  $\chi^2$  difference between the models.

The six factor correlation estimates among the four first-order variables in the first-order model ranged from .78 to .96 with an average of .86. Also, the four loadings of the first-order variables on the second-order construct in the second-order model were .93, .87, .92, and .99 with an average of .93. These correlation coefficient estimates and factor loading estimates from meta-analytic data are substantially greater than those from Studies 2–4. These results imply that when meta-analysis and CFA are combined, more reliable and stronger true relationships among the four

variables reveal themselves, as some of the statistical and measurement artifacts (e.g., sampling and measurement errors) and the interconnectedness among the four variables are simultaneously accounted for.

#### Measurement equivalence test across cultures

Although the primary purpose of this research was not to compare core confidence means across cultures, if the higher-order factor loadings differ across cultures, then that has implications for how interchangeable the first-order constructs are cross-culturally. Given that the sample of Study 2 comprising of college students in the United States can be conceived as a cross-cultural counterpart of that of Study 3 comprising of college students in Republic of Korea, we compared our second-order model across the two samples. We conducted test of measurement equivalence following Cheung's (2008) procedure. The focus of this test was on the strength of the relationship between the first-order constructs and their underlying second-order construct rather than on the other parts of the latter's measurement model such as means or intercepts.

In comparing a second-order construct across groups, it is necessary to first demonstrate at least partial metric equivalence (i.e. equivalent loadings of observed items on their respective constructs) and scalar equivalence (i.e., equivalent item intercepts) of the first-order constructs across comparison groups (Cheung, 2008). Our data supported a partial metric equivalence (with nonequivalent loadings for one item parcel of hope and two item parcels of general-efficacy) and a scalar equivalence of the first-order factor models across the two samples.

We proceeded with the measurement equivalence tests for the second-order model (Table 7). The relatively good fit indices for Model 1 supported a configural equivalence of the second-order model, implying that the number of first- and second-order construct(s) and the form of their relationships are the same across the two samples. We tested metric equivalence for the second-order model by constraining the magnitudes of factor loadings of the first-order factors on the second-order construct to be equivalent across the two samples. Metric equivalence was not supported ( $\Delta\chi^2 = 10.06$ ,  $\Delta df = 4$ ,  $p < .05$ ). Optimism showed nonequivalent loading on the second-order factor with a smaller magnitude in the U.S. sample. Accordingly, a partial metric equivalence model was constructed by constraining the second-order factor loadings to be equivalent for hope, general-efficacy, and resilience, but not for optimism. Partial metric equivalence was supported ( $\Delta\chi^2 = 7.75$ ,  $\Delta df = 3$ ,  $p > .05$ ), indicating that the strength of the relationships between three first-order variables and the core confidence latent factor were not significantly different across the two samples. Thus, the four variables manifest core confidence with

**Table 7**  
Measurement equivalence tests for second-order construct across samples in Studies 2 and 3.

Model	$\chi^2$	df	$\Delta\chi^2$	$\Delta df$	RMSEA	NNFI	CFI	GFI (Study1, Study 2)	SRMR (Study 1, Study 2)
Configural equivalence model	167.50	114			.043	.99	.99	.96, .93	.030, .031
Metric equivalence model	177.56	118	10.06*	4	.044	.99	.99	.96, .93	.049, .074
Partial metric equivalence model	175.25	117	7.75	3	.044	.99	.99	.96, .93	.040, .064

**Table 8**  
Commonality analysis for Study 3.

Variance component	Academic performance ( $R^2 = .10$ )				Satisfaction with life ( $R^2 = .42$ )			
	Hope (%)	General-efficacy (%)	Optimism (%)	Resilience (%)	Hope (%)	General-efficacy (%)	Optimism (%)	Resilience (%)
U <sub>1</sub>	0.70				6.83			
U <sub>2</sub>		2.59				0.07		
U <sub>3</sub>			0.60				0.16	
U <sub>4</sub>				0.01				1.99
C <sub>12</sub>	-0.69	-0.69				2.82	2.82	
C <sub>13</sub>	-0.14		-0.14		-0.15			-0.15
C <sub>14</sub>	0.01			0.01	3.22			3.22
C <sub>23</sub>		1.79	1.79			-0.06		-0.06
C <sub>24</sub>		0.50		0.50		0.29		0.59
C <sub>34</sub>			0.01	0.01			-0.06	-0.06
C <sub>123</sub>	0.42	0.42	0.42		0.90	0.90	0.90	
C <sub>124</sub>	0.12	0.12		0.12	10.34	10.34		10.34
C <sub>134</sub>	-0.03		-0.03	-0.03	0.07		0.07	0.07
C <sub>234</sub>		0.68	0.68	0.68		-0.05	-0.05	-0.05
C <sub>1234</sub>	3.22	3.22	3.22	3.22	14.83	14.83	14.83	14.83
Unique	0.70	2.59	0.60	0.01	6.83	0.07	0.16	1.99
Common	2.92	6.04	5.97	4.52	32.04	29.38	15.49	28.95
Total	3.62	8.64	6.57	4.53	38.86	29.45	15.65	30.94
Unique % of $R^2$	7.13	26.43	6.11	0.11	16.44	0.17	0.39	4.80
Common % of $R^2$	29.79	61.65	60.85	46.09	77.18	70.78	37.30	69.73

Note. unique = unique effect, common = common effect, total = total variance explained, unique % of  $R^2$  = amount of unique variance in total variance explained, common % of  $R^2$  = amount of joint variance in total variance explained.

relatively equal weights among Korean participants, and optimism reflects core confidence to a lesser degree compared to the other three variables among U.S. participants.

#### Regression commonality analysis

To complement regression analyses in Studies 3–4, we conducted regression commonality analysis to estimate the extent to which the common effects among the four first-order constructs versus the unique effects of each construct explain the outcomes (Nimon, Henson, & Gates, 2010; Schoen, DeSimone, & James, 2011). Regression analyses with all combinations of the four predictors were conducted, and the unique and common components of explained variance were calculated based on  $R^2$  values from the regression analyses. Unique effects identify the amount of variance unique to each of the four manifest variables, and common effects, decomposed into all possible combinations, pertain to variance explained jointly with other predictors.

Results of the commonality analyses for Study 3 are reported in Table 8. A consistent result across the four manifest variables and two outcomes was that joint variances are much greater than unique variance, which occurred even when variables accounted for a moderate amount of unique variance. For example, hope explained only 0.7% of the variance in academic performance uniquely and 2.92% jointly with the three other variables, corresponding to 7.13% of unique and 29.79% of joint contribution to explained variance. Hope explained satisfaction with life uniquely by 6.38% and by 32.04% jointly, corresponding to 16.44% of unique and 77.18% of joint contribution to the explained variance. For both academic performance and satisfaction with life, the largest amount of explained variance was common to all four variables together (3.22% and 14.83%). Commonality analyses for

Study 4 are reported in Table 9. A notable result was that optimism had a negative joint contribution to sales commission (–0.90%), implying a suppression effect (Nimon et al., 2010). Further look at all components of joint variance with and without optimism revealed that optimism indeed suppressed variance in each of the other three variables. Satisfaction with life was mainly explained by variance common to all four variables together (8.31% corresponding to 31.96% of total explained variance).

#### Latent or aggregate second-order construct

A second-order construct can be construed as latent or aggregate (Law et al., 1998). We conceptualized latent factor, but empirically both could be tested. By such test, we can explore how four variables relate to the core confidence second order construct in predicting criteria. Given their field nature, we examined two criteria from Study 4 in this analysis, one performance (sales commission) and one attitudinal (job satisfaction). Following past research (Edwards, 2001; Law & Wong, 1999), a single indicator measurement model was tested by using an average of all the items assessing each of the four predictors and two outcomes. We set the factor loadings of the single indicators to the square root of reliability estimates (alphas) multiplied by the standard deviations of the indicators. Error variances of the single indicators were set to one minus their alphas multiplied by their variances. Unweighted least squares method was the estimation method to avoid inadmissible solutions for the aggregate model. Thus, it is no longer meaningful to compare the fit indices between the two models (Bollen, 1989), and the focus of this comparison is on the examination of factor loadings or path coefficients across the models.

The results of the latent model show that the four variables reliably reflect the core confidence second order construct. Their factor

**Table 9**  
Commonality analysis for Study 4.

Variance component	Sales commission ( $R^2 = .04$ )				Satisfaction with life ( $R^2 = .26$ )			
	Hope (%)	General-efficacy (%)	Optimism (%)	Resilience (%)	Hope (%)	General-efficacy (%)	Optimism (%)	Resilience (%)
U <sub>1</sub>	0.91				0.07			
U <sub>2</sub>		0.46				1.59		
U <sub>3</sub>			0.91				2.77	
U <sub>4</sub>				0.00				1.23
C <sub>12</sub>	1.11	1.11			0.67	0.67		
C <sub>13</sub>	−0.16		−0.16		0.13		0.13	
C <sub>14</sub>	0.08			0.08	0.31			0.31
C <sub>23</sub>		−0.11	−0.11			0.72	0.72	
C <sub>24</sub>		0.05		0.05		1.92		1.92
C <sub>34</sub>			0.08	0.08			1.11	1.11
C <sub>123</sub>	−0.17	−0.17	−0.17		0.64	0.64	0.64	
C <sub>124</sub>	1.49	1.49		1.49	3.84	3.84		3.84
C <sub>134</sub>	−0.16		−0.16	−0.16	0.49		0.49	0.49
C <sub>234</sub>		−0.12	−0.12	−0.12		1.97	1.97	1.97
C <sub>1234</sub>	−0.25	−0.25	−0.25	−0.25	8.31	8.31	8.31	8.31
Unique	0.91	0.46	0.91	0.00	0.07	1.59	2.77	1.23
Common	1.94	1.99	−0.90	1.17	14.39	18.06	13.36	17.94
Total	2.85	2.45	0.01	1.17	14.46	19.65	16.13	19.17
Unique % of $R^2$	22.20	11.18	22.03	0.00	0.26	6.16	10.75	4.78
Common % of $R^2$	47.12	48.47	−21.86	28.47	55.86	70.11	51.88	69.66

Note. unique = unique effect, common = common effect, total = total variance explained, unique % of  $R^2$  = amount of unique variance in total variance explained, common % of  $R^2$  = amount of joint variance in total variance explained.

loadings were all significant (.96 for hope, .91 for general-efficacy, .53 for optimism, and .82 for resilience) with an average of .81. Core confidence in turn predicts sales commission ( $\beta = .14$ ,  $p < .01$ ) and job satisfaction ( $\beta = .53$ ,  $p < .01$ ). The aggregate model showed different results. Although interrelations among the four variables were high and significant, ranging from .53 to .88 with an average of .69, none of their path coefficients to core confidence was significant. The path coefficients from core confidence to the two outcomes were the same as in the latent model. These exploratory results appear to suggest that the latent model explains the relationships between core confidence second-order construct and its dimensional first-order constructs better than the aggregate model does.

## Discussion

This research contributes to growing literature on self-regulation in organizations (Bell & Kozlowski, 2002; Bolino et al., 2012; DeShon et al., 2004; Lord et al., 2010). Building upon the mainly separate confidence and self-regulation literatures, we proposed that the core confidence higher-order construct plays an important role in facilitating adaptive human self-regulation. We hypothesized and tested the predictive role of core confidence with regard to academic and job performance, satisfaction with life of students and employees, and employees' job satisfaction.

In doing so, we propose a model in which regulatory processes are not automatic, and have specified the mechanisms which drive such adjustments (or lack thereof). In particular, we argue that human self-regulation goes awry in the traditional control theory model (Powers, 1973), because of the insisted upon automaticity of the input and output functions in that model (first part of Fig. 1). We contend and illustrate that many types of reference points exist, that human reactions to them are not uniform but vary, and that such reactions can indeed be volitional.

The model of self-regulation we specified further postulates that although a reference point and a comparison to it may guide behavior, confidence determines it (second part of Fig. 1). Challenges evaluated through the lens of doubt will likely be perceived as insurmountable and those aided by confidence will likely result in more adaptive subsequent self-regulation. In this sense, unlike automaticity in control theory, in the model of self-

regulation we propose, confidence plays an important role in determining whether behavioral adjustments to feedback loops will be made. On the basis of these conceptual foundations, we developed three hypotheses.

Prior to testing these hypotheses, we conducted several sets of analyses to empirically establish the existence of the core confidence higher-order construct, including multiple meta-analyses and CFA. These results, in general (and we discuss more specific confines in the limitations section), suggest sufficient similarity between the four first-order constructs, and make a contribution by highlighting the potential integration of heretofore-separate research streams. Results also point to the existence of a jangle fallacy: "the use of two separate words or expressions covering in fact the same basic situation, but sounding different, as though they were in truth different" (Kelley, 1927, p. 64). We found the average correlation among the four trait manifest variables to be .69, which, as Judge and Kammeyer-Mueller (2012) note, is as high as the correlations between alternate measures of the Big Five traits. We are, however, cautious not to overstate these findings. It could be that hope, efficacy, optimism, and resilience are different specific traits, but that the literature was not clear in developing their definitions and measures. Thus, the field may be in need of better definitions and measures, not of integration, although the measures used in this study have been validated in previous research. Ultimately, though, we believe that "scientific understanding is advanced through consideration of these issues even if the ultimate answers rest in the eye of the beholder" (Judge & Kammeyer-Mueller, 2012, p. 163).

Tests of hypotheses revealed that core confidence significantly predicted academic and sales performance, satisfaction with life, and job satisfaction. These new findings indicate that the core confidence higher-order construct can make a meaningful prediction of important criteria in the lives of students and employees.

In particular, a variety of activities are undertaken by college students over the course of the semester that influence their academic performance, and core confidence was predictive of it in a sample of students in Republic of Korea. Understanding the predictors of satisfaction with life of college students is not trivial given the rising rates of dissatisfaction with life, depression, and anxiety among them (Diener, 2000; Dyrbye, Thomas, & Shanafelt, 2006; Eisenberg, Gollust, Golberstein, & Hefner, 2007; Myers, 2000;

Myers & Diener, 1996). The need to address antecedents of satisfaction with life among adults is accentuated in light of the literature in social psychology and the health field that polemically considers adult life as easily frothed by dissatisfaction, and the need to recognize and address it (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Myers, 2000). For example, Baumeister et al. (2001) titled their article: “Bad is stronger than good” and provide a review of this research in social psychology, and Myers (2000) offers a similar review and discussion focused on health outcomes. As this literature points out, many aspects of one’s functioning may be hampered if an individual is dissatisfied with life. We provide evidence that confidence can predict satisfaction with life of employed adults in a business organization.

Our findings that core confidence significantly predicted objective performance criteria in an organizational setting have important implications. As we discussed, employees will encounter difficulties, adversities, and probabilistic undertakings at work (e.g., Osman, 2010) which require self-regulation towards continued and successful performance. Skill and motivation may not be sufficient if confidence keeps employees from initiating and sustaining action. We found that sales associates with higher trait core confidence sold more cars, earned higher commissions, and were generally more satisfied. Understanding ways in which such behaviors and attitudes can be predicted is useful for organizations. Firms with more confident employees may reap the rewards. As our analysis showed, more confident employees created more value for their organization.

### Limitations

First, an important theory aspect worth reiterating here is that the four variables of hope, efficacy, optimism, and resilience are not necessarily “the” four manifest variables. They are four variables that were theoretically proposed as manifestations of core confidence, and future theory and research may identify additional or superfluous manifest variables indicating this construct.

Second, although the results from the convergent validity analyses appear to attest to the strong associations among the four manifest variables, evidence pertaining to the existence of the higher-order construct was less consistent. For example, optimism represented core confidence to a lesser degree among US participants, which may indicate more complex interrelationships between the first-order constructs, especially cross-culturally, than suggested by the latent construct. Results from two supplemental analyses offer further details. In the measurement equivalence test across cultures, optimism manifested core confidence to a lesser degree among U.S. participants than among those in Republic of Korea, suggesting that manifest variables may be more interchangeable within some cultures than others. Similarly, in the regression commonality analysis, optimism had a suppressor effect on the relationships of hope, efficacy, and resilience with sales (i.e., when optimism is not in the equation, these three variables are less related to performance and when optimism is in the equation, they are more related to performance), suggesting that manifest variables may have differential impacts on certain types of criteria.

Third, in addition, the present research does not provide a specific answer as to whether manifest variables are essentially interchangeable in terms of measurement. One way to address this limitation is to ask if the facets are interchangeable for every case of prediction, or if certain patterns of the four manifest variables are more appropriate for different outcomes (Youssef & Luthans, 2007). Another way to address this question in the context of limitations of this research is to explore if the predictive power of the core confidence second-order construct would be different when some of the four manifest variables are not present in the equation.

Likewise, different arguments could be made if parts of the higher-order construct are taken separately. This limitation, and the question inherent in it, is at the center of the study of this and other multidimensional constructs. Accordingly, there may be pros and cons of using the core confidence second-order construct versus individual first-order constructs. For example, one might find it more efficient to study the relationship between hope and an aspect of performance without including efficacy, optimism, and resilience rather than including all four variables in that one would not have to control for the method variance effects regarding interrelationships among them. Also, one may be skeptical about the benefits of including efficacy, optimism, and resilience if hope demonstrates both unique variance and joint variance while the others offer little unique variance, as was the case with predicting satisfaction with life in Study 3 (Table 8).

Finally, construct contamination may be an unwanted source of commonality. For instance, the item “I am friends with myself” in the resilience scale may contaminate resilience with some nuisance variable. If the latter is related to the measures of the other manifest variables, construct contamination might become a part of the shared variance among the manifest variables. Replicating findings with different scales or multiple scales per each construct is recommended.

### Future research

These questions also inform the larger one, which is how future research should capture the core confidence belief. Because core confidence is a higher-order multidimensional construct, the growing consensus in the literature is that it should be modeled as such. Johnson et al. (2011, p. 758) write that “... higher order multidimensional constructs ought to be modeled as latent factors...” We agree. In addition to theoretical reasons, modeling multidimensional constructs as latent factors allows for control of the effects of method variance regarding the interrelationships among manifest variables and with the criteria (Johnson et al., 2011). However, doing so requires measurement of manifest variables separately, which can be challenging or even not feasible in some situations (e.g., research in organizations where the number of items that can be included on a survey is limited). In this sense, the development of a new core confidence scale could be beneficial as it would facilitate the research process. However, such a scale would need to go through a validation process which would include, as a necessary step, examining the degree of overlap between the new scale and core confidence when modeled as a latent factor. That said, although we recognize the practical advantages of using one scale, especially in the workplace, we still recommend that core confidence be modeled as a latent factor if and when possible.

Research should also examine if having more core confidence is always better. Adaptive self-regulation requires a balance between doubt and excessive confidence. Doubt makes life unfulfilling, over-confidence may encourage taking imprudent risks resulting in unproductive outcomes, and excessive confidence spilling into arrogance can result in negative consequences. Research points to important differences between confidence and arrogance. Confidence belief is about something that is reality driven, and its effectiveness comes down to how much it represents the reality. Arrogance is defined as “... engaging in behaviors intended to exaggerate a person’s sense of superiority by disparaging others” (Silverman, Johnson, McConnell, & Carr, 2012, p. 22). Arrogance is self-aggrandizing that is meant to put others down and make them feel inferior (Johnson et al., 2010). Thus, confidence reflects a reality-based intrapersonal belief and arrogance is interpersonal – used to belittle others as a protective screen against personal



insecurities and incompetence (Bauer, Cho, & Johnson, 2008; Silverman et al., 2012).

Future research could also examine the degree to which core confidence is distinct from core self-evaluations. Both represent multidimensional higher-order constructs, but differ in several important ways: (a) with regard to their theoretical conceptualizations (i.e., confidence versus feeling of self-worth), (b) core confidence and core self-evaluations are manifested by different indicators (i.e., hope, optimism, resiliency versus self-esteem, emotional stability, and locus of control, and general-efficacy is common to both), and (c) core confidence and core self-evaluations play different roles in human functioning (see Stajkovic, 2006, for details). Briefly, the two constructs could be orthogonal at their conceptual boundaries: one can have high core confidence and low core self-evaluations and vice versa. Thus, it appears that "...core self-evaluations and core confidence are different higher-order constructs and are both important in their own right" (Stajkovic, 2006, p. 1218), and future research on these constructs in tandem may be valuable.

Another avenue for future research would be to examine differences between core confidence and psychological capital. Stajkovic (2003) introduced the core confidence construct, and Stajkovic (2006) further developed it. An assimilated construct at the state level only, psychological capital, emerged shortly thereafter. With its roots in the positive organizational behavior movement (Luthans & Youssef, 2007), psychological capital has been conceptualized as an "individual's positive psychological state of development" (Luthans, Youssef, & Avolio, 2007, p. 3), and "one's positive appraisal of circumstances and probability of success based on motivational effort and perseverance" (Luthans, Avolio, Avey, & Norman, 2007, p. 550). The appeal of the "capital" part of this construct is that it can represent a variety of state variables amenable to development. As such, psychological capital is explicitly defined as "being state-like (as opposed to trait-like) and thus open to development" (Luthans & Avolio, 2014, p. 125).

In contrast, trait core confidence is defined as a more stable individual characteristic. That is, some people, more than others, have a relatively consistent tendency to believe that they can handle multiple aspects of their lives (see Kay & Shipman, 2014, for examples across professions). They are confident that they can handle what the future holds, and such repeated experiences solidify in memory over time. People rely on these memories to appraise if they can handle the multitude of responsibilities in front of them. Future research should examine the pros and cons of a malleable state psychological capital versus less malleable personality trait of core confidence. In addition, future research should also examine if trait core confidence sets the broader parameters within which state psychological capital varies.

Relatedly, unlike core confidence trait conceptualized as a latent second-order construct, psychological capital has often been described to be made up of its components and empirically dealt with as a composite model (e.g., Avey, Luthans, & Youssef, 2010; Luthans, Avolio, Avey, & Norman, 2007; Luthans, Youssef, & Avolio, 2007), implying an aggregate factor structure (Law et al., 1998). It can be said that an aggregate second-order model posits looser assumptions regarding the relationships between the first-order constructs than the second-order construct in that the first-order constructs are only aggregately related to the second-order construct in such a model. In a latent second-order factor model, all the first-order constructs are considered to be reflective indicators of the second-order construct. Core confidence was supported as a latent second-order construct in this research, and our supplemental analyses provided exploratory evidence favoring the latent second-order model over the aggregate second-order model. Future research should conduct these tests with psychological capital and compare the results with those obtained here.

### Practical implications

We argued that employees exercise volition with regard to perceiving and accepting the input function and responding to the negative feedback loop. They recognize the need for accurate processing of the information and adaptive responses. However, we do not suggest that successful practice of it comes "over night." One way organizations can facilitate adaptive self-regulation for employees may be to assist them with three components of it: increasing situational awareness, clarifying perceptual disparities, and incremental behavioral adaptation.

To better cope with changing input function, employees can be assisted with situational awareness. This should increase employees' functional consciousness of the type of incoming information that is probable. In particular, the (perceived) possibility of negative information and events will have greater attention-pull on employees than the positive information (Baumeister et al., 2001). Negative events can have dire implications, and when things are not as they should be at work, or elsewhere, more urgent action is invoked to remedy them (Forgas, 2013). Conversely, when positive information is anticipated, less action is elicited for such information does not bring with it the same level of urgency (Carver & Scheier, 1998). As we discussed, a premise of control theory that the input function is automatic (Powers, 1973) is questionably helpful to managers. Psychology research demonstrates that people tend to act in intentional (and often calculated), rather than automatic, ways to elicit the information they need (Swann, 1990).

When employees' awareness of the incoming information is increased in this way, they will become more functionally conscious about it. However, this is not to say that a comparator will produce a negative feedback loop that all agree on. There could be discrepancy between how managers, referent others such as coworkers, and employees themselves perceive the negative feedback loop. This is partly because people tend to generate less than accurate assessment of themselves, their situation, and the self-other agreement about it (Dunning, Heath, & Suls, 2005; Williams, 2005). Helping employees clarify potential perceptual disparities with regard to the characteristics of the negative feedback loop may subsequently foster cognitive discrepancy reduction. The applied implication is greater clarity of the output function.

The third part would be about the output function, focusing on incremental behavioral adaptation. Employees would be advised about potential perils of automatic responses to the negative feedback loop. By the same token, managers would ensure that employees do not become overwhelmed by the necessary changes in their responses to the negative feedback loop. Instead, managers could help employees develop gradual accumulation of more adaptive responses to the negative feedback loop. This process should benefit from core confidence as described in this research, and thus minimize doubt that may result from the realization that automatic response are not necessarily effective. Consequently, employees would learn that automatic responses to the negative feedback loop are limited in effectiveness and would start developing volitional responses more helpful to them in terms of incrementally correct behavioral responses, and ultimately adaptive self-regulation.

In conclusion, we recommend that future research on core confidence be "dual," as recently dubbed and discussed by Mohrman and Lawler (2011). They call for findings with research rigor that appeal to both theory and practice, and we hope to have provided such elements in this work.

### Appendix A and B. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.obhdp.2015.02.001>.

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