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Michael S. Cole, Frank Walter, Arthur G. Bedeian and Ernest H. O'Boyle  
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# Job Burnout and Employee Engagement: A Meta-Analytic Examination of Construct Proliferation

Michael S. Cole

*Texas Christian University*

Frank Walter

*University of Groningen*

Arthur G. Bedeian

*Louisiana State University*

Ernest H. O'Boyle

*Longwood University*

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*Drawing on 50 unique samples (from 37 studies), the authors used meta-analytical techniques to assess the extent to which job burnout and employee engagement are independent and useful constructs. The authors found that (a) dimension-level correlations between burnout and engagement are high, (b) burnout and engagement dimensions exhibit a similar pattern of association with correlates, and (c) controlling for burnout in meta-regression equations substantively reduced the effect sizes associated with engagement. These findings suggest that doubts about the functional distinctiveness of the dimensions underlying burnout and engagement cannot be dismissed as pure speculation.*

**Keywords:** *burnout; construct redundancy; construct proliferation; construct validity; engagement*

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*Corresponding author: Michael S. Cole, Texas Christian University, M.J. Neeley School of Business, Department of Management, Fort Worth, TX 76129, USA*

*E-mail: [m.s.cole@tcu.edu](mailto:m.s.cole@tcu.edu)*

Constructs are the central means we have for connecting the operations used in a [study] to pertinent theory . . . [and] mislabelings often have serious implications for either theory or practice.

—Shadish, Cook, and Campbell (2002: 65, 71)

Further progress in research would be more effective if there were broad agreement on the meaning of work engagement.

—Bakker, Schaufeli, Leiter, and Taris (2008: 196)

The nature and etiology of job burnout has been the focus of multidisciplinary research for more than 35 years (Schaufeli, Leiter, & Maslach, 2009). In large part, researchers have viewed burnout as a form of job strain emanating from accumulated work-related stress (Hobfoll & Shirom, 2000). Accordingly, they have primarily drawn on theoretical models that posit burnout is a result of chronic job demands and continued threats to resources necessary for successful performance (Halbesleben, 2006). Building on the referent literature, interventions for preventing burnout have logically focused on reducing job demands and providing employees with supplemental resources (Halbesleben & Buckley, 2004; Leiter & Maslach, 2010). This focus, however, has highlighted a gap in traditional burnout research (Bakker & Schaufeli, 2008, and references therein), that is, the beneficial aspects of what has been cast as the positive antithesis of burnout and dubbed “employee engagement” (Bakker & Demerouti, 2008; Maslach, Schaufeli, & Leiter, 2001). Interest in employee engagement has grown along with the mounting popularity of the “positive movement” in organizational behavior and its emphasis on promoting affirmative rather than merely preventing negative psychological states (Avey, Luthans, & Youssef, 2010; Luthans & Avolio, 2009).

At the same time, the conceptualization and interpretation of employee engagement have elicited a great deal of confusion. This confusion relates to the meaning of engagement relative to existing constructs such as job satisfaction, organizational commitment, and job involvement (see Macey & Schneider, 2008, and the accompanying commentaries), as well as whether burnout and engagement are distinct constructs or positioned at opposite ends of a common continuum (Bakker & Leiter, 2010; Maslach & Leiter, 2008). With regard to this latter point, engagement and burnout were initially operationalized as each other’s opposites and measured by the reverse pattern of scores on the Maslach Burnout Inventory (Maslach & Leiter, 1997). By contrast, it has been more recently argued that, despite their antithetical nature, burnout and engagement are distinct psychological states more adequately assessed using separate measures (e.g., Schaufeli & Bakker, 2010; Schaufeli, Salanova, González-Romá, & Bakker, 2002).

These opposing perspectives underlie the central focus of the present study. To date, conclusive empirical evidence supporting one or the other is lacking. Thus, in an effort to provide such evidence, we used meta-analytic techniques to quantitatively summarize relations between the component dimensions of burnout and engagement, as well as their relationships with a common set of work-related correlates. Our interest in this regard was sparked by the realization that the quality of research within a discipline is primarily determined by the fabrication and utilization of its core constructs (Zmud, Sampson,

Reardon, Lenz, & Byrd, 1994). Of particular concern is the notion of *construct proliferation*, wherein the observed correlations of new constructs (such as employee engagement) with existing constructs (such as job burnout) are so similar and their patterns of correlation with other variables are so alike to suggest that they may be redundant (Le, Schmidt, Harter, & Lauver, 2010). Such redundancy represents a violation of the *law of parsimony*, which holds “entities are not to be multiplied unless necessary” (*Entia non sunt multiplicanda praeter necessitatem*). Violations of this law cloud understanding and, thus, impede theory building. As a result, Schmidt, Le, and Oh (2010: 6) have noted that “a science that ignores the mandate for parsimony cannot advance its knowledge base and achieve cumulative knowledge.”

## **Burnout and Engagement: Conceptual Issues**

Ideally, both theoretical and empirical concerns should guide the development of new theoretical concepts (Bagozzi & Phillips, 1982). In this respect, it has been suggested that construct validity flows from a researcher’s ability to formulate concepts into variables and, in turn, variables into measures (Suddaby, 2010). Despite more than 10 years of engagement research, disagreement persists regarding the theoretical meaning and, thus, distinctiveness of engagement as a useful construct.

### *Opposite Ends of a Common Continuum*

Maslach, Jackson, and Leiter (1996) originally defined *engagement* as an energetic state in which employees are both dedicated to excellent performance and confident in their effectiveness. As portrayed by Maslach and Leiter (1997), individuals typically begin a new job feeling engaged rather than burned out. Under stressful conditions, however, fulfilling and meaningful work can become unfulfilling and meaningless. From this perspective, burnout is an erosion of engagement, and, thus, burnout and engagement logically represent opposite ends of a common continuum. By consequence, the three dimensions of burnout (viz., exhaustion, cynicism, and inefficacy) are viewed as direct opposites of the three dimensions of engagement (viz., energy, involvement, and efficacy). The practical significance of this perspective is that engagement represents “a desired goal” for work-based interventions designed to reduce burnout (Maslach & Leiter, 2008: 499).

Given this logic, Maslach and Leiter (1997, 2008) contend that the three dimensions of the Maslach Burnout Inventory (MBI) measure burnout *as well as* employee engagement. The first MBI dimension, *emotional exhaustion*, is characterized by feelings of being emotionally overextended and worn out with work. When exhausted, individuals feel physically fatigued, used up, and unable to unwind and recover. *Cynicism* (alternatively known as *depersonalization*) refers to negative, callous, or excessively distant attitudes toward coworkers and one’s job. It is marked by heightened pessimism and a tendency to abandon tasks. The final MBI dimension, labeled either *ineffectiveness* or *inefficacy*, covers feelings of personal failure, incompetence, and lack of achievement in one’s work. As

operationalized by Maslach and Leiter, when individuals experience burnout, energy turns into emotional exhaustion, involvement turns into cynicism, and efficacy turns into inefficacy (Maslach & Leiter, 1997).

### *Independent States*

In counterpoint to the “opposite poles” perspective, others have argued that burnout and engagement are independent states. This alternative view has been championed by W. Schaufeli and colleagues (e.g., Schaufeli, Salanova, et al., 2002). Although they likewise maintain that engagement is the “positive antipode of burnout,” Schaufeli and colleagues nevertheless argue that engagement is a distinct concept whose accurate assessment requires a stand-alone instrument (Schaufeli, Bakker, & Salanova, 2006: 702). They base their argument, in part, on psychometric considerations. For example, they logically note that in using the MBI to assess both burnout and engagement, one cannot study their empirical relationship (Schaufeli & Bakker, 2003). Given the nature and wording of the items composing the MBI, they further contend that engagement is inadequately represented by an opposite pattern of dimension scores. As an example, Schaufeli and Bakker (2004: 294) observe that “feeling emotionally drained from one’s work ‘once a week’ [an MBI item] does by no means exclude that in the same week one might feel bursting with energy” and, therefore, feel engaged. Drawing on an analogy with positive and negative affect, Schaufeli and Bakker (2004: 294) reason that rather than being “perfectly complementary and mutually exclusive states, burnout and engagement are independent states that—because of their antithetical nature—are supposed to be negatively related.”

On this basis, Schaufeli, Salanova, et al. (2002: 74) defined *engagement* as a persistent and positive affective-cognitive state of mind that is characterized by the dimensions of vigor, dedication, and absorption, and they constructed the Utrecht Work Engagement Scale (UWES; Schaufeli & Bakker, 2003) to assess these three dimensions. *Vigor* reflects high energy and mental resilience and a willingness to invest effort even in the face of difficulties. *Dedication* refers to a sense of involvement at work. High levels of dedication are associated with strong feelings of pride, significance, inspiration, and challenge. *Absorption* is characterized by being fully concentrated and engrossed in one’s work. Individuals highly absorbed in their work are often so immersed that they lose all track of time and have difficulty detaching.

### *An Evaluation of the Contrasting Views*

As the above discussion suggests, there is currently no standard, accepted definition of employee engagement. Although supporters of the newer, independent states perspective claim to have successfully articulated a theoretical distinction between burnout and engagement, conceptual considerations cast doubt on this assertion. More specifically, despite maintaining that they are distinct constructs, Schaufeli and colleagues conceptualize burnout and engagement as “each other’s opposites” (Schaufeli & Bakker, 2004: 295). They, thus, dub

**Table 1**  
**Comparison of Operational Definitions and Survey**  
**Items for Job Burnout and Employee Engagement**

Maslach Burnout Inventory <sup>a</sup> (MBI; Maslach, Jackson, & Leiter, 1996)	Utrecht Work Engagement Scale (UWES; Schaufeli & Bakker, 2003)
<p><i>Cynicism</i> refers to a negative, callous, or excessively detached response to various aspects of the job.</p> <ul style="list-style-type: none"> <li>• Become less enthusiastic. (Cynicism 2)</li> <li>• Cynical about contribution. (Cynicism 4)</li> <li>• Doubt work significance. (Cynicism 5)</li> </ul>	<p><i>Dedication</i> refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasms, inspiration, pride, and challenge.</p> <ul style="list-style-type: none"> <li>• I am enthusiastic about my job. (Dedication 2)</li> <li>• I find the work that I do full of meaning and purpose. (Dedication 1)</li> <li>• My job inspires me. (Dedication 3)</li> <li>• I am proud of the work I do. (Dedication 4)</li> <li>• To me, my job is challenging. (Dedication 5)</li> </ul>
<p><i>Emotional exhaustion</i> refers to feelings of being overextended and depleted of one's emotional and physical resources.</p> <ul style="list-style-type: none"> <li>• Feel emotionally drained. (Exhaustion 1)</li> <li>• Tired to face another day. (Exhaustion 3)</li> <li>• Feel burned out. (Exhaustion 5)</li> </ul>	<p><i>Vigor</i> is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence also in the face of difficulties.</p> <ul style="list-style-type: none"> <li>• At my job, I feel strong and vigorous. (Vigor 2)</li> <li>• When I get up in the morning, I feel like going to work. (Vigor 3)</li> <li>• At my work, I feel bursting with energy. (Vigor 1)</li> <li>• I can continue working for very long periods of time. (Vigor 4)</li> <li>• At my job, I am very resilient, mentally. (Vigor 5)</li> </ul>
<p><i>Inefficacy</i> refers to feelings of incompetence and a lack of achievement and productivity at work.</p> <ul style="list-style-type: none"> <li>• Effectively solve problems. (Inefficacy 1)</li> <li>• Effective contribution to organization. (Inefficacy 2)</li> <li>• Confident I am effective. (Inefficacy 6)</li> </ul>	<p><i>Absorption</i> is characterized by being fully concentrated and happily engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work.</p> <ul style="list-style-type: none"> <li>• Time flies when I'm working. (Absorption 1)</li> <li>• When I am working, I forget everything else around me. (Absorption 2)</li> <li>• I feel happy when I am working intensely. (Absorption 3)</li> <li>• I am immersed in my work. (Absorption 4)</li> <li>• I get carried away when I'm working. (Absorption 5)</li> </ul>

*Note:* Operational definitions of MBI (Maslach & Leiter, 2008: 498); operational definitions of UWES (Schaufeli & Bakker, 2003: 5-6). Items tapping inefficacy are reverse coded.

a. Copyright © 1986 by CPP, Inc. All rights reserved in all media. Published by Mind Garden, Inc., www.mindgarden.com. Item roots are shown to illustrate the core meaning of exemplar items. Reproduced here with written permission.

engagement as the “positive antipode” of burnout (Schaufeli & Bakker, 2004: 308). Based on this conceptualization, it is logical to assume that construct proliferation may be a problem insofar as burnout and engagement appear to be largely equivalent from a theoretical point of view. Indeed, an inspection of the operational definitions for the different dimensions of burnout and engagement reveals overlapping content domains (see Table 1).

The engagement dimension of dedication, for example, is viewed by Schaufeli and Bakker (2003) as the *polar opposite* of burnout-cynicism; hence, it should not be surprising to find that the definitions and survey items (albeit reversed) for these dimensions are quite similar. As shown in Table 1, an example item from the UWES for dedication is, "I am enthusiastic about my job," whereas an analogous item from the MBI for cynicism is, "I have become less enthusiastic about my work."<sup>1</sup> The second engagement dimension, vigor, was created as the *direct contrast* to burnout-exhaustion (Schaufeli & Bakker, 2003: 5). As one might expect, there is considerable overlap in both the definition and measurement of these dimensions (see Table 1). To illustrate, a sample UWES item for vigor is, "When I get up in the morning, I feel like going to work," whereas a parallel sample MBI item for exhaustion is, "I feel tired when I get up in the morning and have to face another day on the job."<sup>2</sup>

Paradoxically, then, the view that burnout and engagement are independent states, as conceptualized by Schaufeli et al. (2002), not only holds that burnout and engagement are directly opposing phenomena (in spite of their assumed independence) but also asserts that two of the three dimensions composing burnout and engagement represent bipolar opposites (Schaufeli & Bakker, 2010). Such theoretical statements by leading proponents of the stand-alone engagement construct as well as the abovementioned content overlap compel one to question whether the UWES dedication and vigor dimensions are, in fact, conceptually distinct from their burnout counterparts.

Although the two remaining dimensions—burnout-inefficacy and engagement-absorption—both involve cognitive components, advocates of the stand-alone engagement concept do not assume these dimensions fall on a common continuum (Schaufeli & Bakker, 2003, 2004). Yet researchers have found burnout-inefficacy to consistently and substantively correlate with all three engagement dimensions, including absorption (e.g., Christian & Slaughter, 2007; Kim, Shin, & Swanger, 2009; Schaufeli & Bakker, 2003). A comparison of the operational definitions provided in Table 1 is of assistance in making sense of this finding. As an anonymous reviewer pointed out, a common element in each of the engagement dimension definitions is how well one feels about one's job performance (cf. Kahn, 1990). As such, correlations between burnout-inefficacy and all three engagement dimensions could be expected; it seems unlikely that individuals can suffer from feelings of incompetence and a lack of work-related achievement (viz., high inefficacy) and, at the same time, experience a sense of pride (viz., high dedication) and a willingness to invest effort (viz., high vigor) and also be happily engrossed in their work (viz., high absorption). This reasoning provides a theoretical basis for how and why these two purportedly different constructs may be viewed as logical opposites (cf. Maslach & Leiter, 1997, 2008). It further suggests that burnout and engagement, when conceptualized as distinct psychological states, may be contributing to construct proliferation.

## Overview of the Present Investigation

One might conclude that there is little left to debate regarding the extent to which job burnout and employee engagement are independent and useful constructs. To do so, however, would gainsay the extent to which engagement, as a distinct psychological state,

is operationalized using the UWES and is at the center of a rapidly growing area of research (Schaufeli & Bakker, 2010).<sup>3</sup> Given this increased interest, it is surprising that few studies have empirically explored the purported conceptual similarities between burnout and engagement. The purpose of the present investigation is to determine whether burnout and engagement are, in fact, redundant constructs. We considered two empirical issues in examining this matter, as suggested by Le et al. (2010) and Schmidt et al. (2010). The first issue involves the discriminant validity of the component dimensions composing burnout and engagement. The second issue concerns the relationships between both burnout and engagement, on one hand, and their common, work-related correlates, on the other. We investigated both empirical issues using meta-analytic techniques. The application of such techniques is appropriate in the present instance because, as LePine, Erez, and Johnson (2002: 55) note, when a construct is believed to be ambiguously defined (as is the case for engagement), it is possible “to examine empirical relationships in an effort to infer construct meaning post hoc.”

We are not alone in our suspicions about the functional distinctiveness of the dimensions underlying burnout and engagement. Supporters of both competing perspectives have together acknowledged that the relationship between burnout and engagement “remains unclear” (Maslach, Leiter, & Schaufeli, 2008: 104). Exemplifying a growing doubt, Bakker and Leiter (2010: 89), among others, have remarked that further research is needed to “address the positioning of burnout and work engagement: Are they polar opposites or neighboring or even overlapping work experiences?” Thus, we are most concerned with what Macey and Schneider (2008) refer to as the “old wine in new wineskins” phenomenon, which would suggest that the more recently developed UWES may tap a well-known construct (burnout) under a new label (engagement). For ease of exposition, in the following discussion we equate the term *burnout* with the MBI and the term *engagement* with the UWES.

## **Burnout and Engagement: Empirical Issues**

### *Intercorrelations among Burnout and Engagement Dimensions*

To be considered independent, the dimensions underlying burnout and engagement should be relatively uncorrelated (Le et al., 2010). Correlations reported in the UWES Test Manual (Schaufeli & Bakker, 2003), however, suggest that the dimensions underlying burnout (MBI) and engagement (UWES) share substantial variance. Raw (i.e., uncorrected) mean correlations (derived from 15 samples;  $N = 6,726$ ) are reported as follows: exhaustion-vigor ( $r = -.38$ , ranging from  $-.29$  to  $-.71$ ), cynicism-dedication ( $r = -.66$ , ranging from  $-.55$  to  $-.73$ ), and inefficacy-absorption ( $r = -.55$ , ranging from  $-.44$  to  $-.69$ ). Follow-up studies have consistently found similarly high correlations (e.g., Christian & Slaughter, 2007; Kim et al., 2009; Schaufeli et al., 2006), suggesting that either dimensions purported to gauge different constructs tap into the same construct or the dimensions underlying the measures cannot be distinguished by empirical data (cf. Le et al., 2010: 113). Expanding these findings, González-Romá, Schaufeli, Bakker, and Lloret (2006) directly examined the dimensionality of burnout and engagement. They showed that the items reflecting burnout-cynicism and



engagement-dedication are direct opposites along a bipolar dimension, as are the items reflecting burnout-exhaustion and engagement-vigor (also see Demerouti, Mostert, & Bakker, 2010).<sup>4</sup> Taken together, such findings call into question whether the dimensions composing burnout and their counterpart engagement dimensions are empirically distinguishable. Our initial set of analyses explores this issue using meta-analytic data:

*Research Question 1:* Is the empirical overlap among the dimensions that compose burnout and engagement so strong as to suggest these constructs are redundant?

### *Nomological Networks of Burnout and Engagement*

The second empirical issue at play in determining whether burnout and engagement are independent constructs involves whether the dimensions underlying burnout and engagement exhibit a similar pattern of association with a common set of work-related correlates (Le et al., 2010). In this respect, the opposing perspectives surrounding the proper conceptualization of burnout and engagement lead to fundamentally different predictions. The view that burnout and engagement represent opposite poles of a common continuum (Maslach & Leiter, 1997, 2008) would logically suggest “mirrored” correlates (i.e., a similar nomological net but with opposite directional signs). In contrast, the independent states perspective (Schaufeli & Bakker, 2003, 2004) would predict “distinct” correlates, wherein the dimensions of burnout and engagement differentially relate to a common set of antecedents and outcomes.

*Antecedent correlates.* Common across the opposing views is that perceived working conditions are seen as proximal predictors of burnout and engagement. The associated antecedent-oriented research is largely grounded in the job demands-resources model (JD-R; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Essentially, the JD-R model classifies working conditions into two broad categories suggested to play a key role in the development of burnout and engagement: job demands and job resources.

According to the JD-R model, *job demands* (i.e., aspects that require sustained physical or psychological effort) provoke a health impairment process whereby high demands overtax and deplete employees’ available resources and ultimately result in burnout (Bakker & Demerouti, 2007). Thus, theory and empirical research both suggest job demands (e.g., work overload and excessive time pressure) have a direct positive relationship with all three burnout dimensions (e.g., Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, et al., 2001; Leiter & Maslach, 2009; Maslach et al., 2001; Schaufeli, Leiter, et al., 2009). In contrast, empirical evidence on the relationship between job demands and engagement has produced inconsistent findings. Some studies (e.g., Schaufeli & Bakker, 2004; Schaufeli, Bakker, & Van Rhenen, 2009) have shown job demands are irrelevant for predicting engagement, whereas others (e.g., Schaufeli, Taris, & Van Rhenen, 2008) have unexpectedly found job demands to significantly positively relate with the dimensions of engagement. Finally, Demerouti et al. (2010: 212) concluded—having reviewed the available literature—that “there is no clear evidence for differential relationships” between job demands (viz., work overload), on one hand, and burnout and engagement, on the other.

The JD-R model also proposes that *job resources* (i.e., aspects that assist in goal achievement and encourage employee growth) have a direct negative relationship with burnout because resources enable employees to meet job demands and, thus, protect themselves from experiencing strain (Maslach & Leiter, 2008; Schaufeli & Bakker, 2004; Schaufeli, Bakker, et al., 2009). Accordingly, research has shown work-related social support (i.e., the most widely studied job resource) to negatively correlate with all three dimensions of burnout (e.g., Halbesleben, 2006). The JD-R model further assumes job resources can activate a motivational process that leads to increased engagement (Bakker & Demerouti, 2007, 2008). In support of these assumptions, multiple studies have shown that job resources (e.g., social support and autonomy), when present, positively associate with engagement's dimensions (e.g., Bakker & Demerouti, 2008; Demerouti, Bakker, de Jonge, & Janssen, 2001; Llorens, Bakker, Schaufeli, & Salanova, 2006; Schaufeli & Bakker, 2004; Schaufeli et al., 2008).

*Outcome correlates.* Given its lengthy history, burnout has been linked with a wide variety of work-related outcomes (Halbesleben & Buckley, 2004; Maslach et al., 2001). Far fewer empirical studies have explored linkages between engagement and possible outcome variables. As Halbesleben (2010: 104) explains, researchers have often assumed "engagement is the outcome." For the purposes of the present study, we concentrate on a common set of correlates that have been examined in relation to both burnout and engagement: health complaints, job satisfaction, and organizational commitment.

Empirical evidence has consistently established burnout as a stress phenomenon that positively correlates with mental and physical health impairments (Maslach et al., 2001; Maslach & Leiter, 2008). Furthermore, burnout has been linked to job satisfaction and organizational commitment (Lee & Ashforth, 1996), with results consistently demonstrating worn-out and exhausted employees are less likely to approach jobs with enthusiasm and manifest lower levels of commitment to their organizations (Hakanen, Bakker, & Schaufeli, 2006; Spence-Laschinger, Leiter, Day, & Gilin, 2009). Available research on engagement and these same three outcome correlates has produced a similar (albeit reversed) pattern of results. Evidence from a handful of studies suggests, for example, that the dimensions composing engagement are negatively related to health complaints (Demerouti, Bakker, de Jonge, et al., 2001; Hakanen et al., 2006; Schaufeli & Bakker, 2004). Engagement as a strategy for improving employees' job attitudes has also begun to receive scholarly attention. In this respect, research indicates that psychologically engaged employees feel excited about their jobs and are more committed to their firms (Demerouti, Bakker, de Jonge, et al., 2001; Hakanen et al., 2006). Schaufeli et al. (2008) have underscored the abovementioned results by directly demonstrating that the different dimensions of burnout and engagement similarly associate (in opposite directions) with health complaints, job satisfaction, and organizational commitment. On the basis of these equivalent findings, they concluded that "it seems that burnout and engagement act as each other's opposites" (Schaufeli et al., 2008: 192; also see Demerouti et al., 2010).

On initial impression, it may seem that burnout and engagement share a common nomological net. A possible exception in this regard, however, is the antecedent correlate of job demands, with research indicating more consistent relationships with the dimensions

underlying burnout as opposed to those composing engagement. Recognizing that a synthesis of evidence from multiple studies is more conclusive than evidence from any single study (Schmidt, 2010), we used meta-analytic data to clarify the pattern of relationships between burnout and engagement and both antecedent (*viz.*, job demands, work overload, job resources, coworker support) and outcome (*viz.*, health complaints, job satisfaction, and organizational commitment) correlates.

*Research Question 2:* Do the dimensions that compose burnout and engagement share a common nomological network? Specifically, are their patterns of association with study correlates similar (mirrored correlates) or dissimilar (distinct correlates)?

### *Incremental Validity*

Going beyond the basic requirements for determining empirical redundancy (Le et al., 2010), we note that incremental validity may be a further indication of a measure's usefulness (Hunsley & Meyer, 2003). Nevertheless, prior research has rarely examined whether the various dimensions of engagement incrementally contribute to the prediction of outcome variables beyond what is captured by the constituent dimensions of burnout. If burnout and engagement are empirically nonredundant—as assumed by the independent states perspective (Schaufeli & Bakker, 2003, 2004)—then the dimensions of engagement should account for meaningful variance in outcome correlates over and above burnout. Thus,

*Research Question 3:* Do the dimensions that compose engagement account for unique variance in outcome correlates beyond that attributed to the dimensions of burnout?

## **The Current Study and Rationale for Meta-Analysis**

The present meta-analysis is timely in that the frequency with which engagement studies have been published has recently surged. An updated meta-analysis is, therefore, necessary to account for new findings since Christian and Slaughter's (2007) review of the engagement literature. Indeed, the number of primary studies included in the current meta-analysis is almost double that summarized by Christian and Slaughter. With a larger number of studies, stricter inclusion criteria can be applied and a sufficient number of studies can still be retained to yield meaningful results (Valentine, Pigott, & Rothstein, 2010). In the present instance, this larger number of studies allowed us to control for sample differences and other potential confounds by using effect sizes matched by sample (*i.e.*, we only considered primary studies that included *both* burnout and engagement), which was impossible to do at the time of Christian and Slaughter's (2007) review. In addition, we tested theoretical propositions that could not be previously investigated; this is the first meta-analysis to examine the relationships between all three engagement dimensions and job satisfaction.

The quality of a meta-analysis is largely dependent on the quality of the studies it synthesizes. Therefore, we focused our review on primary studies that utilized the most highly

regarded inventories of burnout and engagement (Lam & Kennedy, 2005). The MBI is considered the “gold standard” of burnout measures (Maslach et al., 2008), and the UWES has been used almost exclusively to gauge the stand-alone engagement concept (Bakker & Leiter, 2010; Halbesleben, 2010). We concentrated on these measures because (a) they have the greatest likelihood of being used in future research, (b) they will likely have the greatest impact on new theory building, and (c) our results will enhance conceptual understanding of the two measures predominantly used by burnout and engagement researchers.

Finally, to more fully understand the association between burnout and engagement, we focused on dimension-level rather than construct-level correlations (cf. Crawford, LePine, & Rich, 2010). Burnout and engagement were both developed as multidimensional constructs so that researchers could examine interrelationships among their underlying dimensions as well as differential, dimension-level relations with work-related correlates. Accordingly, burnout-engagement scholars have suggested that basing conclusions on a single score oversimplifies both constructs (Maslach et al., 2008). Furthermore, there is no a priori theory about whether and how the dimensions composing burnout and engagement should be combined (Maslach et al., 2008). Our decision to investigate burnout and engagement as a set of related dimensions (as opposed to more broadly defined concepts) is in line with contemporary thinking and, as a consequence, contributes to further theory refinement in these areas of inquiry (Strauss & Smith, 2009).

## Method

### *Literature Review*

We searched various databases, including ABI/INFORM, AllAcademic.com, Google Scholar, PsycINFO, and Web of Science, for published research. In doing so, we used various combinations of the following keywords in Dutch, German, French, Finnish, and Spanish: *engagement, vigor (and vigour), dedication, absorption, burnout, exhaustion, depersonalization, cynicism, (in)efficacy, professional efficacy, and personal accomplishment*. To lessen the effect of publication bias associated with the “file drawer” problem (in reference to the supposed cabinets full of unpublishable studies that yielded nonsignificant results; Rosenthal, 1979), we posted requests for unpublished studies and data on various e-mail listservers (e.g., EMONET-L, HRDIV\_NET, and OB-LIST); a similar message was placed on the Society for Industrial and Organizational Psychology’s website (December 2009). We also reviewed abstracts of recent Academy of Management and Society for Industrial and Organizational Psychology conferences (2006-2009), examined the reference sections of earlier meta-analyses and narrative reviews on engagement (e.g., Bakker & Demerouti, 2008; Christian & Slaughter, 2007), and reviewed a bibliography of engagement hosted by W. Schaufeli ([www.schaufeli.com](http://www.schaufeli.com)). Finally, we contacted authors who have published empirical research on engagement and requested unpublished manuscripts or raw data. Our literature review, finalized in December 2009, yielded more than 750 studies and other potential sources of relevant data. Of these, more than 100 were unpublished manuscripts, conference papers, and dissertations.

### *Inclusion Criteria*

As noted, we focused our review on primary studies that utilized the most highly regarded inventories of burnout (*viz.*, MBI) and engagement (*viz.*, UWES). We thereby controlled for the possibility that an observed effect might be attributable to substantive differences in the operationalization of specific variables (Strube & Hartmann, 1983). Furthermore, to guard against potential differences in effect sizes that could be the result of sample error variability, we focused on MBI and UWES studies that assessed *both* burnout and engagement within the same individual-level samples. Although tests do exist to determine if a set of studies is homogenous, they are inappropriate for the multivariate analyses included in the present investigation for reasons relating to limited statistical power (Huedo-Medina, Sánchez-Meca, Marín-Martínez, & Botella, 2006). Although this inclusion criterion narrows the number of studies available for analysis, it reduces internal validity threats that typically hamper meta-analytic regression tests and likewise controls for potential history effects (Strube & Hartmann, 1983). We also required that the primary studies selected for analysis report correlation coefficients (or statistics that could be transformed into correlations) among constituent dimensions of burnout and engagement; this criterion eliminated studies that reported only overall burnout or engagement scores summed across dimensions. If dimension-level correlations were not included in a study, we requested this information from its author(s). Finally, given our interest in quantitatively summarizing relations among the component dimensions of burnout and engagement, as well as their relationships with a common set of work-related correlates, studies that used student samples were excluded. We placed no restrictions on the nationality of a sample or the language in which a study was reported.

### *Coding of Studies*

In cases where a single study used multiple, independent samples, we included effect sizes from each sample as long as the aforementioned inclusion criteria were met. Following established detection heuristics (Wood, 2008), we also sought to identify and eliminate studies that used the same database. When two or more studies drew on the same data, we recorded each study's unique effect sizes and then randomly selected one of the studies for coding the effect sizes common to both. This yielded a final pool consisting of 37 studies (representing 50 unique samples); the studies were reported in several languages, spanning 10 nationalities and 13 industries.

### *Coding of Correlates*

Similar to prior meta-analyses (e.g., LePine et al., 2002), we included a correlate in our analyses if it was reported in at least three primary studies. We used this criterion because, as Valentine et al. (2010: 241) have explained, “[A] meta-analysis of two studies will likely only be informative if the studies are direct (or ‘statistical’) replications of one another.”

Once the pool of studies was selected, we coded the relevant data for comparative analysis. Coding was done at the most inclusive level, resulting in the identification of both general (e.g., job demands) and specific (e.g., work overload) work-related correlates.

*Antecedent correlates.* There were a sufficient number of studies in our final pool to code four correlates as antecedents of burnout and engagement. *Job demands* broadly refer to those physical, social, or organizational aspects of a job that require sustained employee effort and, thus, engender psychological costs. There were also an appropriate number of studies to conduct a separate meta-analysis for *work overload* (i.e., a specific type of job demand relating to a heavy work routine or time urgency). Given that we performed a separate meta-analysis of work overload, we did not include this correlate within the broader construct of job demands. *Job resources* broadly refer to those physical, social, or organizational aspects of the job that assist in achieving work goals and encourage growth and development. Finally, *coworker support* is a specific type of resource referring to work-related assistance that employees receive from their colleagues (this correlate was not included in the broader job resources construct).

*Outcome correlates.* There were a sufficient number of studies to code three separate outcome correlates of burnout and engagement. *Health complaints* include individuals' physical (e.g., cardiovascular ailments, dizziness) and mental (e.g., anxiety, sleeplessness, and tension) complaints related to body and mind. *Job satisfaction* is the overall global feeling that results from the appraisal of one's job experiences. *Organizational commitment* refers to the extent to which individuals are emotionally attached to and involved in an organization.

### *Meta-Analytic Procedures and Corrections*

In conducting our meta-analysis, we used a varying-coefficient meta-analytic procedure recommended by Bonett (2010). This procedure has excellent small-sample performance characteristics and does not incorporate assumptions inherent in fixed effects analyses (i.e., study results vary only as the result of random sampling error and known covariates) or random effects analyses (i.e., study results vary as the result of random sampling error and both known and unidentifiable covariates). Furthermore, the point estimates and confidence intervals generated by the varying-coefficient meta-analytic procedure have consistently outperformed fixed and random effects methods in simulation studies (Bonett, 2008). All point estimates and confidence intervals reported in the present analysis were obtained using Synthesizer 1.0 (Krizan, 2010). To detect potential outlier coefficients, we computed Huffcutt and Arthur's (1995) sample-adjusted meta-analytic deviance statistic; we found no basis for excluding any studies from our final pool.

We elected to use  $r$  with a Fisher  $z$  transform as our effect size metric because of the optimal weighting that it provides (Geyskens, Krishnan, Steenkamp, & Cunha, 2009). To control for artifact variance, we corrected for unreliability in the various dimensions composing burnout and engagement as well as in all antecedent and outcome correlates.

When a primary study did not report reliability estimates ( $n = 3$ ), we imputed the average reliability associated with a specific construct. Along with corrections for unreliability, we also took into account an often-overlooked methodological artifact, that is, scale coarseness (Aguinis, Pierce, & Culpepper, 2008). Scale coarseness occurs when a continuous construct is measured with a response scale that forces a range of “true” scores into a single category, resulting in a downward bias in correlation coefficients. Finally, a dichotomization correction was not needed because all the studies in the pool being meta-analyzed used continuous variables. In sum, we report four estimates for each mean (sample-size-weighted average) effect size. The first is an observed correlation ( $r_{\text{observed}}$ ). The second and third correlations are estimated correlations corrected only for unreliability ( $r_{\text{measured}}$ ) and scale coarseness ( $r_{\text{coarse}}$ ), and the fourth is an estimated true correlation corrected for both unreliability and scale coarseness ( $\hat{\rho}$ ). Each of the applied corrections deals with a “simple statistical artifact,” and, therefore, the order of corrections is immaterial. We also report the standard deviations of estimated uncorrected correlations ( $SD_{\text{observed}}$ ), which provide information regarding the degree of variation in specific relationships.

### *Regression Analyses*

To assist in addressing Research Question 1 (i.e., intercorrelations between burnout and engagement) and Research Question 3 (i.e., incremental validity), we conducted regression analyses on meta-analytically derived correlation matrices for burnout, engagement, and the outcome correlates of health complaints, job satisfaction, and organizational commitment (McDaniel, Hartman, Whetzel, & Grubb, 2007). To compute the standard errors associated with regression weights, we used the harmonic means of the total sample sizes on which each meta-analytic correlation was estimated (Viswesvaran & Ones, 1995). Because the harmonic mean gives less weight to large samples, this approach results in more conservative effect size estimates (Colquitt, Scott, & LePine, 2007).

## **Results**

### *Intercorrelations among the Dimensions of Burnout and Engagement*

We utilized three complementary analyses to examine interrelationships among the different dimensions composing burnout and engagement (i.e., Research Question 1). As shown in Table 2, we first examined dimension-level correlations. Results indicate that all of the estimated true correlations are moderate to strong in magnitude and associated 95% confidence intervals exclude zero, indicating statistical significance. The average true correlation between the burnout and engagement dimensions is  $-.55$ , with inefficacy being the burnout dimension most strongly correlated with all three engagement dimensions (mean  $\hat{\rho} = -.79$ ).

To further determine the degree of commonality between the various burnout and engagement dimensions, we next used meta-analytic matrices of the estimated true correlations as input into a set of regression analyses. Regressing the engagement-absorption dimension on

**Table 2**  
**Meta-Analysis of the Relations between the Burnout and Engagement Dimensions**

Burnout Dimension	Engagement Dimension	<i>k</i>	<i>N</i>	<i>r</i> <sub>obser</sub>	<i>SD</i> <sub>obser</sub>	<i>r</i> <sub>meas</sub>	<i>r</i> <sub>coarse</sub>	$\hat{\rho}$	95% CI
Cynicism	Absorption	19	14,475	-.28	.15	-.36	-.30	-.39	-.48; -.30
	Dedication	35	22,637	-.53	.14	-.65	-.57	-.69	-.74; -.64
Exhaustion	Vigor	35	22,637	-.39	.14	-.49	-.41	-.52	-.57; -.47
	Absorption	21	15,503	-.15	.13	-.19	-.16	-.21	-.27; -.15
	Dedication	36	23,351	-.28	.14	-.34	-.30	-.37	-.43; -.31
Inefficacy	Vigor	36	24,096	-.32	.12	-.40	-.34	-.43	-.49; -.37
	Absorption	21	15,271	-.50	.14	-.67	-.54	-.72	-.76; -.68
	Dedication	21	15,271	-.59	.20	-.74	-.63	-.80	-.87; -.73
	Vigor	21	15,271	-.60	.15	-.79	-.64	-.85	-.93; -.77

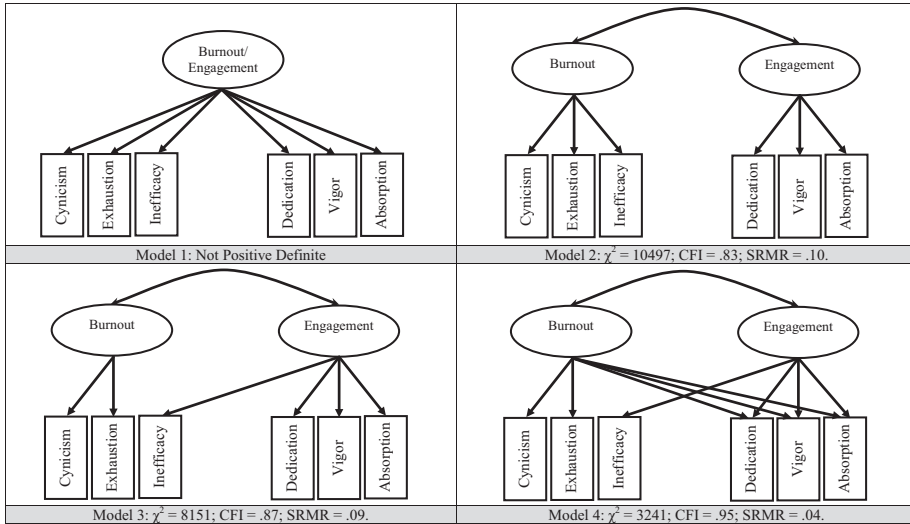
Note: *k* = number of independent samples in analysis; *N* = total sample size in *k* studies; *r*<sub>obser</sub> = mean uncorrected correlation; *SD*<sub>obser</sub> = estimated standard deviation of uncorrected correlation; *r*<sub>meas</sub> = mean correlation corrected for unreliability; *r*<sub>coarse</sub> = mean correlation corrected for scale coarseness;  $\hat{\rho}$  = estimated mean true correlation; CI = confidence interval.

all three burnout dimensions resulted in a coefficient of multiple correlation (*R*) of .73. Thus, the dimensions composing burnout accounted for 53% (i.e., .73<sup>2</sup>) of the variance in individuals' absorption scores. Results likewise yielded a multiple *R* of .86 for dedication (74% variance accounted for by the burnout dimensions) and a multiple *R* of .85 for vigor (73% variance accounted for by the burnout dimensions).

Third and finally, we used a meta-analytic correlation matrix as input for a series of confirmatory factor analyses (CFAs; see Figure 1) to gain further perspective on the degree of empirical overlap between burnout and engagement (cf. Bagozzi & Phillips, 1982). The first model we tested was a one-factor measurement model that assumes a single latent factor including all burnout and engagement dimensions. This model failed to fit the data and resulted in a "not positive definite matrix" error. Other researchers have similarly encountered a not positive definite matrix when using CFAs to assess the discriminant validity between burnout and engagement dimensions (e.g., Schaufeli & Bakker, 2004). This error is a common occurrence when some set of vectors in a measurement model is linearly dependent (Schumacker & Lomax, 1996: 26); in the present instance, it likely reflects the high intercorrelations among the burnout-engagement dimensions (see Table 2). We therefore proceeded to test Model 2, which assumes that cynicism, exhaustion, and inefficacy load on a latent burnout variable and that dedication, vigor, and absorption load on a latent engagement variable. Goodness-of-fit statistics (comparative fit index [CFI] = .83, standardized root mean square residual [SRMR] = .10) suggested the observed data do not fit this model. Our third model is based on prior studies that have allowed burnout-inefficacy to load on a latent engagement factor, but not on a latent burnout factor (e.g., Schaufeli & Bakker, 2004; Schaufeli et al., 2008). This alternative model is likewise a poor fit to the observed data (CFI = .87, SRMR = .09). Our final model is consistent with Model 3; however, all three engagement dimensions were permitted to cross-load on the latent burnout factor. Hence, Model 4 assumes a strong degree of overlap among the burnout and engagement dimensions. This final model achieved a satisfactory fit to the observed data (CFI = .95, SRMR = .04) and provided a significantly better fit compared to Model 3 ( $\Delta\chi^2 = 4,910.5$ ,  $\Delta df = 3$ ,  $p < .01$ ).



**Figure 1**  
**Measurement Model Results (CFAs) between the**  
**Dimensions of Burnout and Engagement**



Note: CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual.  $N = 16,162$ . The input matrix is meta-analytically derived; this can impact standard errors associated with significance tests of the factor loadings, but has no effect on the fit statistics reported.

Taken together, these results demonstrate that (a) dimensions composing burnout and engagement are relatively highly correlated, (b) dimensions of engagement share considerable variance with the dimensions of burnout, and (c) a CFA model allowing for substantial cross-loadings between burnout and engagement is a better fit than alternative models that do not allow for cross-loadings. Thus, even though the underlying dimensions of burnout and engagement are not perfectly (negatively) correlated, their observed relations with each other are substantial. As such, the first empirical requirement for establishing empirical (non) redundancy is inconclusive. Further analyses are required to categorically determine whether the empirical overlap among the dimensions that compose burnout and engagement is so strong as to suggest that these constructs lack discriminant validity and are, thus, redundant.

### *Burnout, Engagement, and the Nomological Network*

We conducted two complementary analyses to examine whether the dimensions that compose burnout and engagement share a common nomological network (i.e., mirrored vs.

**Table 3**  
**Meta-Analysis of the Relations among Burnout, Engagement,**  
**and Antecedent Correlates**

Correlate	Construct	Dimension	<i>k</i>	<i>N</i>	<i>r</i> <sub>obs</sub>	<i>SD</i> <sub>obs</sub>	<i>r</i> <sub>meas</sub>	<i>r</i> <sub>coarse</sub>	$\hat{\rho}$	95% CI
Job demands	Burnout	Cynicism	7	8,652	.13	.16	.17	.14	.18	.09; .28
		Exhaustion	10	10,434	.31	.15	.38	.33	.42	.34; .50
		Inefficacy	5	8,260	.05	.18	.06	.05	.07	-.04; .18
	Engagement	Dedication	7	8,652	.05	.12	.06	.05	.06	-.01; .13
		Vigor	10	10,434	.04	.19	.05	.04	.05	-.04; .14
Work overload	Burnout	Cynicism	9	6,486	.15	.07	.19	.17	.21	.12; .30
		Exhaustion	12	8,964	.30	.04	.36	.33	.40	.30; .51
		Inefficacy	3	2,513	.17	.07	.22	.19	.23	-.08; .54
	Engagement	Dedication	9	6,486	.01	.12	.01	.01	.01	-.12; .14
		Vigor	12	8,964	-.01	.17	-.01	-.01	-.01	-.14; .12
Job resources	Burnout	Cynicism	11	9,016	-.25	.09	-.31	-.27	-.32	-.39; -.26
		Exhaustion	12	9,730	-.19	.04	-.22	-.20	-.23	-.26; -.21
		Inefficacy	6	6,474	-.18	.18	-.22	-.19	-.23	-.42; -.04
	Engagement	Dedication	11	9,016	.24	.05	.30	.26	.31	.27; .36
		Vigor	12	9,730	.28	.11	.33	.30	.36	.27; .44
Coworker support	Burnout	Cynicism	9	7,074	-.20	.04	-.26	-.22	-.28	-.43; -.14
		Exhaustion	9	7,074	-.23	.04	-.28	-.25	-.30	-.34; -.26
		Inefficacy	3	4,514	-.29	.03	-.36	-.31	-.40	-.49; -.32
	Engagement	Dedication	9	7,074	.29	.04	.35	.31	.37	.34; .41
		Vigor	9	7,074	.26	.04	.32	.28	.34	.29; .39
		Absorption	3	4,514	.13	.00	.17	.14	.18	.09; .28

Note: See note to Table 2.

distinct correlates; Research Question 2). First, we computed bivariate correlations between the burnout and engagement dimensions and study correlates. Then, we conducted a test of the *overall patterns* of relationships between the component burnout-engagement dimensions and these correlates. This set of analyses is important because, as Schmidt et al. (2010) explain, when two constructs correlate highly (but not perfectly), to be considered empirically independent the two should exhibit a sufficiently different pattern of intercorrelations with other variables (i.e., differing nomological nets).

Tables 3 and 4 present results for the bivariate correlations. With respect to antecedent correlates (see Table 3), results indicate small to moderate relations with the burnout dimensions for job demands (mean  $\hat{\rho}$  = .22), work overload (mean  $\hat{\rho}$  = .28), job resources (mean  $\hat{\rho}$  = -.26), and coworker support (mean  $\hat{\rho}$  = -.33). All but 2 (of the 12) associated confidence intervals exclude zero. Results for the engagement dimensions also indicate small to moderate relations with respect to the antecedent correlates. Estimated true correlations

**Table 4**  
**Meta-Analysis of the Relations between Burnout, Engagement,**  
**and Outcome Correlates**

Correlate	Construct	Dimension	<i>k</i>	<i>N</i>	<i>r</i> <sub>obs</sub>	<i>SD</i> <sub>obs</sub>	<i>r</i> <sub>meas</sub>	<i>r</i> <sub>coarse</sub>	$\hat{\rho}$	95% CI
Health complaints	Burnout	Cynicism	5	5,004	.19	.11	.24	.21	.26	.10; .42
		Exhaustion	5	5,004	.29	.13	.36	.32	.39	.24; .54
		Inefficacy	4	3,827	.22	.13	.29	.23	.32	.14; .50
	Engagement	Dedication	5	5,004	-.21	.07	-.26	-.23	-.27	-.39; -.16
		Vigor	5	5,004	-.17	.11	-.21	-.18	-.23	-.35; -.12
Job satisfaction	Burnout	Absorption	4	3,827	-.12	.08	-.16	-.13	-.17	-.25; -.09
		Cynicism	4	5,858	-.45	.08	-.54	-.49	-.58	-.82; -.35
		Exhaustion	4	5,858	-.29	.08	-.34	-.32	-.37	-.57; -.18
	Engagement	Inefficacy	4	5,858	-.33	.06	-.40	-.36	-.44	-.75; -.14
		Dedication	4	5,858	.47	.15	.54	.50	.58	.29; .88
		Vigor	4	5,858	.37	.18	.44	.39	.47	.31; .63
		Absorption	4	5,858	.32	.16	.39	.34	.41	.27; .55
Organizational commitment	Burnout	Cynicism	8	5,828	-.46	.12	-.57	-.50	-.62	-.68; -.56
		Exhaustion	7	5,174	-.27	.09	-.33	-.29	-.36	-.42; -.31
		Inefficacy	3	1,482	-.39	.08	-.50	-.43	-.54	-.67; -.41
	Engagement	Dedication	8	5,828	.51	.09	.62	.54	.66	.60; .72
		Vigor	7	5,174	.44	.07	.56	.47	.59	.52; .66
		Absorption	3	1,482	.40	.05	.50	.42	.53	.37; .70

Note: See note to Table 2.

are not significantly different from zero for job demands (with the exception of absorption; mean  $\hat{\rho} = .08$ ) and work overload (mean  $\hat{\rho} = .04$ ); however, correlations with job resources (mean  $\hat{\rho} = .32$ ) and coworker support (mean  $\hat{\rho} = .30$ ) are statistically significant and similar in magnitude to the respective correlations observed for burnout (albeit in the opposite direction). With respect to outcome correlates (Table 4), health complaints (mean  $\hat{\rho} = .32$ ), job satisfaction (mean  $\hat{\rho} = -.46$ ), and organizational commitment (mean  $\hat{\rho} = -.51$ ) all have moderate to strong negative relationships with the dimensions of burnout, and all confidence intervals exclude zero. A similar pattern of significant correlations (again in the opposite direction) with the engagement dimensions is observed across the same three correlates, namely health complaints (mean  $\hat{\rho} = -.22$ ), job satisfaction (mean  $\hat{\rho} = .49$ ), and organizational commitment (mean  $\hat{\rho} = .59$ ). Taken together, these results suggest a similar pattern of correlations between dimensions composing burnout-engagement and study correlates, especially given the overlapping confidence intervals reported in Tables 3 and 4.

To corroborate this conclusion, we followed a procedure described by Hofmann and Jones (2005: 514) to directly compare the *overall patterns* of true correlation depicted in Tables 3 and 4. This procedure (summarized in Table 5) is not concerned with the magnitude of specific correlations, but rather summarizes intercorrelation patterns *across* variables.

**Table 5**  
**Vector Correlations between Burnout and Engagement**  
**Dimensions and All Study Correlates**

Engagement Dimensions	Burnout Dimensions		
	Cynicism	Exhaustion	Inefficacy
Absorption	-.89	-.79	-.78
Dedication	-.96	-.91	-.95
Vigor	-.97	-.93	-.96

*Note:* All  $ps < .001$ . Values are vector correlations based on the correlations of a specific pair of burnout-engagement dimensions with all seven study correlates (cf. Hofmann & Jones, 2005: 514).

Specifically, we computed a series of correlation coefficients between two vectors that summarized the true correlations observed between each burnout dimension and the seven study correlates (Vector 1) and each engagement dimension and the seven study correlates (Vector 2). Thus, each observation in both vectors represents a bivariate relationship. For example, the first vector correlation ( $v_r$ ) in Table 5 summarizes the pattern of intercorrelation between all seven correlates and both burnout-cynicism and engagement-absorption. In this instance, Vector 1 reflects the true correlations between burnout-cynicism and job demands, work overload, job resources, and so on (i.e., 7 total rows of data; 4 antecedent correlates + 3 outcome correlates). Vector 2 reflects the true correlations between engagement-absorption and these same seven correlates (input in the same order). We then calculated a correlation coefficient across the two summary vectors ( $r_{\text{vector1, vector2}}$ ). Essentially, this procedure summarizes the extent of similarity for the overall pattern of relationships among the burnout-engagement dimensions and the seven study correlates. We repeated this procedure for each of the nine possible pairings among the different component dimensions composing burnout and engagement.

As shown in Table 5, the dimensions composing burnout and engagement have similar patterns of association with the available correlates. Overall, the average vector correlation is  $-.90$ , ranging from  $-.78$  to as high as  $-.97$ . Moreover, recall that engagement researchers (e.g., Schaufeli & Bakker, 2004) have consistently cast dedication and vigor as direct opposites of cynicism and exhaustion, respectively. Our results indicate that engagement-dedication and burnout-cynicism exhibit a nearly identical pattern of association with the available correlates (mean  $v_r = -.96$ ); the same holds true for the pattern of association with respect to the correlates and engagement-vigor and burnout-exhaustion (mean  $v_r = -.93$ ). Finally, although absorption is believed to be a distinct aspect of engagement (Schaufeli & Bakker, 2003), its average vector correlation across the three dimensions of burnout is substantive (mean  $v_r = -.82$ ). Taken together, the present results suggest that the various dimensions of burnout and engagement have a similar (at times nearly identical) pattern of association with the available correlates and, thus, provide support for the view that rather than being independent constructs that differentially relate to a common set of correlates, the dimensions of burnout and engagement share a nomological net.

**Table 6**  
**Regression Results Testing Incremental Validity Effects**  
**and Relative Weights Analysis**

Variable	Health Complaints ( <i>n</i> = 456)			Job Satisfaction ( <i>n</i> = 858)			Org. Commitment ( <i>n</i> = 597)		
	Step 1 ( $\beta$ )			Step 1 ( $\beta$ )			Step 1 ( $\beta$ )		
<b>Burnout</b>									
Cynicism	—			—			—		
Exhaustion	—			—			—		
Inefficacy	—			—			—		
<b>Engagement</b>									
Dedication	-.20**			.42**			.38**		
Vigor	-.09			.13**			.17**		
Absorption	.08			-.05			.03		
<i>R</i> <sup>2</sup>	.05**			.23**			.28**		
Variable	Health Complaints ( <i>n</i> = 456)			Job Satisfaction ( <i>n</i> = 858)			Org. Commitment ( <i>n</i> = 597)		
	Step 1 ( $\beta$ )	Step 2 ( $\beta$ )	RW (%)	Step 1 ( $\beta$ )	Step 2 ( $\beta$ )	RW (%)	Step 1 ( $\beta$ )	Step 2 ( $\beta$ )	RW (%)
<b>Burnout</b>									
Cynicism	-.01	-.04	10.4	-.36**	-.26**	30.3	-.37**	-.27**	29.7
Exhaustion	.25**	.26**	42.5	-.04	-.03	9.8	.01	.02	7.2
Inefficacy	.15**	.12*	18.7	-.18**	-.01	10.0	-.25**	-.05	11.8
<b>Engagement</b>									
Dedication		-.11	13.3		.29**	25.2		.24**	20.8
Vigor		.04	8.8		.04	12.7		.08	16.4
Absorption		.02	6.3		.02	12.0		.09	14.0
<i>R</i> <sup>2</sup>	.10	.11		.23	.29		.26	.33	
$\Delta R^2$		.01			.06**			.06**	

Note: Sample sizes (*n*) are based on harmonic mean. Standardized regression ( $\beta$ ) coefficients are shown. Org. = organizational. RW = relative weight as a percentage of *R*<sup>2</sup>.

\**p* < .05. \*\**p* < .01.

### *Incremental Validity and Relative Weights of Burnout and Engagement Dimensions*

Although the empirical evidence presented above is consistent with the conclusion that burnout and engagement are empirically redundant, we proceeded to investigate whether the dimensions of engagement could nevertheless account for incremental variance in the available outcome correlates (viz., health complaints, job satisfaction, and organizational commitment) beyond burnout (i.e., Research Question 3). As shown in the top half of Table 6, the engagement dimensions, when included in meta-regressions that exclude burnout, account for significant variance across all outcomes (ranging from *R*<sup>2</sup> = .05 to *R*<sup>2</sup> = .28, *ps* < .01). Dedication is the only engagement dimension that is a significant predictor of all three outcomes, and vigor has a positive and significant relationship with job satisfaction

and organizational commitment (but not with health complaints). The regression coefficients for engagement-absorption stand out. Absorption is not related to the outcome correlates in the regression analyses; however, it is significantly correlated to all three outcomes in the bivariate analyses (see Table 4). As will be discussed, we suspect that multicollinearity among the engagement dimensions may have adversely affected the reported ordinary least squares regression models.

The bottom half of Table 6 shows meta-regression results that include both burnout and engagement. As shown, adding the engagement dimensions in the regression equations yielded a  $\Delta R^2$  of .06 for job satisfaction ( $p < .01$ ) and a  $\Delta R^2$  of .06 for organizational commitment ( $p < .01$ ). This suggests that the engagement dimensions (as a block) account for a small to moderate amount of unique variance in these two outcomes beyond burnout. An inspection of regression coefficients reveals that the only engagement dimension that is significantly related to these outcomes (after controlling for burnout) is dedication. Although engagement-vigor is significant for both job satisfaction and organizational commitment when not controlling for burnout, it is an impotent predictor when the burnout dimensions are considered. Furthermore, no engagement dimension is related to health problems, yielding a nonsignificant incremental  $R^2$  of .01.

In a final step, we probed the relative strength of *each* burnout and engagement dimension in the meta-analytic regression models. We applied relative weights (denoted as RW) analysis (Tonidandel & LeBreton, 2011) to accomplish this purpose.<sup>5</sup> As shown in Table 6, the burnout dimensions outperform the engagement dimensions in predicting health complaints, with emotional exhaustion (RW = 42.5%) and inefficacy (RW = 18.7%) emerging as the two most important predictors. Results for job satisfaction indicate that across all possible combinations of predictors, burnout-cynicism (RW = 30.3%) and engagement-dedication (RW = 25.2%) outperform the various other dimensions. A similar result is obtained for organizational commitment; both cynicism (RW = 29.7%) and dedication (RW = 20.8%) outperform all remaining predictors. As will be discussed below, however, caution seems warranted when interpreting the findings regarding engagement-dedication and job satisfaction and organizational commitment (cf. Newman & Harrison, 2008).

### *Publication Bias*

To ensure that our study pool was a fair representation of the general population of burnout-engagement studies, we explored the possibility of publication bias. We focused on the associations between the constituent dimensions composing burnout and engagement, using the “trim and fill” method of publication bias detection (Duval & Tweedie, 2000). This method visually captures distortions resulting from selective reporting as evidenced by an asymmetric funnel graph. A funnel graph is a scatter plot of each study’s effect size (Fisher  $z$ ) against some measure of sampling error, such as precision (used here) or overall sample size. In cases of publication bias, a funnel graph will have a skewed and asymmetrical shape. Conversely, in the absence of publication bias, a funnel graph will resemble a symmetrical inverted funnel. The trim and fill method identifies “asymmetric” studies, imputes their missing counterparts, and after adding them to a study’s database (thereby

removing the putative bias), reestimates effect sizes. It is possible using this method to detect whether, and to what degree, publication bias may be affecting meta-analytic results (Duval & Tweedie, 2000).

We used Comprehensive Meta-Analysis 2.0 (Borenstein, Hedges, Higgins, & Rothstein, 2005) to conduct the publication bias tests. Results suggested no publication bias between burnout-emotional exhaustion and the three engagement dimensions. Publication bias was present between burnout-cynicism and burnout-vigor; the analyses needed to impute 13 studies to create a symmetric distribution between these variables and indicated that our estimated correlation is attenuated by roughly 14%. Publication bias was also observed between burnout-cynicism and engagement-absorption with 9 studies imputed (24% attenuation). Finally, 1 study needed to be imputed for burnout-inefficacy and engagement-absorption (1% attenuation). Although our previous results indicate that several burnout dimensions are highly correlated with the dimensions of engagement, it would seem that, based on our publication bias analyses, a number of the true population correlations may be even stronger in magnitude than reported. All funnel graphs are available from the corresponding author.

## Discussion

Interest in employee engagement continues to surge despite doubts on whether engagement adds conceptual or phenomenological clarity beyond established constructs—job burnout, in particular (Maslach et al., 2008). The reported analyses represent an attempt to address this ambiguity. To this end, our findings challenge the notion that engagement (as captured by the UWES) is an independent construct whose accurate assessment requires a stand-alone measure.

### *Engagement and the Problem of Construct Proliferation*

*Theoretical considerations.* For two constructs to be considered independent, researchers must, in a first step, conceptually differentiate the constructs in question. Our evaluation yielded evidence of conceptual alignment and overlapping item content between the dimensions composing burnout and engagement. Thus, it appears that conceptual concerns about engagement's distinctiveness are legitimate. That being said, we acknowledge that construct redundancy is "an empirical research question and should be answered based upon data" (Le et al., 2010: 114). By extension, it does not seem viable to resolve existing confusion on purely conceptual grounds.

*Discriminant validity.* From an empirical standpoint, we found that various dimensions of burnout and engagement are strongly related. For example, high correlations ( $\rho$  ranging from  $-.85$  to  $-.79$ ) suggest that burnout-inefficacy is almost interchangeable with all three constituent dimensions of engagement. Correlations of such magnitude are typically accepted as indicative of *convergent* validity (Kline, 2011: 116). Even if scholars can articulate theoretical distinctions between the dimensions of burnout and engagement, we suspect—based on our findings—that this distinctiveness is of little practical import. Correlations as

high as  $-.85$  intimate that respondents, as a part of their day-to-day work routines, do not—and probably cannot—make the same types of logical distinctions made by engagement and burnout researchers (Harter & Schmidt, 2008). Taking this a step further, our analyses revealed that the dimensions underlying burnout and engagement yielded highly similar (albeit opposite) patterns of correlations with antecedent and outcome correlates (mean  $v_r = -.90$ ). Given that the true correlations between burnout and engagement are high and the two constructs cannot be differentiated based on their nomological nets, the “interpretation most consistent with the scientific principle of parsimony is that the constructs are redundant” (Schmidt et al., 2010: 32). On this basis, doubts about the functional distinctiveness of the constituent dimensions composing burnout and engagement cannot be dismissed as pure speculation.

One important methodological consideration in arriving at this conclusion is the sensitivity of Hofmann and Jones’s (2005) vector correlation procedure for establishing construct redundancy. Two points merit attention in this regard. First, as indicated earlier, the 95% confidence intervals associated with the effect sizes for burnout (reported in Tables 3 and 4) consistently overlapped with the same intervals for engagement’s dimensions. This provides additional evidence that burnout and engagement exhibit a comparable pattern of association with the available study correlates. Second, we probed the sensitivity of Hofmann and Jones’s procedure by using previously published studies to estimate a series of vector correlations. As one example, in a recent meta-analysis Joseph and Newman (2010) concluded that ability-based and mixed measures of emotional intelligence (EI) do not manifest the same construct. Accordingly, we found that despite being moderately related ( $r = .23$ ), the overall pattern of association between different EI measures and various study correlates was only  $v_r = -.14$ . In a second example, based on a comparison of structural equation models, Mathieu and Farr (1991) concluded that measures of organizational commitment, job involvement, and job satisfaction are empirically distinct. Despite a moderate degree of association between organizational commitment and job involvement ( $r = .45$ ), we found the overall pattern of association between these variables and available correlates was moderate in magnitude ( $v_r = .51$ ). Accordingly, their respective nomological nets do not represent a “lawful network,” and, thus, the measures employed do not appear to be empirically redundant. In contrast, we found a nearly identical pattern of association between organizational commitment and job satisfaction and available correlates ( $v_r = .94$ ), which is in line with the strong correlation ( $r = .70$ ) between the measures of these two constructs—indicating they share a nomological net. On the basis of these results, we find no reason to doubt the sensitivity of the Hofmann and Jones (2005) vector correlation procedure.

*Incremental validity.* Beyond meta-analytic evidence that raises doubts about engagement’s discriminant validity, it is worth noting that controlling for the burnout dimensions substantially reduced the effect sizes associated with the dimensions underlying engagement (seven of nine possible relationships no longer reached statistical significance in the reported meta-regressions); the variance accounted for by engagement’s dimensions declined by 80% for health complaints, 74% for job satisfaction, and 79% for organizational commitment. Nevertheless, engagement-dedication did account for unique variance in job satisfaction and



organizational commitment. Given dedication's empirical overlap with burnout-cynicism ( $\hat{\rho} = -.69$ ) and near-identical pattern of correlations ( $v_r = -.96$ ) with study correlates, this finding is unexpected.

Thus, a reasonable question is how to interpret this result. One possible interpretation is that the items composing burnout-cynicism tap portions of the latent construct space that are not covered by the items intended to gauge engagement-dedication and vice versa (cf. Wong, Law, & Huang, 2008). In reviewing the relevant literature, however, we suspect that the most parsimonious interpretation is what Newman and Harrison (2008: 32) identified as a "relabeling of reshuffled items." When mapping item overlap between the UWES and various established measures, Newman and Harrison found that four of the five items used to assess engagement-dedication are paralleled by near-identical items from conventional measures of job affect or satisfaction and organizational commitment. Methodologically speaking, it is quite plausible that item overlap is creating artificially high associations between these variables (see Hunsley & Meyer, 2003). Given this possibility, it seems reasonable to conclude that the incremental validity results we report for engagement-dedication may be artifactual, and that evidence supporting engagement-dedication's predictive utility should be cautiously interpreted.

### *Implications for Theory and Practice*

Our overall findings suggest employee engagement, as gauged by the UWES, overlaps to such an extent with job burnout, as gauged by the MBI, that it effectively taps an existing construct under a new label. This lack of independence, instantiated using the most highly regarded inventories of engagement and burnout, creates a serious risk of misalignment between theory and measurement. A potential hazard is that using different terms for a similar phenomenon produces confusion within a research community, leading to miscommunication and misunderstandings that can impede theory development. This concern is compounded in that the advancement of existing theory relies on future researchers' ability to build on previous work. As Suddaby (2010: 352-353) has explained, when researchers "cannot agree on or communicate the basic elements of a phenomenon, the accumulation of knowledge cannot occur . . . and organizational knowledge becomes increasingly fragmented."

The empirical redundancies identified also carry implications for practicing managers. Much of the knowledge transfer between academics and practitioners occurs at the ideational level, as theoretical explanations provide frames of reference for understanding what may otherwise appear to be unstructured problems (Astley & Zammuto, 1992). Thus, experience suggests that unless researchers can clearly define and measure engagement as a unique phenomenon that is conceptually and empirically independent from existing constructs, their work will face continued criticism, scientific progress may lose pace, and knowledge transfer between scientific and practitioner domains will be hampered.

### *Taking Stock: Where Do We Go from Here?*

*Common method variance.* In each and every one of the primary studies included in the reported meta-analysis, burnout, engagement, and the available correlates were assessed

using the same method and rater and at the same point in time. This raises a concern that our findings may be inflated and, by extension, the problem of construct redundancy exaggerated. Given a dearth of studies incorporating different measurement sources, we are unable to directly address this issue (i.e., comparing correlations based on same-source ratings versus different-source ratings). On the basis of an extensive meta-analysis, Crampton and Wagner (1994) have concluded, however, that inflation of observed effects in same-source studies is more an exception than a rule in micro-organizational research. Spector (2006: 224) similarly holds there is little credible evidence that same-source studies are a “universal inflator of correlations.” Still, to address concerns related to common-method variance, future studies on burnout-engagement would benefit from more robust research designs incorporating different data sources and introducing a time lag between the measurement of predictor and criterion variables.

As one anonymous reviewer suggested, studies using repeated-measures designs may be particularly helpful as they would allow researchers to empirically explore how relationships between burnout, engagement, and their correlates evolve over time (see, e.g., Pitariu & Ployhart, 2010). Future research may find, for example, that the effects of job demands and resources on the component dimensions of burnout and engagement are subject to temporal fluctuations. Alternatively, an examination of burnout-engagement and their effects on job attitudes and performance, both within and between individuals, could shed new light on our findings. For these reasons, longitudinal research may be particularly useful in teasing out differential relationships where we concluded there are none.

*Adequacy of focal correlates.* Empirical research on the antecedents of burnout and engagement has almost exclusively relied on the JD-R model (Bakker & Demerouti, 2007), wherein physical, social, and organizational aspects of the job are lumped into one of two all-encompassing categories (viz., demands and resources). Accordingly, researchers have rarely accounted for the possibility that there may be important theoretical distinctions among different forms of demands and resources. Crawford et al. (2010), for example, have found job demands that are appraised as challenges foster engagement, whereas those perceived to be obstacles tend to hurt engagement. Although we attempted to re-create meta-analytic matrices that distinguished job demands into challenge and hindrance demands, we were unable to test these differentiated relationships because a majority of studies meeting our inclusion criteria used broad measures of demands that collapse across these categories. There is a need for studies that more fully consider this differentiated JD-R model. Perhaps by using a more nuanced system of relationships, burnout-engagement researchers may be able to delve deeper into the empirical redundancies observed here.

Furthermore, because the referent literature has focused on job demands and resources in predicting burnout and engagement, it is possible that other relevant antecedents have been neglected. Negative affectivity, for example, is believed to strongly relate to psychological distress and dysfunction, including burnout (Watson, Clark, & Tellegen, 1988). Positive affectivity, on the other hand, has been proposed as a causal indicator of engagement (Macey & Schneider, 2008). Thus, it may be that these (and other) personality traits differentially predict burnout and engagement components. Future analysis of this possibility is needed as only one study included in the present meta-analysis clearly indicated that it captured personality characteristics.

Finally, we identified fewer studies examining outcome than antecedent correlates. This leads to the question of whether the outcomes examined (*viz.*, health complaints, job satisfaction, and organizational commitment) are those that best discriminate between burnout and engagement. An indication that our results are representative is that they mirror a previous meta-analysis that summarized relationships between two engagement dimensions (dedication and vigor) and health complaints and organizational commitment (Christian & Slaughter, 2007). Furthermore, the present study goes beyond this previous meta-analysis by summarizing relationships among engagement-absorption and outcome correlates; also, ours is the first to clarify associations among all three engagement dimensions and job satisfaction. Nevertheless, there are other outcome correlates that remain understudied. For example, no study meeting our inclusion criteria examined burnout-engagement and job performance—despite entreaties to focus on this issue (Griffin, Parker, & Neal, 2008). We encourage future research to expand the outcomes examined and, as findings accumulate, future meta-analyses to reexamine the pattern of relationships among burnout-engagement and this broader set of outcome correlates.

*Multicollinearity among predictors.* Concern has been raised regarding high correlations among the dimensions of engagement (see, e.g., Christian & Slaughter, 2007; Maslach et al., 2008). In a separate analysis available from the corresponding author, we also found that all three engagement dimensions were highly correlated (mean  $\hat{\rho} = .89$ ), with the strongest correlation between vigor and absorption ( $\hat{\rho} = .91$ , 95% CI = .84 to .98). As these results suggest, multicollinearity across engagement dimensions may be a concern in interpreting study results. Although multicollinearity does not reduce the reliability of a regression equation as a whole, it does affect calculations regarding individual predictors. In this respect, statistically significant (bivariate) relationships between engagement-absorption and job satisfaction ( $\hat{\rho} = .41$ ), organizational commitment ( $\hat{\rho} = .53$ ), and health complaints ( $\hat{\rho} = -.17$ ) became nonsignificant when simultaneously entered into a multivariate regression equation with the other engagement dimensions (see the top half of Table 6). This empirical overlap (both between burnout and engagement and among engagement's dimensions) and resulting potential for confounding because of multicollinearity pose a challenge for researchers seeking to test theory and tease apart valid results about any one individual dimension.

*Construct homogeneity.* In the literature reviewed here, researchers distinguished between the burnout-engagement dimensions as bipolar versus independent constructs. It might be concluded from our results that it is worthwhile to utilize a bipolar conceptualization for the dimensions underlying burnout-engagement. Conceptually, unless the specific variance of the lower level dimensions is similar, it should be noted that bipolar measures can introduce unintended theoretical imprecision. For example, use of a composite score that reflects both cynicism and dedication might obscure the predictive roles of the different facets underlying this bipolar measure. Furthermore, the identical composite score could reflect different combinations of cynicism and dedication for different employees within the same sample. As these ideas suggest, we believe the use of bipolar measures as predictors or criteria may be particularly problematic in burnout-engagement research.

Others (e.g., Harrison, Newman, & Roth, 2006) have argued that it can be useful to take collections of items from multiple overlapping constructs and test for the presence of a

latent, general factor that may serve as a composite variable. As Newman and Harrison (2008: 32) have explained, “[E]ven without new content, it is still possible to specify a novel construct as a general, higher order factor. Engagement may be such a construct.” Theoretically, this latent variable must be recast to capture individuals’ psychological maladjustment at work as well as meaningful engagement. In this respect, the second-order factor would capture the covariation among the six dimensions underlying burnout and engagement. Although this may be a viable alternative, if utilized, researchers should not attempt to interpret results relating to burnout and engagement as distinct concepts. Given that burnout and engagement would, then, represent imperfect indicators of the same, second-order construct, interpreting differential relationships among burnout and engagement’s dimensions would be problematic because one must assume that any observed differences are the result of sampling and measurement error (LePine et al., 2002).

For burnout-engagement research to advance, we thus believe theoretical clarity should be a guiding consideration (Strauss & Smith, 2009). In this connection, there is little guidance as to when a construct measure is homogenous or elemental enough. As noted by Strauss and Smith (2009: 15), “[T]here is a risk of continually parsing constructs until one is left with a content domain specific to a single item, thus losing full coverage of a target construct and attenuating predictive power.” Recognizing the fine lines among construct breadth, bandwidth, and fidelity (Cronbach, 1990), we echo the sentiment that “when there is good theoretical or empirical reason to believe that an item set actually consists of two separately definable constructs with different psychological meaning, . . . measuring the two separately is likely to improve both understanding and empirical prediction” (Strauss & Smith, 2009: 15).

As these ideas suggest, perhaps it is time for Schaufeli and colleagues’ independent states perspective to be reformulated. Although rarely mentioned by burnout-engagement researchers, Kahn (1990) has described engagement as the harnessing of an employee’s full self in terms of physical, cognitive, and emotional energies to task performance. This description highlights not only the connection between engagement and work role performance (something not explicitly considered by burnout theory) but also the notion of employees’ personal agency or agentic self. Considered in this way, Kahn’s more encompassing description of engagement may offer the theoretical basis necessary to reconceptualize engagement as a construct that does not overlap with burnout.

## Summary and Conclusion

Our findings provide an updated and more complete understanding of the dimensions underlying burnout and engagement and their measurement. They demonstrate that construct redundancy is a major problem in understanding and advancing burnout-engagement research. The most frequently used inventory of employee engagement (*viz.*, UWES) is shown to be empirically redundant with a long-established, widely employed measure of job burnout (*viz.*, MBI). Accordingly, researchers interested in advancing contemporary thinking on engagement should avoid treating the UWES as if it were tapping a distinct, independent phenomenon.

In preparing for future studies on engagement, we hope that researchers will consider not only our findings but also any relevant research on burnout. In doing so, they may avoid the

unnecessary expenditure of valuable resources. Moreover, if burnout-engagement researchers are to work toward a cumulative science, it is time to conceptually define and empirically measure the engagement construct in a more precise manner (for a recent effort in this regard, see Rich, LePine, & Crawford, 2010). This is crucial if future research is to avoid further conceptual confusion and counter criticisms that engagement is but “a new blend of old wines” (Newman & Harrison, 2008: 32).

## Notes

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3. As of March 2008, a Google Scholar search for *work engagement* yielded 785 articles and a PsycINFO search yielded 20 publications with *work engagement* in the title (Schaufeli & Bakker, 2010). As of March 2010, the same Google Scholar search revealed 5,500 articles and an identical search in PsycINFO revealed 102 publications.

4. It has become an increasingly common practice to exclude burnout-inefficacy and engagement-absorption from empirical studies. Both González-Romá, Schaufeli, Bakker, and Lloret (2006) and Demerouti, Mostert, and Bakker (2010) elected to exclude these two remaining dimensions.

5. A predictor variable's relative weight is defined as the contribution it makes to  $R^2$ , considering both its unique contribution and its contribution in the presence of other predictor variables in all possible combinations (LeBreton, Hargis, Griepentrog, Oswald, & Ployhart, 2007: 477). In comparison to traditional techniques (e.g., comparing ordinary least squares regression weights), which can provide misleading information when predictors are correlated (as in the present instance), relative weights deliver meaningful and interpretable estimates of predictor strength even given high multicollinearity (Tonidandel & LeBreton, 2011). Another benefit of this approach is that the strength estimates provide an index of the proportionate contribution each predictor makes to total variance explained, such that the contribution of a predictor with a relative weight of .20 is twice as strong as a predictor with a weight of .10.

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