

Which Cognitive Biases can Exacerbate our Workload?

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Despite the advent of technologies that enhance productivity, the workload of many individuals, including psychologists, remains onerous, provoking burnout and similar complications. Although the circumstances that mitigate or exacerbate the effects of workload have been studied extensively, the antecedents of these demands have not been established definitively. Without this insight, managers cannot be sure of which practices are likely to contain the workload of individuals. To resolve this shortfall, we first pose the possibility that many cognitive biases, heuristics, and illusions may, at least partly, explain elevated levels of workload. Specifically, we demonstrate that 14 established biases, such as the restraint bias and IKEA effect, are likely to prolong work hours and increase the demands on individuals. For example, according to research on the restraint bias, individuals tend to inflate their capacity to inhibit their temptations and, therefore, may overestimate their ability to work extensive hours. Second, we show that all these biases can be divided into four constellations—self-enhancement, stable worldviews, need for closure, and just world—each of which tends to dissipate whenever people experience a sense of meaning in their lives. These observations, therefore, imply that attempts to foster meaning may contain the workload of workers.

■ **Keywords** cognitive biases, job demands, meaning in life, workload

Workload has become a recurring problem in many fields, including health (Oddie & Ousley, 2007). Arguably, many trends and dynamics have conspired to maintain, or even increase, the workload of many employees. For example, because of changes in financial regulations and information technology, since the 1970s, institutional investors have become increasingly capable of shifting their capital, rapidly and capriciously, across the globe (Sennett, 2006). The fortunes of companies often change unexpectedly and dramatically. The strategies, priorities, and tactics of these organizations, therefore, also shift frequently and erratically (Robinson et al., 1994). Past endeavors or pursuits are often discarded, and efficiency thus plummets, increasing the workload of individuals (Sennett, 2006).

Many strands of literature have explored the consequences of this workload as well as the resources and provisions that mitigate these consequences (e.g., Bakker & Demerouti, 2007). Fewer researchers have probed into the conditions or characteristics that increase workload. To illustrate, some evidence indicates that cognitive bi-

ases, such as the inclination of people to underestimate the time that is needed to complete tasks (Kahneman & Tversky, 1979), may increase workload (Buehler et al., 2002). Unfortunately, initiatives that are intended to overcome one bias can, instead, amplify other biases (Petty et al., 1998) or impair decisions (Dijksterhuis, 2004) — impeding attempts to manage workload.

The aim of this paper is to characterize the biases that are likely to exacerbate the workload of workers. In addition, this paper outlines the strategies and practices that could temper these biases and, therefore, contain the workload of individuals. These insights might be

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especially beneficial to organizational psychologists who, not only need to manage their own workload, but often assist clients with time management as well.

The Significance of Workload

Over the last two to three decades, workplaces have been flooded with inventions and advances that purportedly, and sometimes actually, improve productivity. For example, a flurry of apps, such as Rescue Time, a program that can block distracting websites, has been developed to diminish inefficiency (see www.rescuetime.com). Furthermore, if recent trends continue, these advances in technology are likely to increase exponentially in the future (e.g., Mollick, 2006).

Yet, despite this unparalleled progress, productivity has not escalated at the same rate as technology (Benati, 2007) — sometimes called the productivity paradox (Brynjolfsson, 1993). Specifically, the amount of work that is needed to produce some output has not diminished as rapidly as anticipated (Kruger, 2003). Indeed, in some nations, including Australia, productivity has stalled, or even declined, in some industries (for a review, see Green et al., 2014). Consequently, the expected drop in work hours has not transpired.

Indeed, at least in some quarters, work hours have escalated in Australia and in many other nations. For example, according to one report, prepared by the Australian Bureau of Statistics (2010), the average number of work hours in full time employees rose about three hours from 1978 to 2000 — but tended to decline marginally since this time, except during 2007. In America, dual earners, on average, worked 81 hours a week in 1977 but 91 hours a week in 2002 (Bond et al., 2003). This trend, although neither universal nor inexorable, belies the assumption that technology will decrease work hours and increase leisure time appreciably.

Extensive work hours can culminate in two clusters of problems, as differentiated by Netemeyer et al. (1996). First, when people work long hours, they are not granted enough time to pursue other beneficial activities, such as family responsibilities, leisure, or rest. Second, if people work longer hours, they often, but not always, expend more effort from a depleted resource, culminating in feelings of strain.

Unless accompanied by increased autonomy (Karasek, 1979), support (Bakker et al., 2005), or similar resources (Bakker & Demerouti, 2007), limited time and excessive strain increase the likelihood of burnout (Braunstein-Bercovitz, 2013). Specifically, although some research indicates that excessive strain is especially detrimental (Lambert et al., 2010), inadequate time has also been shown to provoke burnout and similar complications (e.g., Braunstein-Bercovitz, 2013). Therefore, in this paper, workload is conceptualized as the extent to which activities at work limit the availability of time and pro-

voke psychological strain. As a systematic review later in this paper shows, this definition of workload entails the key features of related measures, such as job demands, role overload, and caseload.

Excessive workload, and the concomitant burnout, disrupts a range of physiological processes, such as the production of brain-derived neurotrophic factor (Sertoza et al., 2008), contributing to various mental and physical disorders, including depression (Greenglass & Burke, 1990). To exacerbate this problem, when workload is excessive, individuals are not granted the time to access the provisions that could alleviate this burnout (Bakker & Demerouti, 2007). Furthermore, burnout tends to compromise performance (e.g., Taris & Schreurs, 2009), undermining productivity and magnifying workload; an inexorable cycle can thus ensue.

Health practitioners in general, and psychologists in particular, are not immune to these trends (e.g., Hannigan et al., 2004). For example, a review of British studies showed that between 21% and 48% of mental health workers report elevated levels of emotional exhaustion (Oddie & Ousley, 2007), one of the three key facets of burnout (Maslach & Leiter, 2008). This burnout is especially elevated in psychologists who work extended hours, dedicate significant time to administrative tasks, and need to manage difficult clients (Rupert & Morgan, 2005).

Executives and managers should thus introduce a variety of practices to manage workload. Yet, if individuals work in organizations that do not manage workload effectively, or do not work in organizations at all, they may need to consider other alternatives.

Specifically, individuals may consider two complementary approaches. First, workers may apply strategies and practices that curb the detrimental effects of workload. Indeed, a plethora of practices have been shown to diminish the extent to which workload compromises wellbeing. For example, if workers are primarily motivated to extend their expertise, rather than outperform their rivals, workload is perceived as a challenge instead of a threat and, therefore, is not as likely to magnify distress (Van Yperen & Janssen, 2002). Likewise, as Winwood et al. (2007) demonstrated, physical activity, creative hobbies, social engagement, and many other practices can diminish the degree to which workload provokes fatigue or impairs sleep.

Second, rather than temper the effects of workload, individuals can, at least in some circumstances, attempt to regulate their workload. In particular, they can avoid decisions or choices that amplify workload but do not facilitate the achievement of their broader goals. This paper is confined to the attempts of individuals to prevent an escalation in workload; other reviews can be consulted to appreciate the strategies and practices that diminish the detrimental effects of workload (e.g., Bakker et al., 2005).

Which Antecedents to Workload Should be Addressed?

Several theories, such as the dualistic model of passion (Vallerand et al., 2010) and the biophysical model of challenge and threat (Tomaka et al., 1993), imply that increases in workload can be beneficial or detrimental. To illustrate, many individuals choose to work long hours or engage in taxing or frustrating activities. Sometimes, this choice aligns to the overarching goals and values of individuals; for example, some workers may cherish the repertoire of skills they develop as they work more extensively. In these circumstances, the elevated workload actually diminishes burnout and other unfavorable states (e.g., Vallerand et al., 2010). In other occasions, this choice diverges from their broader goals and values; instead, individuals feel obliged to reach this choice. In these circumstances, the elevated workload exacerbates burnout and provokes other negative states (Vallerand et al., 2010).

Arguably, if individuals integrate all the information that is relevant to a decision proportionately, they should reach a choice that aligns to their aggregated needs. In contrast, if individuals do not integrate all this information proportionately, they are more likely to reach a choice that deviates from their aggregated needs. Beliefs that are derived from unrepresentative information — and thus deviate from some objective norm or measure — are defined as biased (for a discussion on this definition, see Krueger & Funder, 2004). Consequently, a decision or choice that increases the workload of individuals, but deviates from their goals and values, reflects a bias.

Hence, although many traits, events, and circumstances, such as job commitment, might increase the workload of individuals, research into cognitive biases might be especially fruitful. In particular, this research may uncover causes of workload that are detrimental rather than beneficial.

The Planning Fallacy

Research in psychology has uncovered biases in cognition that could exacerbate this inefficiency and increase workload. One of the most robust and relevant biases is called the planning fallacy (Kahneman & Tversky, 1979). In particular, individuals tend to underestimate the duration that is needed to complete specific tasks (for a review, see Buehler et al., 2002). To illustrate, in one study, conducted by Buehler et al. (1994), on average, students predicted they would complete their thesis in 34 days but actually needed 56 days. The discrepancy tends to be about 20% to 50% of the predicted time (Dunning, 2007).

Besides everyday projects, such as school assignments, the planning fallacy has also been observed extensively in industrial and commercial endeavors, such as the

completion of public transport services and hydroelectric dams (Flyvbjerg et al., 2002; Hall, 1980; Schnaars, 1989). Furthermore, when individuals are assigned positions of power (Weick & Guinote, 2010), timelines are determined in team settings (Buehler et al., 2005), and projects are extensive (Dunning, 2007), the planning fallacy is especially pronounced.

Because of the planning fallacy, people will often assume responsibilities they cannot actually complete within standard work hours. To fulfil these responsibilities, therefore, these individuals must either work hurriedly or complete the tasks in their personal time, increasing workload.

Other biases may also increase the workload of employees, including health professionals. For example, Stimpfel et al. (2012) showed that lengthy shifts tend to provoke job dissatisfaction in nurses. Yet, many nurses tend to choose these lengthy shifts over shorter shifts. Accordingly, the belief or assumption that lengthy shifts are beneficial diverges from their experience, representing a bias.

These considerations imply that, at least some, biases in cognition could exacerbate the workload of individuals. Attempts to mitigate these biases may contain the workload of psychologists and other employees. A more comprehensive understanding of how biases could increase workload, as well as the causes of these biases, is thus warranted. To fulfil this need, this paper summarizes our attempt to review the relationship between cognitive biases and workload.

Scope of this Review

To conduct this review, established, robust biases were extracted from previous literature. Several activities were conducted to uncover these biases.

Identification of Biases

First, we utilized PsychINFO, produced by the American Psychological Association, to uncover all journal articles or books in which *cognitive bias*, *heuristic*, *fallacy*, or *illusion* was included as a subject term. Second, if accessible, we perused these journal articles and books to identify past inventories or taxonomies of biases. We distilled only cognitive biases rather than sensory illusions. Third, we perused the abstract of these articles to uncover references to other biases, heuristics, fallacies, illusions, or effects. Fourth, we excluded biases that have been corroborated by fewer than three studies. This procedure unearthed 217 biases. Finally, to eradicate duplication, we identified biases that entail other biases. Once this activity was completed, 192 unique biases were retained.

Identification of the Recurring Features of Workload

Next, we distilled the biases that could increase workload. To achieve this goal, we again utilized PsychINFO

Table 1
Recurring Features of Objective and Subjective Workload

Objective facets of workload
Number of core tasks
Inefficiency or performance on core tasks
Number of discretionary tasks
Inefficiency or performance on discretionary tasks
Subjective facets of workload
Level of mental or physical demands on each task
Level of haste or hurry on each task
Level of effort devoted to each task
Level of frustration that each task evoked

to uncover all refereed journal articles that included the subject terms *workload*, *work overload*, *caseload*, or *job demands* as well as the term *definition*, *conceptualization*, or *operationalization*. This procedure uncovered 28 definitions or conceptualizations of workload from a diversity of sources (e.g., Morris et al., 2007).

We next extracted the recurring features of these definitions. In particular, according to past conceptualizations or operationalizations, workload can be objective or subjective (van Emmerik & Jawahar, 2006). Objective workload depends on the number of core and discretionary tasks people undertake as well as the capacity of individuals to complete these tasks efficiently. Subjective workload depends on the level of mental or physical difficulty associated with these tasks, feelings of haste or urgency, level of effort that is dedicated to these activities, and the degree to which individuals experience frustration and similar emotions (e.g., Hart, 2006). Table 1 presents these recurring features of workload.

Identification Biases that Could Affect Workload

Finally, we identified the biases that should increase one or more of these features. To illustrate, because of the IKEA effect (Norton et al., 2012), in which individuals overestimate the value of creations in which they contributed, people may complete tasks that could have been assigned to someone else. This bias, therefore, should increase the number of discretionary tasks that individuals need to complete.

Results

These procedures unearthed 14 biases that could exacerbate the workload of individuals, as summarized in Table 2. In particular, the first column labels the bias. The second column describes this bias. The third column demonstrates how this bias may heighten the workload of individuals.

Two of the authors independently sorted these 14 biases into clusters. In particular, biases that were assumed to fulfill overlapping motives were assigned to the same cluster. The authors independently generated the same clusters, with one exception. One author assigned the status quo bias to the same cluster as the information bias, the effort heuristic, peak end rule, and duration neglect. After some discussion, however, the authors agreed the status quo bias belongs to a distinct cluster. This procedure generated four constellations of biases, each corresponding to a separate motive.

Self-Enhancement

Individuals often experience the motivation to enhance their perception of themselves, called self-enhancement (Paulhus, 1998). To illustrate, as Holden and Evoy (2005) showed using discriminant function analysis, people may exaggerate four distinct characteristics. Specifically, they can inflate the extent to which they are effective, sociable, bold, or honest. As Paulhus (1984) highlights, when individuals inflate these qualities, they are motivated either to deceive themselves, to deceive someone else, such as a recruiter, or both.

As Table 2 indicates, seven cognitive biases are likely both to fulfil this motivation and to augment the workload of individuals. In particular, some of these biases enable people to inflate their qualities. For example, when people overestimate the value of anything they construct, called the IKEA effect (Norton et al., 2012), they tend to overrate the quality of their work. Likewise, when people exhibit the planning fallacy, they tend to overrate the efficiency of their work. Furthermore, people often persevere with initiatives that are obviously foundering (Soman, 2001; Staw, 1997) — a manifestation of the sunk cost fallacy (Garland, 1990) — merely to persuade themselves their initial choices, and hence their decisions in general, tend to be astute (Sivanathan et al., 2008).

In addition, some of the other biases enable people to trivialize their limitations. To illustrate, if people inflate their capacity to resist temptations, called the restraint bias (Nordgren et al., 2009), they may overlook their inability to maintain concentration and effort over an extended period. Similarly, if people underestimate their susceptibility to problems, called the optimism bias (Weinstein & Klein, 1996), or inflate their ability to control random events, called the illusion of control (Langer, 1975), they may overlook other complications at work, such as burnout. Even the self-protective similarity bias, in which individuals try to differentiate themselves from stigmatized populations (Gump & Kulik, 1995), could motivate employees to feel they can work more vigorously than tarnished employees.

These biases should not only fulfill the motivation of individuals to inflate their qualities, or to trivialize their limitations, but could also magnify the workload of

Table 2
Association between Cognitive Biases and Workload

Name of bias	Description of bias	Relationship between bias and workload
Self-enhancement biases		
IKEA effect (Norton et al., 2012)	Individuals are more likely to overestimate the monetary value of anything they constructed themselves	Because of this tendency, individuals may not delegate tasks to other people when applicable
Planning fallacy (Buehler et al., 2002)	Individuals tend to underestimate the duration that is needed to complete a task	Because of this fallacy, individuals tend to schedule more tasks in a day, week, or so forth than feasible in this timeframe
The sunk cost fallacy (Garland, 1990)	People tend to persist with a failing initiative, especially if they had previously decided to devote considerable effort and resources to this endeavor (Brockner, 1992)	Because of this fallacy, individuals may persist with ineffective practices
Restraint bias (Nordgren et al., 2009)	People tend to overestimate their capacity to resist temptations and impulses	Because of this fallacy, individuals may unduly inflate their ability to complete work demands
Optimism bias (Weinstein & Klein, 1996)	People tend to underestimate their susceptibility to risks, such as lung cancer	Because of this bias, individuals may underestimate the detrimental effects of prolonged hours
Illusion of control (Langer, 1975)	People tend to overestimate their capacity to control random events, such as the roll of a dice	Because of this illusion, individuals may feel the need to intervene on a task when no involvement is warranted
Self-protective similarity bias (e.g., Gump & Kulik, 1995)	Individuals tend to overrate the extent to which they differ from anyone in a stigmatized or disadvantaged social category, such as people with HIV	To differentiate themselves from stigmatized categories, individuals may strive to work considerably harder than colleagues who are not perceived as proficient
Stable values over time		
Status quo bias (Samuelson & Zeckhauser, 1988)	People, on average, tend to prefer an existing practice over an alternative practice	Because of this bias, individuals may persist with inefficient practices
Need for closure		
The information bias (Baron, 1994)	People are willing to sacrifice effort or money to receive more information, even if this information cannot affect their choices or conclusions	Because of this bias, individuals will complete work that does not improve products but merely uncovers unnecessary information
The effort heuristic (Kruger et al., 2004)	If people assume that some product demanded considerable time and effort to produce, they tend to evaluate this item more favorably	Because of this heuristic, individuals feel the need to dedicate effort to their work, even if this effort does not improve the actual quality
Peak end rule (Redelmeier & Kahneman, 1996)	Individuals tend to bias judgments of events towards the most intense consequence of this activity — rather than aggregate their experiences across the entire episode	Because of this bias, individuals may dismiss the unpleasant emotions associated with arduous work and orient their attention only towards the positive outcome
Duration neglect (Redelmeier et al., 2003)	The degree to which individuals evaluate an event as unpleasant seems to be relatively insensitive to the duration of this event	Because of this tendency, individuals may underestimate the drawbacks of protracted, rather than brief, work.
Just world		
The just world fallacy (Lerner, 1980)	People tend to receive the rewards, recognition, and punishment they deserve: Therefore, moral acts tend to be rewarded	Because of this fallacy, individuals assume that excessive efforts and sacrifice at work — a sacrifice that tends to be regarded as moral — will be rewarded
Spotlight effect (Gilovich et al., 2000)	Individuals tend to overestimate the extent to which their appearance or actions are likely to be noticed by other people	Because of this effect, people tend to feel their behavior, such as leaving work prematurely, will be recognized

individuals. Specifically, if people inflate their qualities or overlook their limitations, they may assume more responsibilities than perhaps they can actually fulfill. They may, for example, decide to complete 20 tasks this week even though only 15 tasks are feasible.

Status Quo Bias

According to terror management theory, this self-enhancement motive evolved to prevent existential angst (Greenberg et al., 1993). In particular, central to the terror management theory is the notion that humans, unlike

other animals, are aware of their mortality. To override the sense of futility this insight can evoke, individuals like to believe their contributions to society will persist indefinitely (Simon et al., 1998). They want to believe that symbols or artefacts of their life are immortal, called symbolic immortality (Routledge & Arndt, 2008).

As proponents of terror management theory contend, individuals recognize their contributions will not be cherished in the future unless two conditions are fulfilled (Greenberg et al., 1997). First, people need to feel they demonstrate the qualities that are valued by society. Attempts to fulfil this need manifest as self-enhancement (Greenberg et al., 1993). For example, after their mortality is primed, individuals are more likely to perceive themselves as superior to other people (for a review, see Pyszczynski et al., 2004).

Second, people need to feel the values of society are stable and enduring over time; otherwise, contributions that are appreciated now may not be appreciated in the future (Solomon et al., 1991). Consistent with this premise, after their mortality is primed, individuals become more inclined to dismiss information that challenges their values or worldviews (e.g., Jonas et al., 2003).

As Table 2 indicates, one of the biases is likely to reinforce the stability of values as well as augment the workload of individuals. In particular, people often exhibit the status quo bias (Samuelson & Zeckhauser 1988), in which they tend to prefer existing practices to alternative possibilities. For example, when deciding between two policies, such as whether or not prostitution should be legal, they tend to choose the alternative that aligns to the existing laws (Moshinsky & Bar-Hillel, 2010). This attempt of individuals to maintain the status quo may reflect their need to stabilize the values of society (for other possible motives, see Jost & Hunyady, 2002).

Regardless of the motive that underpins this tendency, the status quo bias is likely to magnify the workload of individuals. Because of this bias, workers may persevere with obsolete, and thus inefficient and redundant, work practices, compromising their productivity.

Need for Closure

Individuals are motivated to clarify not only the values of society in the future but also their duties and responsibilities now. When settings are unpredictable, unfamiliar, or ambiguous, individuals are not certain how they should behave (Webster & Kruglanski, 1994). They feel they may be excluded or punished, provoking agitation and other unpleasant emotions (Higgins, 1987). To override these feelings, individuals seek clarity about the standards and norms they need to observe. Because of this need to seek clarity and certainty, people tend to shun ambiguous or incomplete information as well as reach decisions expeditiously and prematurely (Webster & Kruglanski, 1994).

Many studies have explored the determinants and consequences of this need for closure. For example, when individuals feel rushed, fatigued, disrupted, or inebriated, this tendency to shun ambiguous or incomplete information is amplified (for a review, see Kruglanski & Webster, 1996). In addition, this need for closure tends to magnify opposition and contempt towards divergent opinions and practices (Kruglanski & Webster, 1996). Furthermore, to prevent feelings of uncertainty, individuals who experience a need for closure are more susceptible to a range of biases, such as the tendency to ascribe behavior to enduring dispositions (Webster, 1993).

One of the biases that augment workload may have evolved to prevent the negative emotions that ambiguous or incomplete information can evoke. Specifically, to fulfill this need, individuals may attach undue value to information. They may, therefore, expend unwarranted effort or money to seek this information. Consistent with this possibility, people even tend to seek information that could not actually affect their choices, called the information bias (Baron, 1994). Because of this information bias, individuals may undertake tasks that uncover information but are not actually beneficial, curbing efficiency.

Three biases might enable people to reach decisions expeditiously, decreasing the feeling of uncertainty that precedes this choice. For example, to expedite decisions, individuals often apply heuristics — approximate algorithms or principles that enable people to reach definitive conclusions from incomplete information. To illustrate, people may apply the effort heuristic, in which they equate the quality of work with the effort or time that was dedicated to this creation (Kruger et al., 2004). This heuristic enables people to evaluate the quality of work expeditiously. Yet, because of this assumption that effort is tantamount to quality, people may dedicate effort to activities that are not actually productive, increasing workload.

Furthermore, to expedite decisions, individuals may confine their attention to only a subset of considerations, overlooking other complexities. To illustrate, when people evaluate an activity, they tend to consider only the most intense feature of this event, called the peak end rule (Redelmeier & Kahneman, 1996; for boundary conditions, see Miron-Shatz, 2009). While deciding whether or not they enjoyed a workshop, they may orient their attention to the intense sense of achievement at the end, dismissing the uncertainty, frustration, or monotony they endured during the activity. As a consequence of this peak end rule, the evaluations of individuals tend to be insensitive to the duration of various emotions, called duration neglect (Redelmeier et al., 2003). The peak end rule and duration neglect may expedite decisions but amplify workload: because of these tendencies, workers may underestimate the costs, such as burnout, that prolonged and arduous tasks can incur.

Just World

Attempts to seek certainty and clarity will be compromised if people are sometimes punished or rejected unfairly. Consequently, in general, individuals like to believe that people will receive the rewards, recognition, and punishments they deserve (Lerner, 1980). Indeed, they tend to overestimate the degree to which society is fair, called the just world fallacy (Lerner, 1980). For example, to sustain this assumption, people like to believe that victims deserved their predicament (Lerner, 1980). They will, therefore, tend to denigrate victims.

Many studies have explored the implications of this just world bias. For example, when the belief in a just world is challenged, individuals do not feel they can shape their life in the future. They are, therefore, are not as willing to sacrifice their pleasure now to benefit their future. They prefer modest rewards now to larger rewards later, diminishing their capacity to delay gratification (Callan et al., 2014). In addition, they are also not as willing to forgive other people after a transgression (Lucas et al., 2010).

This just world fallacy may increase the workload of individuals. That is, because they inflate the degree to which the world is just, individuals may overestimate the degree to which their efforts at work will be rewarded. They may, therefore, devote more effort to their work than warranted.

Furthermore, as Leventhal (1980) emphasized, procedures are unlikely to be fair and just unless decisions are derived from comprehensive sources of information — a condition called accuracy. To fulfill this condition, individuals like to assume that all their behaviors and contributions will be recognized. They may, therefore, exhibit the spotlight effect (Gilovich et al., 2000), in which they tend to overestimate the degree to which their actions will be noticed by other people.

This spotlight effect may also amplify workload. For example, because of this tendency, people may be reluctant to leave work early, unnecessarily concerned this behavior will be noticed and disdained.

Practices to Contain these Biases and Decrease Workload

To reiterate, this review uncovered 14 cognitive biases that could magnify the workload of individuals. These biases could increase the number of work hours that individuals dedicate to work, potentially impeding leisure time and life goals, or evoke feelings of overload, frustration, and burnout. Accordingly, to preclude these problems, the various biases need to be minimized.

Antecedents of Biases

Three approaches could be pursued to minimize these biases and diminish workload. First, practitioners could attempt to redress the causes of these biases. To facilitate

this approach, Table 3 outlines some of the established antecedents of these cognitive biases. For example, when individuals undertake tasks that reinforce their strengths, values, and integrity, called self-affirmation, the sunk cost effect tends to subside (Sivanathan et al., 2008). Consequently, to curb workload, psychologists should complete similar activities, such as write about their values.

The problem with this approach is that practices that diminish one bias sometimes exacerbate another bias. To illustrate, activities that elicit positive emotions will often decrease the just world bias (Goldenberg & Forgas, 2012) but magnify the status quo bias (Yen & Chuang, 2008). The drawbacks of this activity, therefore, may nullify the benefits.

Debiasing

Second, individuals could apply an approach called debiasing to diminish these biases. Debiasing refers to a range of techniques in which individuals supersede their reliance on intuition or heuristics with careful and systematic deliberation (Croskerry & Singhal, 2013). To override the planning fallacy, for example, people may utilize previous HR records, instead of their hunches, to estimate the duration that is needed to complete a task. Or, to offset the planning fallacy, they may increase their estimates of duration by 20% to 30%.

Yet, these techniques are not always effective. When people attempt to correct biases, they often overcompensate (e.g., Petty et al. 1998). For example, while attempting to correct the planning fallacy, individuals may be inclined to overestimate the duration that is needed to complete tasks.

In addition, when individuals discount their intuition, their decisions are often misguided (Dijksterhuis, 2004). That is, according to unconscious thinking theory (Dijksterhuis, 2004), and corroborated by a range of studies (e.g., Dijksterhuis et al., 2009; Dijksterhuis & van Olden, 2006), the intuitions of individuals are shaped by a more extensive range of considerations than careful deliberation and, consequently, are more astute, especially when the choices differ on innumerable attributes (for conflicting results, see Newell et al., 2009).

The Meaning Maintenance Model

Third, and perhaps more feasibly, practitioners could implement an approach, derived from the meaning maintenance model (Heine et al., 2006), that is likely to mitigate all the biases that amplify workload. In particular, according to this model, individuals experience a profound need to perceive their life as meaningful and coherent. Occasionally, people experience events that threaten this sense of meaning and coherence. Even absurd plays (Proulx & Heine, 2009), incompatible words (Randles et al., 2013), or subliminal references to futility (Van Tongeren & Green, 2010) threaten meaning. In response to these threats, individuals strive to restore their sense of

Table 3
Circumstances that Diminish the Magnitude of these Biases

Bias	This biases tends to diminish when
IKEA effect	<ul style="list-style-type: none"> • The object that individuals constructed was unfinished (Norton et al., 2012)
Planning fallacy	<ul style="list-style-type: none"> • Power is diminished (Weick & Guinote, 2010) • Timelines are set alone rather than in team settings (Buehler et al., 2005) • Projects are short rather than extensive (Dunning, 2007)
Restraint bias	None established
Optimism bias	<ul style="list-style-type: none"> • The risk is especially common, uncontrollable, and consequential (Harris et al., 2008) • Individuals are granted opportunities to affirm their strengths, values, and integrity (Sherman et al., 2009)
Illusion of control	<ul style="list-style-type: none"> • Individuals are motivated to diminish or prevent shortfalls rather than pursue achievements or progress (Langens, 2007) • Individuals are encouraged to reflect upon alternative causes of outcomes, but only if these outcomes are desirable rather than undesirable (Matute & Blanco, 2014)
Self-protective similarity bias	<ul style="list-style-type: none"> • The other person is different in gender (Gump & Kulik, 1995)
The sunk cost fallacy	<ul style="list-style-type: none"> • Individuals are granted opportunities to affirm their strengths, values, and integrity (Sivanathan et al., 2008) • Individuals feel content rather than anxious (Moon et al., 2003) • Individuals trust their intuition rather than depend unduly on logic and deliberation (Wong et al., 2008) • The alternative to their existing behavior is defined clearly and vividly (e.g., Northcraft & Neal, 1986)
Status quo bias	<ul style="list-style-type: none"> • Individuals experience negative emotions, especially feelings of uncertainty (Yen & Chuang, 2008).
The information bias	• NA
The effort heuristic	<ul style="list-style-type: none"> • individuals receive more unequivocal information to evaluate quality or performance (Kruger et al., 2004)
Duration neglect	<ul style="list-style-type: none"> • Individuals rate their experience every few minutes on a graph (Liersch & Mackenzie, 2009).
Peak end rule	<ul style="list-style-type: none"> • Individuals delay their evaluation of an event by a month or so (Geng et al., 2013)
The just world fallacy	<ul style="list-style-type: none"> • People experience a positive mood (Goldenberg & Forgas, 2012); specifically, when individuals experience a positive mood, they are not as likely to blame victims
Spotlight effect	<ul style="list-style-type: none"> • Individuals do not feel like they will be evaluated, or at least not harshly, by anyone else (Brown & Stopa, 2007)

meaning. Indeed, they skew their attention, memory, or appraisals to evoke thoughts that foster meaning (Proulx & Heine, 2006; 2008). Because of this skew in attention, memory, and appraisal, the thoughts of these individuals will, by definition, be biased (Heine et al., 2006).

Indeed, when meaning is threatened, individuals tend to exhibit four clusters of biases. First, they tend to overestimate their qualities or self-esteem (Van Tongeren & Green, 2010), analogous to self-enhancement. Second, they tend to inflate the degree to which they feel the values of society will persist in the future, facilitating symbolic immortality (Van Tongeren & Green, 2010). Third, they tend to experience a heightened need for clo-

sure (Van Tongeren & Green, 2010). Finally, they tend to denigrate victims or stigmatized communities (Randles et al. 2013), epitomizing the just world fallacy.

These four clusters overlap closely with the four constellations of biases that appear in Table 2. Accordingly, when meaning is threatened, these biases are likely to magnify. Conversely, if people experience a sense of meaning or coherence in their lives, these biases dissipate, as many studies have shown (Proulx & Heine, 2006; 2008; Van Tongeren & Green, 2010); consequently, workload should subside.

Managers can implement a variety of practices that are likely to foster meaning in their employees and,

therefore, contain workload. For instance, when the managers and executives of organizations promulgate an inspiring and uplifting vision of the future (Arnold et al., 2007), or provide timely feedback, autonomy in how to prioritize and complete tasks, and a variety of roles (Piccolo & Colquitt, 2006), employees tend to perceive their role as especially meaningful. Likewise, managers and executives who cultivate an organization that attempts to confront and address social problems, such as injustices that disadvantage deprived communities, tend to foster a sense of meaning in employees (Schnell et al., 2013).

Yet, if individuals work in organizations that treat employees unsupportively, or do not work in organizations at all, they cannot benefit from these practices. Instead, they may need to consider other opportunities to foster meaning and, therefore, contain workload. To illustrate, after individuals reflect upon their true qualities — the qualities they may conceal from other people — their sense of meaning is reinforced (Schlegel et al., 2009). In addition, reminiscence about the past, and the ensuing nostalgia, has also been shown to foster meaning (Routledge et al., 2011). Finally, after individuals adjust their aspirations or strivings to ensure these objectives facilitate each other, meaning tends to be restored (see Gore & Cross, 2010).

If individuals experience limited meaning in life, they may reach decisions that not only exacerbate their own workload, but could increase the workload of people they manage. To illustrate, when managers do not feel a sense of meaning, and thus become susceptible to the planning fallacy (Buehler et al., 2002), they underestimate the duration that is needed to complete tasks. They are, therefore, likely to impose unrealistic goals on their team. Likewise, they will tend to demonstrate the illusion of control (Langer, 1975), in which they overestimate their capacity to control events. Consequently, they may overrate their capacity to inspire other people to fulfil steep, and indeed implausible, goals.

Conclusion

In short, when individuals perceive their activities now as meaningful to their future and coherent with one another, four constellations of biases are likely to subside. Because some of these biases tend to amplify workload, this meaning and coherence may diminish the work hours and sense of overload that many people, including psychologists, often experience.

Unfortunately, in modern society, the roles of individuals change frequently and erratically (Sennett, 2006). Many activities that people complete now are irrelevant to their future goals, compromising this sense of meaning and coherence. Future research, therefore, may need to explore systemic changes in addition to individual practices that may curb the biases that augment workload.

Finally, future research should establish whether people who are more susceptible to these biases do indeed experience a steeper workload. For example, this research could assess whether the IKEA effect curbs delegation and whether the sunk cost fallacy promotes obsolete practices, culminating in excessive demands at work.

References

- Arnold, K.A., Turner, N., Barling, J., Kelloway, E.K., & McKee, M.C. (2007). Transformational leadership and psychological well-being: The mediating role of meaningful work. *Journal of Occupational Health Psychology, 12*, 193–203. doi: 10.1037/1076-8998.12.3.193
- Australian Bureau of Statistics. (2010). *Trends in hours worked*. Cat No. 6105.0. Available at www.abs.gov.au. Retrieved 15 March 2014
- Bakker, A.B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*, 309–328. doi: 10.1108/02683940710733115
- Bakker, A.B., Demerouti, E., & Euwema, M.C. (2005). Job resources buffer the impact of job demands on burnout. *Journal of Occupational Health Psychology, 10*, 170–180. doi: 10.1037/1076-8998.10.2.170
- Baron, J. (1994). *Thinking and deciding*. Cambridge: Cambridge University Press.
- Benati, L. (2007). Drift and breaks in labor productivity. *Journal of Economic Dynamics and Control, 31*, 2847–2877.
- Bond, J., Thompson, C., Galinsky, E., & Prottas, D. (2003). Highlights of the National Study of the Changing Workforce. Family and Work Institute, No. 3.
- Braunstein-Bercovitz, H. (2013). A multidimensional mediating model of perceived resource gain, work-family conflict sources, and burnout. *International Journal of Stress Management, 20*, 95–115. doi: 10.1037/a0032948
- Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *Academy of Management Review, 17*, 39–61.
- Brown, M., & Stopa, L. (2007). The spotlight effect and the illusion of transparency in social anxiety. *Journal of Anxiety Disorders, 21*, 804–819. doi: 10.1016/j.janxdis.2006.11.006
- Brynjolfsson, E. (1993). The productivity paradox of information technology. *Communications of the ACM, 36* (12), 66–77. doi:10.1145/163298.163309. ISSN 0001-0782.
- Buehler, R., Griffin, D., & Ross, M. (1994). Exploring the ‘planning fallacy’: Why people underestimate their task completion times. *Journal of Personality and Social Psychology, 67*, 366–381.
- Buehler, R., Griffin, D., & Ross, M. (2002). Inside the planning fallacy: The causes and consequences of optimistic time predictions. In T. D. Gilovich, D. W. Griffin, & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 250–270). New York: Cambridge University Press.
- Buehler, R., Messervey, D., & Griffin, D. (2005). Collaborative planning and prediction: Does group discussion affect optimistic biases in time estimation? *Organizational Behavior and Human Decision Processes, 97*, 47–63. doi: 10.1016/j.obhdp.2005.02.004.
- Callan, M.J., Harvey, A.J., & Sutton, R.M. (2014). Rejecting victims of misfortune reduces delay discounting.

- Journal of Experimental Social Psychology*, 51, 41–44. doi:10.1016/j.jesp.2013.11.002
- Croskerry, P., & Singhal, G. (2013). Cognitive debiasing 1: Origins of bias and theory of debiasing. *BMJ Quality and Safety*, 22, ii58–ii64. doi:10.1136/bmjqs-2012-001712
- Dijksterhuis, A. (2004). Think different: The merits of unconscious thought in preference development and decision making. *Journal of Personality and Social Psychology*, 87, 586–598. doi:10.1037/0022-3514.87.5.586
- Dijksterhuis, A., & van Olden, Z. (2006). On the benefits of thinking unconsciously: Unconscious thought can increase post-choice satisfaction. *Journal of Experimental Social Psychology*, 42, 627–631. doi:10.1016/j.jesp.2005.10.008
- Dijksterhuis, A., Bos, M.W., van der Leij, A., & van Baaren, R.B. (2009). Predicting soccer matches after unconscious and conscious thought as a function of expertise. *Psychological Science*, 20, 1381–1387. doi:10.1111/j.1467-9280.2009.02451.x
- Dunning, D. (2007). Prediction. In A. Kruglanski & E.T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (2nd Edition) (pp. 60–90). New York: Guilford Press.
- Flyvbjerg, B., Holme, M.S., & Soren, B. (2002). Underestimating costs in public works projects: Error or lie? *Journal of the American Planning Association*, 68, 279–295.
- Garland, H. (1990). Throwing good money after bad: The effect of sunk costs on the decision to escalate commitment to an ongoing project. *Journal of Applied Psychology*, 75, 728–731.
- Geng, X., Chen, Z., Lam, W., & Zheng, Q. (2013). Hedonic evaluation over short and long retention intervals: The mechanism of the peak–end rule. *Journal of Behavioral Decision Making*, 6(3), 225–236. doi:10.1002/bdm.1755
- Gilovich, T., Medvec, V.H., & Savitsky, K. (2000). The spotlight effect in social judgment: An egocentric bias in estimates of the salience of one's own actions and appearance. *Journal of Personality and Social Psychology*, 78(2), 211–222. doi:10.1037/0022-3514.78.2.211
- Goldenberg, L., & Forgas, J.P. (2012). Can happy mood reduce the just world bias? Affective influences on blaming the victim. *Journal of Experimental Social Psychology*, 48(1), 239–243. doi:10.1016/j.jesp.2011.07.007
- Gore, J.S., & Cross, S.E. (2010). Relational self-construal moderates the link between goal coherence and well-being. *Self and Identity*, 9, 41–61. doi:10.1080/15298860802605861
- Green, R., Toner, P., & Agarwal, R. (2014). *Understanding productivity: Australia's choice*. McKell Institute, Sydney, Australia.
- Greenberg, J., Pyszczynski, T., Solomon, S., Pinel, E., Simon, L., & Jordan, K. (1993). Effects of self-esteem on vulnerability-denying defensive distortions: Further evidence of an anxiety-buffering function of self-esteem. *Journal of Experimental Social Psychology*, 29, 229–251.
- Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. In M. Zanna (Ed.), *Advances in experimental social psychology* (vol. 29, pp. 61–139). New York: Academic Press.
- Greenglass, E.R., & Burke, R.J. (1990). Burnout over time. *Journal of Health and Human Resources Administration*, 13, 192–204.
- Gump, B.B., & Kulik, J.A. (1995). The effect of a model's HIV status on self-perceptions: A self-protective similarity bias. *Personality and Social Psychology Bulletin*, 21, 827–833.
- Hall, P. (1980). *Great planning disasters*. London: Weidenfeld & Nicolson.
- Hannigan, B., Edwards, D., & Burnard, P. (2004). Stress and stress management in clinical psychology: Findings from a systematic review. *Journal of Mental Health*, 13, 235–245. doi:10.1080/09638230410001700871
- Harris, P.R., Griffin, D.W., & Murray, S. (2008). Testing the limits of optimistic bias: Event and person moderators in a multi-level framework. *Journal of Personality and Social Psychology*, 95, 1225–1237. doi:10.1037/a0013315
- Hart, S. (2006). NASA-Task Load Index (NASA-TLX); 20 years later. *Human Factors and Ergonomics Society Annual Meeting Proceedings*, 50, 904–908.
- Heine, S.J., Proulx, T., & Vohs, K.D. (2006). Meaning maintenance model: On the coherence of human motivations. *Personality and Social Psychology Review*, 10, 88–110. doi:10.1207/s15327957pspr1002_1
- Higgins, E.T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, 94, 319–340.
- Holden, R.R., & Evoy, R.A. (2005). Personality inventory faking: A four-dimensional simulation of dissimulation. *Personality and Individual Differences*, 39, 1307–1318. doi:10.1016/j.paid.2005.06.007
- Jonas, E., Greenberg, J., & Frey, D. (2003). Connecting terror management and dissonance theory: Evidence that mortality salience increases the preference for supporting information after decisions. *Personality and Social Psychology Bulletin*, 29, 1181–1189. doi:10.1177/0146167203254599
- Jost, J.T., & Hunyady, O. (2002). The psychology of system justification and the palliative function of ideology. *European Review of Social Psychology*, 13, 111–153.
- Kahneman, D., & Tversky, A. (1979). Intuitive predictions: Biases and corrective procedures. *TIMS Studies in Management Sciences*, 12, 313–327.
- Karasek, R. (1979). Job demands, job decision latitude, and mental strain. Implications for job redesign. *Administrative Science Quarterly*, 24, 285–308.
- Krueger, J.I., & Funder, D.C. (2004). Towards a balanced social psychology: Causes, consequences, and cures for the problem-seeking approach to social behavior and cognition. *Behavioral and Brain Sciences*, 27, 313–327. doi:10.1017/S0140525X04000081
- Kruger, J.J., (2003). The global trends of total factor productivity: Evidence from the nonparametric Malmquist index approach. *Oxford Economic Papers*, 55(2), 265–286. doi:10.1093/oepp/55.2.265
- Kruger, J., Wirtz, D., Van Boven, L., & Altermatt, T.W. (2004). The effort heuristic. *Journal of Experimental Social Psychology*, 40, 91–98. doi:10.1016/S0022-1031(03)00065-9
- Kruglanski, A.W., & Webster, D.M. (1996). Motivated closing of the mind: 'Seizing' and 'freezing'. *Psychological Review*, 103, 263–283.
- Lambert, E., Hogan, N.L., & Altheimer, I. (2010). The association between work-family conflict and job burnout among correctional staff: A preliminary study. *American Journal of Criminal Justice*, 35, 37–55.
- Langens, T.A. (2007). Regulatory focus and illusion of control. *Personality and Social Psychology Bulletin*, 33, 226–237. doi:10.1177/0146167206293494

- Langer, E.J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*, 311–328.
- Lerner, M.J. (1980). *The belief in a just world: A fundamental delusion*. New York: Plenum Press.
- Leventhal, G.S. (1980). What should be done with equity theory? New approaches to the study of fairness in social relationship. In K. Gergen, M. Greenberg, & R. Willis (Eds.), *Social exchange: Advances in theory and research* (pp. 27–55). New York: Plenum Press.
- Liersch, M.J., & Mackenzie, C.R.M. (2009). Duration neglect by numbers – and its elimination by graphs. *Organizational Behavior and Human Decision Processes*, *108*, 303–314. doi:10.1016/j.obhdp.2008.07.001
- Lucas, T., Young, J.D., Zhdanova, L., & Alexander, S. (2010). Self and other justice beliefs, impulsivity, rumination, and forgiveness: Justice beliefs can both prevent and promote forgiveness. *Personality and Individual Differences*, *49*, 851–856.
- Maslach, C., & Leiter, M.P. (2008). Early predictors of job burnout and engagement. *Journal of Applied Psychology*, *93*, 498–512. doi: 10.1037/0021-9010.93.3.498
- Matute, H., & Blanco, F. (2014). Reducing the illusion of control when an action is followed by an undesired outcome. *Psychonomic Bulletin & Review*. doi: 10.3758/s13423-014-0584-7
- Miron-Shatz, T. (2009). Evaluating multiepisode events: Boundary conditions for the peak-end rule. *Emotion*, *9*, 206–213. doi: 10.1037/a0015295
- Mollick, E. (2006). Establishing Moore's law. *IEEE Annals of the History of Computing*, *28*(3), 62–75.
- Moon, H., Hollenbeck, J.R., Humphrey, S.E., & Maue, B. (2003). The tripartite model of neuroticism and the suppression of depression and anxiety within an escalation of commitment dilemma. *Journal of Personality*, *71*, 347–368. doi:10.1111/1467-6494.7103004
- Morris, R., MacNeela, P., Scott, A., Treacy, P., & Hyd, A. (2007). Reconsidering the conceptualization of nursing workload: literature review. *Journal of Advanced Nursing*, *57*(5), 463–471. doi: 10.1111/j.1365-2648.2006.04134.x
- Moshinsky, A., & Bar-Hillel, M. (2010). Loss aversion and status quo label bias. *Social Cognition*, *28*, 191–204. doi:10.1521/soco.2010.28.2.191
- Netemeyer, R.G., Boles, J.S., & McMurrian, R. (1996). Development and validation of work-family conflict and family-work conflict scales. *Journal of Applied Psychology*, *81*, 400–410.
- Newell, B.R., Wong, K.Y., Cheung, J.C.H., & Rakow, T. (2009). Think, blink or sleep on it? The impact of modes of thought on complex decision making. *Quarterly Journal of Experimental Psychology*, *62*(4), 707–732. doi: 10.1080/1747021080221520
- Nordgren, L.F., van Harreveld, F., & van der Pligt, J. (2009). The restraint bias: How the illusion of self-restraint promotes impulsive behavior. *Psychological Science*, *20*(12), 1523–1528. doi:10.1111/j.1467-9280.2009.02468.x
- Northcraft, G., & Neal, M.A. (1986). Opportunity costs and framing of resource allocation decisions. *Organizational Behavior and Human Decision Processes*, *37*, 348–356.
- Norton, M.I., Mochon, D., & Ariely, D. (2012). The IKEA effect: When labor leads to love. *Journal of Consumer Psychology*, *22*, 453–460. doi: 10.1016/j.jcps.2011.08.002
- Oddie, S., & Ousley, L. (2007). Assessing burn-out and occupational stressors in a medium secure service. *The British Journal of Forensic Practice*, *9*(2), 32–48. doi: 10.1108/14636646200700011
- Paulhus, D.L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology*, *46*, 598–609.
- Paulhus, D.L. (1998). Interpersonal and intrapsychic adaptiveness of trait self-enhancement: A mixed blessing? *Journal of Personality and Social Psychology*, *74*, 1197–1208.
- Petty, R.E., Wegener, D.T., & White, P.H. (1998). Flexible correction processes in social judgment: Implications for persuasion. *Social Cognition*, *16*, 93–113.
- Piccolo, R.F., & Colquitt, J.A. (2006). Transformational leadership and job behaviours: The mediating role of core job characteristics. *Academy of Management Journal*, *49*, 327–340. doi: 10.5465/AMJ.2006.20786079
- Proulx, T., & Heine, S.J. (2006). Death and black diamonds: Meaning, mortality, and the Meaning Maintenance Model. *Psychological Inquiry*, *17*, 309–318. doi: 10.1080/10478400701366985
- Proulx, T., & Heine, S.J. (2008). The case of the transmogrifying experimenter: Affirmation of a moral schema following implicit change detection. *Psychological Science*, *19*, 1294–1300. doi: 10.1111/j.1467-9280.2008.02238.x
- Proulx, T., & Heine, S.J. (2009). Connections from Kafka: Exposure to meaning threats improves implicit learning of an artificial grammar. *Psychological Science*, *20*, 1125–1131. doi: 10.1111/j.1467-9280.2009.02414.x
- Pyyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why do people need self-esteem? A theoretical and empirical question. *Psychological Bulletin*, *130*, 435–468.
- Randles, D., Heine, S.J., & Santos, N. (2013). The common pain of surrealism and death: Acetaminophen reduces compensatory affirmation following meaning threats. *Psychological Science*, *24*, 966–973. doi: 10.1177/0956797612464786
- Redelmeier, D.A., & Kahneman, D. (1996). Patients' memories of painful medical treatments: Real-time and retrospective evaluations of two minimally invasive procedures. *Pain*, *66*, 3–8.
- Redelmeier, D.A., Katz, J., & Kahneman, D. (2003). Memories of colonoscopy: A randomized trial. *Pain*, *104*, 187–194.
- Robinson, S., Kraatz, M., & Rousseau, D. (1994). Changing obligations and the psychological contract: A longitudinal study. *Academy of Management Journal*, *37*, 137–152.
- Routledge, C., & Arndt, J. (2008). Self-sacrifice as self-defense: Mortality salience increases efforts to affirm a symbolic immortal self at the expense of the physical self. *European Journal of Social Psychology*, *38*, 531–541. doi: 10.1002/ejsp.442
- Routledge, C., Arndt, J., Wildschut, T., Sedikides, C., Hart, C.M., Juhl, J., Vingerhoets, A.J., & Schlotz, W. (2011). The past makes the present meaningful: Nostalgia as an existential resource.

- Journal of Personality and Social Psychology*, 101, 638–652. doi: 10.1037/a0024292
- Rupert, P.A., & Morgan, D.J. (2005). Work setting and burnout among professional psychologists. *Professional Psychology: Research and Practice*, 36(5), 544–550. doi: 10.1037/0735-7028.36.5.544
- Samuelson, W. & Zeckhauser, R.J. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty*, 1, 7–59.
- Schlegel, R.J., Hicks, J.A., Arndt, J., & King, L.A. (2009). Thine own self: True self-concept accessibility and meaning in life. *Journal of Personality and Social Psychology*, 96, 473–490. doi: 10.1037/a0014060
- Schnaars, S.P. (1989). *Megamistakes: Forecasting and the myth of rapid technological change*. New York: Free press.
- Schnell, T., Hoge, T., & Pollet, E. (2013). Predicting meaning in work: Theory, data, implications. *The Journal of Positive Psychology*, 8, 543–554. doi: 10.1080/17439760.2013.830763
- Sennett, R. (2006). *The culture of the new capitalism*. New Haven, CT: Yale University Press.
- Sertoza, O.O., Binbayb, I.T., Koyluc, E., Noyand, A., Yildirim, E., & Metef, H.E. (2008). The role of BDNF and HPA axis in the neurobiology of burnout syndrome. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 32, 1459–1465. doi: 10.1016/j.pnpbp.2008.05.001. Epub 2008 May 8.
- Sherman, D.K., Nelson, L.D., Bunyan, D.P., Cohen, G.L., Nussbaum, A.D., & Garcia, J. (2009). Affirmed yet unaware: Exploring the role of awareness in the process of self-affirmation. *Journal of Personality and Social Psychology*, 97, 745–764. doi: 10.1037/a0015451
- Simon, L., Arndt, J., Greenberg, J., Pyszczynski, T., & Solomon, S. (1998). Terror management and meaning: Evidence that the opportunity to defend the worldview following MS increases the meaningfulness of life in the depressed. *Journal of Personality*, 66, 359–382.
- Sivanathan, N., Molden, D.C., Galinsky, A.D., & Ku, G. (2008). The promise and peril of self-affirmation in de-escalation of commitment. *Organizational Behavior and Human Decision Processes*, 107, 1–14. doi: 10.1016/j.obhdp.2007.12.004
- Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). A terror management theory of social behavior: The psychological functions of self-esteem and cultural worldviews. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (vol. 24, pp. 93–159). New York: Academic Press.
- Soman, D. (2001). The mental accounting of sunk time costs: When time is not like money. *Journal of Behavioral Decision Making*, 14, 169–185. doi: 10.1002/bdm.370
- Staw, B.M. (1997). The escalation of commitment: An update and appraisal. In Z. Shapira (Ed.), *Organization decision making* (pp. 191–215). New York: Cambridge University Press.
- Stimpfel, A.W., Sloane, D.M., & Aiken, L.H. (2012). The longer the shifts for hospital nurses, the higher the levels of burnout and patient dissatisfaction. *Health Affairs*, 31(11), 2501–2509. doi: 10.1377/hlthaff.2011.1377
- Taris, T.W., & Schreurs, P.J.G. (2009). Explaining worker strain and learning: How important are emotional job demands? *Anxiety, Stress, and Coping*, 22, 245–262. doi: 10.1080/10615800802460401
- Tomaka, J., Blascovich, J., Kelsey, R.M., & Leitten, C.L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of Personality and Social Psychology*, 65, 248–260.
- Vallerand, R.J., Paquet, Y., Philippe, F.L., & Charest, J. (2010). On the role of passion in burnout: A process model. *Journal of Personality*, 78, 289–312. doi: 10.1111/j.1467-6494.2009.00616.x
- van Emmerik, I.J.H., & Jawahar, I.M. (2006). The independent relationships of objective and subjective workload with couples' mood. *Human Relations*, 59(10), 1371–1392. doi: 10.1177/0018726706071649
- Van Tongeren, D., & Green, J.D. (2010). Combating meaninglessness: On the automatic defense of meaning. *Personality and Social Psychology Bulletin*, 36, 1372–1384. doi: 10.1177/0146167210383043
- Van Yperen, N. W., & Janssen, O. (2002). Fatigued and dissatisfied or fatigued but satisfied? Goal orientations and responses to high job demands. *Academy of Management Journal*, 45, 1161–1171.
- Webster, D.M. (1993). Motivated augmentation and reduction of the overattribution bias. *Journal of Personality and Social Psychology*, 65, 261–271.
- Webster, D.M., & Kruglanski, A.W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology*, 67, 1049–1062.
- Weick, M., & Guinote, A. (2010). How long will it take? Power biases time predictions. *Journal of Experimental Social Psychology*, 46, 595–604. doi: 10.1016/j.jesp.2010.03.005
- Weinstein, N.D., & Klein, W.M. (1996). Unrealistic optimism: Present and future. *Journal of Social and Clinical Psychology*, 15, 1–8. doi: 10.1521/jscp.1996.15.1.1
- Winwood, P., Bakker, A.B., & Winefield, A.H. (2007). An investigation of the role of non-work-time behavior in buffering the effects of work strain. *Journal of Occupational and Environmental Medicine*, 49, 862–871. doi: 10.1097/JOM.0b013e318124a8dc
- Wong, K.F.E., Kwong, J.Y.Y., & Ng, C.K. (2008). When thinking rationally increases biases: The role of rational thinking style in escalation of commitment. *Applied Psychology: An International Review*, 57, 246–271. doi: 10.1111/j.1464-0597.2007.00309.x
- Yen, H.R., & Chuang, S. (2008). The effect of incidental affect on preference for the status quo. *Journal of the Academy of Marketing Science*, 36(4), 522–537. doi: 10.1007/s11747-008-0084-2