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Conceptualizing Performance Processes:
A Model to Guide Research Linking
Quality of Life and Performance

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Major Tom Slater's family begins its morning much like many other families. His son and daughter get ready for school, Tom gets dressed and ready for work, and his wife Alice gets breakfast ready for all. At breakfast, Alice mentions again that their impending change of station is going to make it difficult for her to get a new job and reminds Tom how long it took for her to find a job after their last move. He acknowledges the problem but cannot think of an answer that will change the situation. "There's nothing that can be done about it. The military requires us to move... you know that." At particular moments throughout the workday, Tom finds it difficult to concentrate on the tasks he needs to get accomplished because his mind wanders to his family's difficulties. Despite the fact that he feels badly about the situation, he cannot let his feelings get in the way of his interactions with his co-workers. By the middle of the day, Tom feels physically and emotionally drained. The combined burdens of coping with the upcoming move while simultaneously managing his interactions with co-workers have tapped his motivation to accomplish much of anything.

INTRODUCTION AND OVERVIEW

Our overall objective in this paper is to examine the way in which experiences and conditions outside the work domain, such as marital relations, financial circumstances, community support, and social networks, affect job performance. That our lives outside the workplace spill over to influence the way we do our daily jobs may seem intuitive, but there has been very little civilian or military research conducted to support this basic intuition. In addition, the research that does exist examines the relationships between stable features of our lives, degree of conflict, for example, and general performance levels aggregated over time. Such research, we believe, is not very accurate in the way it represents the critical performance processes that play out in real time. As such, it is limited in what it can tell us about the nature of the relationship between the quality of our lives and the way we perform our jobs.

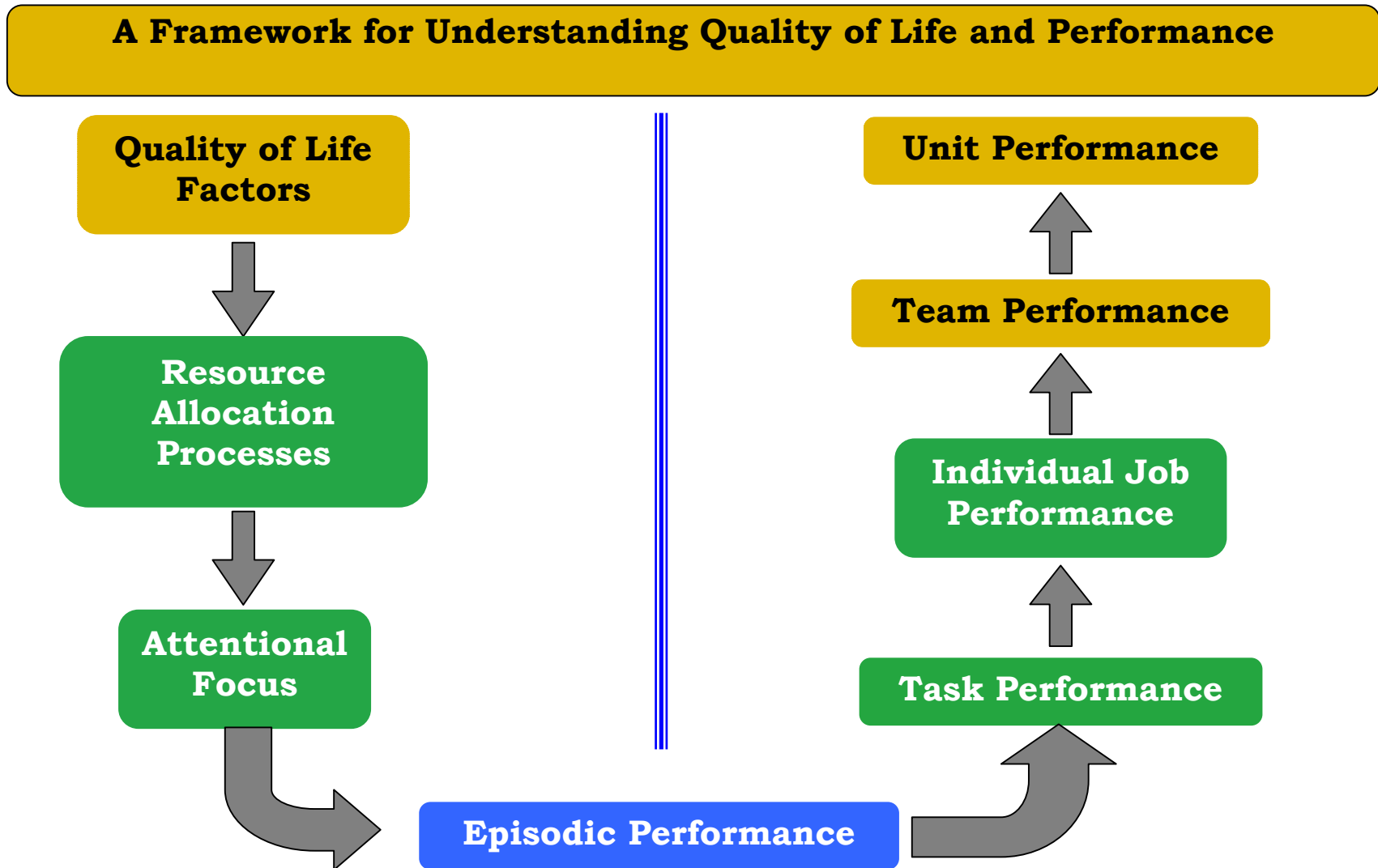
Our approach to researching this topic is somewhat different. We first try to understand the most basic, immediate processes of job performance itself. We then use our insights into these processes to direct us to the linkages between what happens inside and outside of daily work activities. Our goal is to develop a roadmap for productive research on work-life linkages by building up from an understanding of the immediate, basic processes that determine levels of work performance.

Despite its almost stereotypical depiction of the family-work interface, the brief anecdote about Major Slater and his family contains many of the elements central to our framework for understanding performance. It illustrates some of the immediate effects of family on daily performance. It points to the distractive elements of life's conditions. It highlights the need to regulate one's attention and focus in order to accomplish work tasks. It also suggests that the combined effort to regulate both work behavior and emotions has a cumulative and time-lagged effect on one's ability to perform.

Another important aspect of this scene is that the family-related distractions interrupt particular moments of Major Slater's work. At times, he will be able to focus on his work without being plagued by thoughts about his upcoming move. At these moments he would appear to be performing quite well. At other moments, when he is distracted, his performance will suffer noticeably. These notions reflect an important tenet of this paper: the unit of time that captures how life events affect work behaviors is momentary, or episodic in nature.

Figure 1 presents a pictorial representation of the model we describe in detail in this paper. The model begins with the notion of momentary or episodic performance. This is the core of our model, focusing on one person trying to accomplish some immediate task at a particular moment in time. To do his or her immediate task, that person must bring cognitive resources, such as attention or knowledge, to bear on the task at hand. To the extent that cognitive resources are focused elsewhere or the pool of resources is too limited for the task, performance will suffer. Subsequently, both the total pool and the allotment of cognitive resources affect immediate performance. However, cognitive resources are not the only type of resources relevant to immediate task performance. Distribution of cognitive resources also can influence task performance; thus, the ability and motivation to focus those resources on the immediate task will also be important to successful performance. This observation indicates the importance of postulating a second type of resource, what we will refer to as regulatory resources. Together, cognitive and regulatory resources determine immediate performance.

Figure 1.



We believe that this focus on resource that influence immediate performance provides an excellent starting point for a discussion of how these conditions and events influence both the pool and allotment of performance-relevant resources. The story of Major Slater and his family illustrates the negative effects of family circumstance through the diversion of cognitive resources and the reduction in the pool of regulatory resources. However, this is only one way in which work and life outside of work interact. Non-work circumstances can also have a positive effect on performance by enhancing the pool of resources available to the individual. For instance, support from friends and family can enhance resources and prevent diversions. Both resource diversion and resource enhancement are, in our opinion, important areas of investigation.

Our focus on immediate performance does not mean that we do not recognize that jobs require people to do many tasks over extended periods of time certainly this is true. However, job success, broadly defined, is the ability to perform an immediate task at a high level. How those immediate tasks come together defines overall job performance. This is the problem of aggregation - how tasks and the many immediate performances that an individual displays over time come together to determine a person's total job performance. This is not a trivial issue. Some jobs are structured so that deficiencies at a particular time can be compensated for by exceptional performance at a later time. Other jobs are structured in ways that preclude this kind of compensation. A pilot cannot compensate for poor performance on one mission by doing well on the next. Consequently, the aggregation structure will be critical to the study of the way non-work factors influence work performance.

Another element of aggregation is acknowledged in our model is the aggregation of individual performances to influence team or unit performance. As with individuals, team performance can be examined momentarily and over time. For some teams, individuals can compensate for each other. For other teams, some members' performances cannot be made up for by the performances of others. As with individual performance, the effects of quality of life (QoL) on team performance will depend upon resource pools and allotment, as well as the aggregation structure of team performance.

To summarize, our interests lie in how one person, performing one task at one time, manages available resources toward work related or non-work related activities. Because most of life's activities are episodic in nature, it is our belief that this level of analysis represents the key

to understanding *how* life events impact performance. Obviously, there are many factors that combine to determine how people develop and utilize resources, and accordingly, we will spend some time discussing processes such as cognitive interference, rumination, and emotion regulation. In addition, we will not limit ourselves only to those processes that negatively affect resources. At multiple levels, factors both individual and social can contribute to an abundance of resources that help to increase performance. Finally, we will also discuss the problem of aggregation, tracing the impact of family factors from levels of momentary performance through to the performance of an entire unit. Before we begin describing our own perspective, we first will take some time to describe the existing but limited research on the relationship between QoL and performance.

EXISTING RESEARCH ON QUALITY OF LIFE AND PERFORMANCE

Since Kanter (1977) discussed the “myth of separate worlds” researchers have understood that events, conditions, and behaviors inside the workplace interact with events, conditions, and behaviors outside the workplace. As a consequence, “spillover” has become the accepted concept in the domain of work-life interaction. It is also understood that the connection between work and life is bi-directional: experiences at work can greatly influence our lives away from work, and experiences and conditions outside of work can influence how we do our jobs. Yet, in spite of the acceptance of this bi-directional relationship, substantially more research has examined the way work influences non-work outcomes than the way non-work conditions and experiences influence work attitudes and behaviors (Perry-Jenkins, Repetti, & Crouter, 2000).

Even within the limited existing research on the way non-work issues influence work experiences and behaviors, research on the performance implications of those non-work factors is particularly scarce. Marshall (1992) reviewed six decades of research on the way family influences work. She was able to classify that research into four categories: family influences on labor force participation; family influences on career development; family influences on business policies and practices; and family influences on workplace attitudes and behaviors. The review shows that researchers have focused much more of their attention on labor participation and career development than they have on the effects of family on attitudes and performance. Furthermore, even within this latter category, the research overwhelmingly focuses on attitudes, turnover, and absenteeism at the expense of actual job performance. Haas (1999), in a broader and more recent examination of families and work, also examined the literature on the effects of family on work processes and outcomes. Again, labor participation is of great interest and among individual-level work outcomes, the effects of attitude predominate (see Kossek & Ozeki, 1998, for another recent review). Individual performance outcomes are not discussed. Glaser (1996) reviewed the literature on quality of life (QoL) factors and performance in the private sector and concluded the relationship could only be considered suggestive due to lack of research.

Of course, research does indicate that scheduling conflicts at home are an important influence on absenteeism (Erickson, Nichols, & Ritter, 2000), which is a performance-relevant

consequence. Research also indicates that family issues influence turnover (Kossek & Ozeki, 1998), and turnover is an important part of what accounts for effective organizational performance. Nonetheless, these studies do not discuss the links between family factors and the quality of daily performance. The research that comes closest to demonstrating a link between family processes and immediate job performance is research that considers work-family conflict as a stressor. It is known that stress can impede work performance (Driskell & Salas, 1996). It is also known that work-family conflict can be a source of stress to workers (Greenhaus & Beutell, 1985). It is logical to assume, therefore, that work-family conflict can influence immediate performance by increasing stress levels. We agree with this assumption, with two caveats. First, the link has not been carefully examined. Second, we believe the work-family conflict model itself is too limited for understanding the way family influences operate (see MacDermid, Seery & Weiss, 2002).

Inside the Armed Services, research on family-performance/readiness links also is limited. Probably the most important research on this topic within the Armed Forces was conducted as part of the Army Family Research Program (AFRP), which was initiated in 1986 and conducted over a five-year period. A summary of the AFRP can be found in Segal and Harris (1993). Overall, the AFRP found some relationships between family factors, particularly military family support, and individual readiness, as measured with supervisory ratings. Most of the evidence, however, pointed toward the influence of family factors on unit readiness. This research can be seen only as a beginning. The results, while suggestive, are limited by the absence of an underlying performance model to direct the research, a focus on family issues (the mandate of the program) to the exclusion of other extra-work conditions and experiences, and a restricted pool of examined family conditions and processes.

Apart from the program of research conducted by the Army, some other military research does exist on this topic. Like the Army research, these studies suggest a link between family and work performance/readiness, but do not fully explore it. For example, Burnam, Meridith, Sherbourne, Valdez, and Vernez (1992) looked at family factors and readiness. They found that marital problems were related to problems at work, as was poor emotional well-being, which was presumably also a result of non-work factors. Fiedler, Rocco, Schroeder, and Nguyen (2000) studied Coast Guard helicopter pilots and found that domestic stress carried over to the pilots' workday by influencing perceptions of their own job performance.

Overall, it appears that Glaser's (1996) conclusion regarding the tenuous nature of the QoL – individual performance relation is warranted. This conclusion is based primarily on the lack of research on the topic. Even the research that does exist is focused entirely on family issues. Other domains of QoL, such as social support outside the family and religion, are virtually ignored. The family research that does exist focuses mainly on work-life conflict, which is an important but limited perspective. A full model of how the various domains of life might influence immediate performance, or a model that can serve as a guide to a program of research on the topic, is lacking.

In the remainder of this paper we will discuss our ideas about the nature of such a model. We will first present our thoughts on the nature of immediate performance. We do this because we feel that in order to develop a program of research on QoL-performance links, it is necessary to start with a framework for understanding the processes that drive individual performance. Our reasoning for this is quite simple. If QoL factors are to influence individual performance they must do so by impacting immediate performance processes. So, determining which QoL factors are important and how they operate requires a demonstration of how they link to performance processes. Ideas about those linkages will follow the discussion of our model of individual performance.

THE PERFORMANCE EPISODE

Life is Episodic

As alluded to, problems at home can spill over to work and vice versa (Crouter, 1984). One's role as a family member may at times interfere with one's role as a military member (Greenhaus & Beutell, 1985). The literatures that have addressed these issues in the past have done well in determining that such problems exist; they have identified a wide variety of predictors of conflict and spillover (Almeida, Wethington, & Chandler, 1999; Kossek & Ozeki, 1998). Not too surprisingly, prevailing logic has assumed that conflict and spillover negatively impact performance. Beyond this logic, however, a detailed understanding of *how* these family factors affect work performance has been missing. Are there global, overarching relations between average levels of spillover or conflict and average levels of performance? Does one's global assessment of quality of life permeate down to the performance of day-to-day tasks? Do daily life events have an aggregate impact upon one's ability to perform overall? These questions, either implicitly or explicitly, describe how many researchers portray the relation between QoL factors and performance.

The above approaches to the study of QoL and performance, however, do not adequately represent the way in which events unfold throughout the day. Current approaches ask us to recall the events of a day, week, or perhaps longer interval of time, and then make a global judgment about the quality of the events. Life does not progress in such a fashion. Rather, the progression of our lives is comprised of a series of episodes that have a coherent structure in our minds and are associated with specific people, occurrences, and evaluations. We get up, have breakfast, go to work, have lunch, take a break. We engage in all manner of compartmentalized, coherent activities. Along with each of these activities appear various players, or the people with whom we interact. Interactions with these people and the process of these activities give rise to a multitude of specific events, and our evaluation of these events results in, among other things, emotional responses. The exact sequence may not always unfold in this way; indeed, it is possible for our emotional responses to drive our activities and social interactions. Of primary

importance, however, is that these elements all are part of life's episodes, and that the episode is the appropriate unit by which to understand them.

There is a history in the social sciences of understanding human behavior in terms of its episodic structure (Abelson, 1976; Barker, 1963; Newton, 1973; Newton & Engquist, 1976; Newton, Engquist, & Bois, 1977; Schutz, 1970). Initially, researchers sought to determine whether these units have use for predicting various social behaviors. More recently, the focus has fallen on the structure of social interaction episodes (Forgas, 1982). A key finding in this area is that, indeed, most experiences are understood in terms of discrete, coherent units, and that this is the most common way in which people characterize the passage of their lives. For example, if someone were to ask, "What have you done today?" the likely response would be a listing of coherent activities. "I got up and took a shower. Then I drove into town to run some errands, and on the way back I picked up some lunch." In addition to social interactions, some research has examined the episodic structure of emotional experiences. Frijda (1993) discussed this notion and cited several studies documenting how people experience emotions as having distinctive and perceivable beginnings and ends.

If life is constructed episodically, then it seems to follow that life at work also is constructed in such a way. An episodic analysis of our work lives, however, is notably absent from the literature in Industrial/Organizational (I/O) psychology. Toward the end of the paper, we devote a section to drawing explicit links between the episodes of our life and the episodes of our work. In the next section, however, we focus on work, and attempt to define it in terms of its episodic structure. Because the focus of the paper is on performance, the episodes of fundamental interest to us are those that involve work-related activities, and as such, the concept of a performance episode will become a central feature for our discussion.

The Performance Episode: A Framework For Understanding Performance

As we have suggested, our focus on one person, doing one task, at one time, is different from most other theories of performance, which start with assessments of performance across many tasks and many time points. At this juncture, we also should note another difference between our perspective and that of other performance researchers. The global evaluation of performance has, as its goal, the objective of comparing performance among people, or identifying constructs that relate to performance at a global level only. What this approach does

not provide, however, is an understanding of the ongoing process of performance within a single person. It is our view that these processes are essential for understanding the influence of many factors -- most importantly, those factors associated with QoL. Certainly there is variation across people in performance as well as quality of life. It seems obvious, however, that performance and quality of life are constantly in flux for any given person.

Psychologists often are guilty of measuring constructs such as performance at a global level and then assigning the measured score to an individual as if there was never any variation in individual personal performance. Similarly, psychologists might also measure QoL and provide a single score for each person as if the events of their lives and their reactions to these events were a constant. The practice of providing a single score for constructs such as performance and QoL reflects the desire to summarize and compare between individuals. This practice, however, belies the fact that workers perform better on some days and worse on others, or that some days may be filled with positive events and other days equally replete with negative events. Accordingly, our first goal is to provide an understanding of the ongoing, episodic nature of performance. This goal requires us to consider what causes the fluctuations in micro-levels of performance.

The difficulty in this endeavor is to decide what is the appropriate micro-level. There are many conceptions of what constitutes a moment, and there are many conceptions of what constitutes momentary performance. Any decision made concerning this issue will be unavoidably subjective. However, the next section of our paper argues that our definition of momentary performance has a great amount of utility for understanding the processes involved in work.

Defining the Performance Episode

Before launching into our own perspective, we should acknowledge that a large body of research has attempted to define the momentary unit of performance numerous times, albeit for different purposes. In particular, the unit on which we will focus is conceptually similar to the definition of *task* that has been examined in the job analysis literature (Fleishman, Quaintance, & Broedling, 1984; Harvey, 1991). Within this literature, many researchers have attempted to define exactly what a task is and what it is not. There appears to be no consensus on the appropriate definition, and this is as it should be. *Task* is a term used not just by industrial

psychologists, but also by laypeople. As such, it represents many things to many people, and an attempt to reach the *correct* definition seems futile. The literature on tasks appears to concur with this assessment, to which the variety of existing definitions is a testament. Provided here is a sampling:

- “A task is any set of activities, occurring at the same time, sharing some common purpose that is recognized by the task performer.” (Miller, 1967, p. 11, in Fleishman & Quaintance, 1984, p. 49)
- “A task is an arbitrary unit of work: one or more related actions necessary to change or verify a systems state. A task may be mental, physical, or a combination of these.” (Van Cott & Paramore, 1988, p. 653)
- “A task is usually considered to be a discrete unit of work performed by an individual. It usually comprises a logical and necessary step in the performance of a duty, and typically has an identifiable beginning and ending.” (McCormick, 1979, p. 19)

These definitions make clear that researchers have adopted definitions for *task* that suit the needs of their particular research questions. We will follow a similar route. We will use the term *performance episode* as our conception of this unit of performance. We do this not because we feel the construct is conceptually distinct from some definitions of *task*. Rather, we do this so that our discussions involving this construct will not be confused by the plethora of existing “task” definitions.

We wish to capture the unit of performance that corresponds to what workers would report as a coherent, work-related activity at any given moment in time. It is important to understand that this likely will be different depending on a variety of factors, including, but not limited to, the particular type of activity and the precise moment at which the question is posed. Because the processes in which we are interested occur on a moment-to-moment basis - life events, resource diversion, and resource depletion - we wish to capture a set of performance behaviors that match this relatively brief duration of time. In other words, we seek to answer the question: “In any given moment, what fundamental unit of performance is interrupted by non-work factors?”

Certainly, a broad definition of performance, such as that obtained by supervisory ratings or other global assessments, is too coarse. Non-work interferences may come and go during a

period of time captured by a supervisor's rating of performance, and all of the potential variability that occurs as a result of these non-work interferences therefore is lost. At the other extreme, discrete motor behaviors and immediate cognitive processes are likely to be too narrow. For example, we cannot deny that movement of a computer mouse and the associated thoughts about such movements are a part of performance. Although it is true that these motor behaviors and cognitive processes are disrupted by non-work influences, they lack coherence as an identifiable activity. What we are interested in, then, is the smallest unit that is phenomenologically experienced by the worker as a coherent activity. Thus our working definition of performance episode is:

“The coherent set of thoughts and behaviors that one executes in service of the most immediate, conscious, and work-related purpose.”

This definition bears a resemblance to some of the earlier definitions of *task*. The differences, however, are worthy of note, and we will now describe several questions that arise in the process of fleshing out a more concrete definition.

Whose Perspective?

Who defines the particular performance episode, the worker or the observer? In keeping with the phenomenological experience of the worker, it seems that it must be the worker.

The first reason to adopt the worker's view in defining particular performance episodes concerns conceptual clarity. The reason for identifying a performance episode is so that we can isolate those activities that are directed both toward and away from the performance episode. Because the worker necessarily is aware of all these activities, certainly more so than the researchers, our perspective of choice should reflect this subjective awareness. We understand that participants may not be able to describe fully the array of potential processes that are directed toward or away from their performance, but at any given moment in time they certainly are the best judges of what they are doing.

The second reason for adopting the worker's perspective is an issue of pragmatics, and it delves somewhat into our proposed measurement paradigm. Ecological Momentary Assessment (EMA; Larson & Csikszentmihalyi, 1983; Schwartz & Stone, 1998; Stone & Shiffman, 1994) is particularly well suited for our proposed momentary assessment of performance and the factors

that affect it. Briefly, this method involves recording participants' subjective experiences at multiple times throughout the day across several to many days. It allows researchers to track changes in a variety of variables such as mood and emotion (Fisher, 2000) or characteristics of events (Csikszentmihalyi & LeFevre, 1989). EMA does, however, create difficulties if the researcher bears the responsibility of categorizing the activities in which the participants engage. That is, to have the researcher, rather than the worker, decide when a performance episode begins and ends does not capture the phenomenological nature of the episodic structure of life's passing. Consequently, the worker must be asked to provide information concerning the performance episode.

How Long Does the Performance Episode Last?

When does the performance episode begin and end? In keeping with our definition, particularly our emphasis on conscious awareness of our behaviors, the beginning and end of the performance episode occur according to when the worker perceives them to begin and end. This characterization appears, at first blush, to lead to absurd conclusions. For example, if the end of a performance episode is defined as the point in time when a person is no longer engaged in a particular coherent activity, then is it not possible for someone to experience a performance episode over the course of several days while engaged in a long and difficult task? This characterization does not capture the nature of momentary performance. Consequently, working on similar activities over long periods of time would not be considered a single performance episode under our framework because the worker goes through several onset and offset periods. In determining when the performance episode begins and ends, we defer to the limits imposed by the worker. The onset of a performance episode can be identified by the conscious initiation of the activities involved in a given performance. Put simply, the performance episode begins when the worker perceives that he or she has begun working on a particular set of coherent activities. Similarly, its offset can be identified by the conscious termination of the relevant activities. Because one might be engaging in only one activity within a performance episode, as opposed to several at once), the end of a performance episode must be the conscious termination of *all* relevant activities.

Thus, writing a lecture over the course of several days necessarily would constitute several performance episodes because there must be points in time when the would-be lecturer

thinks, “I’m going to stop working on this for today.” This stopping point represents the conscious termination of the performance episode. This also is a key distinction between traditional definitions of *task* and the current perspective, as most definitions of *task* require attaining a goal as opposed to halting activity associated with the task.

How Many Performance Episodes Can Occur at Once?

Can more than one performance episode occur simultaneously? As noted earlier, the nature of performance episodes vary with the type of work under investigation. Because of this, it is certainly possible for someone to engage in multiple concurrent performance episodes. Remember, a particular performance episode ends as a result of conscious termination. Thus, if our aspiring lecturer receives an important business-related phone call, she may stop working on her lecture momentarily to address the pressing nature of the caller’s business. If she were asked to report on her activities at that moment, she might respond that she was dealing with an angry student on the phone. If, however, we were able to delve deeper into the range of performances in which she was engaged, we might find that the temporary phone call did not result in the conscious termination of writing the lecture, and, in fact, that she perceived that both activities were occurring within the same general time frame. Thus, two performance episodes were occurring simultaneously, but one was on “pause”.

Initially, this situation seems to create numerous measurement difficulties. If two performance episodes are occurring simultaneously, then which performance episode is *the* performance episode of interest? As with the other potential gray areas of our definition, we would ask the worker to identify the salient, or *focal* performance episode. In this way, rival performance episodes give way to what is, by definition, the most important performance to the worker at a given moment in time. Our emphasis on a single, focal performance episode foreshadows the idea that performance at any moment on one activity is hindered when the focus of attention shifts to a different activity. Certainly, there are instances of dual-task performance, such as talking on the phone while simultaneously writing a letter, but even in such instances, research consistently has documented that performance on the two simultaneous activities suffers as a result of the divided attention (Schneider & Fisk, 1982).

Summary

Our perspective for understanding performance approaches the topic from a microprocess level. We believe that many interfering thoughts, emotions, moods, and events occur throughout most workdays. These occurrences usually are brief, but can vary in duration and intensity. To examine when and how these occurrences affect performance, we must break down our unit of performance to a correspondingly micro level. Our conceptualization of the focal performance episode achieves this by providing an experiential, coherent structure of work. With this structure in hand, we can evaluate how performance throughout the day is disrupted or altered.

UNDERSTANDING EPISODIC PERFORMANCE

An essential argument of our model is that the features and experiences of life outside the workplace -- marriage quality, support of friends and family, spiritual beliefs and religious community -- influence work performance by directly and indirectly influencing *immediate* performance processes. Later we will elaborate on the linkages between life experiences and these key performance processes. However, since any ideas about these linkages rest on an understanding of the nature of episodic performance processes, it is advantageous to describe our understanding of these processes. The framework we present will serve as the foundation for our thinking about the way quality of life (QoL) influences work performance.

Performance Variability

Even the most cursory examination of people at work will reveal the presence of variability in how well they do their jobs. Such variability comes in two forms. First, performance varies among different workers doing the same job. For whatever reasons, some workers simply perform better than others do. This variability we will call *between-persons*. Second, the performance of each individual worker will vary over time and circumstances. At some moments, on some days, a person may perform better or worse than what is typical and expected for that person. This variability we will call *within-person*.

Imagine the performance of professional baseball players. Some hitters are clearly better than others. This is the between-persons phenomenon that determines who obtains the high-paying free-agent contracts. However, even the best hitters suffer through slumps and even the weakest hitters can get hot. Neither weak nor strong hitters produce consistently from day to day. This is the within-person aspect of performance variability. Fans know that loading a team with productive hitters, as gauged by average or typical performance, is no guarantee of success in any particular game.

Organizational researchers have generally focused their attention on modeling between-persons variability. Selection procedures examine skill and personality differences among applicants. Training procedures focus on raising typical or average performance by enhancing

general and stable skill levels and reducing differences among people in the possession of those skills.

Less attention has been paid to modeling within-person variability in performance over time. Yet, the infrequent attention does not indicate this factor is less important in terms of organizational functioning. Even the best performers in an organization will not be working at peak performance levels all of the time. Over time, the performance of both the best and worst performers will overlap to a considerable extent. Research suggests that, as compared to between-person variability, within-person variability can account for as much or more of the total variability in performance (e.g., Deadrick, Bennett, & Russell, 1997; Miner, in press).

More than 20 years ago, Kane and Lawler (1979) presented a discussion of the importance of measuring performance variability, which resembles our own thoughts on this issue. They argued that most measures of performance - both objective and subjective appraisals - seek to find a single number that represents typical or average performance. Such an approach, they contended, is defended by the dubious assumptions that performance is mostly a function of stable individual and organizational characteristics, that average performance represents some true performance level, and that variations around that average are the result of error of measurement. They concluded that these assumptions are not defensible since behaviors generally, and performance in particular, are greatly influenced by transient, variable individual states and organizational events. Although means are stable and can be predicted by other stable characteristics, our interest lies in mapping out the transient states that give rise to fluctuations within individual performances.

As we have noted throughout this paper, our focus is on momentary performance, or the performance of one person at a particular point in time. It is clear that momentary performance varies across time for individuals. Various QoL experiences and conditions have effects on this momentary performance and, as such, are better able to explain within-person performance variability than has previously been recognized. It is our contention that focusing on momentary performance, and by extension within-person performance variability, will lead to more definitive and heuristic demonstrations of QoL/performance effects than have been shown thus far.

An Overview of Episodic Performance Processes

We will be describing the elements of our performance model in some detail. However, at this point it might be useful to provide a brief overview of the key components and how they come together to influence immediate performance. Our model describes three key concepts that influence performance at a particular time. These are resource allotment, regulation, and behavioral styles.

Resource Allocation

As people approach their work they bring various resources to bear on the task at hand. Among these are their skills, effort levels, task-relevant knowledge, and general cognitive abilities. It is readily apparent that people vary in the level of these resources available to them. Some people are smarter than others. Some have developed more skills through relevant training and experience. Some people are more conscientious. As discussed earlier, these are the relatively stable between-persons differences that account for differences in average levels of performance among workers. As such, these are the factors that figure prominently in general models of performance differences and in the organizational interventions intended to improve average performance based upon these models.

It is also readily apparent that successful performance at any particular time requires that people bring these different resources to bear on the problem at hand. One way to think about this is to understand that people have to focus their attention on the task and thereby direct their resources toward task accomplishment. This concept is captured by the broad idea of attentional focus. To the extent that attention resources are focused on the work, performance will be facilitated. To the extent that attention and resources are focused elsewhere, performance will suffer.

We posit that episodic performance is a function of the amount of attentional focus that can be put toward the task at hand. This is a simple but important idea. If, during an entire performance episode, a worker can devote 100% of their attentional effort to the task at hand, they will be maximally effective, with maximal effectiveness being gauged in terms of the limitations of their own general and stable levels of resources. Such a goal is undoubtedly impossible to achieve, and therefore attention to the focal task will vary from moment to moment across the performance episode. Put differently, if we could look at one's focus of attention over

a relatively short period of time, for example one or two hours, we are likely to find attention to the focal task versus attention to interfering or irrelevant activities to fluctuate dramatically.

We all can appreciate that our lives provide us with numerous diversions and distractions and at any particular time our attention can be easily diverted from the work task and focused on other issues and problems. To the extent that this occurs, performance at that time will generally suffer and therefore a key concept for understanding immediate performance is *resource allocation*, and particularly the allocation of attentional focus. So, in trying to model individual performance, not only must we pay attention to the level of resources that people have and are able to bring to a task, we must also pay attention to how efficiently they are allocating those resources to the task at hand. *Performance is a joint function of resource level and resource allocation.*

Self-Regulation

Regulation is the general process by which people determine in what direction they will apply their resources. Generally we think of regulation as involving effortful attempts to control and alter naturally occurring behaviors or mental states. In our case, regulation is the process that determines whether people can and will focus their resources on accomplishing the primary work task in the face of demands that would naturally divert their attention and resources. It would be inaccurate to claim that the simple number and severity of distractions determines how well we attend to the task at hand. Nestled in this system is our ability to avoid the temptations to be distracted and otherwise resist the urge to focus on off-task activities. The control we exert over our own behavior plays a significant part in determining performance.

Problems of regulation abound in everyday life. I might want to have that piece of pie, but know that it isn't on my diet. I might want to yell at my boss, but know that it would not be in my best interests. I might be angry with my child, but know that thinking about that throughout the day will interfere with my other activities. Successful regulation, as measured from the viewpoint of task performance, requires that people regulate the focus of their attention and the application of their resources to the work task, in the face of natural inclinations to do otherwise.

Two elements of the regulation process are of particular importance for understanding immediate performance: *regulatory demands* and *regulatory resources*. Situations vary in the

demands they place on regulatory processes. Immediate emotional states demand that we deal with them in some way. Problems at home, whether emotionally tinged or not, can also place demands on regulation. Consider the sick child or overdue credit card bill. Emotions, family concerns, and financial problems all place demands on our attention and thereby demands on regulation. Further, it would be a mistake to think that only negative experiences in our lives create the conditions for regulation. Positive events, such as an engagement, a new baby, or a raise, can also be severe distractions requiring effective regulation if performance is to be preserved.

Finally, two other factors influence regulatory demands. First is the importance of performing well, the concept generally referred to as motivation. The worker with little or no desire to perform well will see no need for regulation, even when severely distracted by work and non-work issues. Second is the nature of the task itself. Some tasks are so simple, or so rote, they require few resources for success. In such cases, attentional focus is less important for successful task accomplishment.

When regulatory demands exist, regulatory resources are brought to bear on the conflict. Such resources are both stable and transient. Stable regulatory resources, better described as *regulatory competencies*, vary across individuals. Some people have skills and techniques that allow them to focus their attention better than others can. While the existence of such competencies may seem obvious, little research exists on the nature of these competencies or how to develop them.

A novel aspect to our theory of performance is that it incorporates what is generally termed *self-regulatory resources*, which is the capacity to regulate our own behavior so as to avoid resource depletion over periods of continued use. Of particular relevance is research indicating that self-regulatory resources can be depleted with continued use, regardless of the particular reasons for self-regulation. For example, MSG Slater, the character referred to in the opening scenario, must continually regulate his emotions regarding his upcoming PCS. Controlling emotions constitutes a regulatory demand that requires the use of self-regulatory resources – resources that may not be available later for maintaining attentional focus on the task at hand. We will describe many regulatory demands that might serve to deplete our regulatory resources.

Skills and Behavioral Styles

Skill influences performance. In the absence of a good idea of how to do one's job, no amount of motivation or regulatory focus will produce quality performance. Similar to skills are differences in behavioral styles that can influence performance. For example, gregariousness may help a salesperson perform well, while attention to detail might be useful for an accountant. Although important, these differences in skills and behavioral styles relate primarily to the differences in performance across people, as opposed to the within-person differences we are trying to model.

What is less well recognized is that performance-relevant behavioral styles can be responsive to changing events and circumstances and can, therefore, vary over time. For example, people are more creative when they are in positive mood. They are less cooperative when they are angry. They pay more attention to detail and are less inclined to see the "big picture" when they are in a negative mood. These behaviors - creativity, cooperation, and attention to detail - can greatly influence immediate performance. Since they are responsive to changing events in and out of the workplace, they are part of the way in which immediate performance varies over time.

As can be seen in this overview, there are many factors that affect fluctuations in performance across episodes. The goal of the next section is to familiarize our readers with the intricacies of cognitive resources, self-regulation, and behavioral styles. Throughout our discussion of these processes, we will illustrate the links to performance.

Cognitive Resources

The Available Pool of Cognitive Resources

We conceive of *cognitive resources* in a very general way. For our purposes, it includes the raw "brain power" usually associated with such fundamental cognitive processes as reasoning, problem solving, short-term memory, etc. (Ackerman, 1988; Anderson, 1982; Proctor & Dutta, 1995). It also includes the stored knowledge relevant to task accomplishment (McCloy, Campbell, & Cudek, 1994). One of the most ubiquitous findings in the study of work performance is that individual differences in cognitive resources, whether referring to the general cognitive abilities captured by the concept of intelligence, or the more task specific and "nurtured" elements of knowledge, predict performance differences among workers (Ackerman,

1986; Hunter, 1986). How might we explain this relationship? General cognitive ability can be considered a pool of cognitive resources available to accomplish a task. Ordinarily, and depending upon such factors as the difficulty of the task and the amount of practice, the larger the pool, the easier it becomes to perform well (Kanfer & Ackerman, 1989).

This common finding is an illustration of our between-persons analysis of performance differences. People differ in the size of their pool of cognitive resources -- their skills, knowledge, and processing capacity -- and these differences in the size of their pool of cognitive resources are associated with differences in individual performance.

However, when considering performance, the size of the pool is not the only consideration. Researchers generally believe that it is useful to consider the pool as fixed at any particular time with portions of it being directed at various activities¹. The extent to which those resources are devoted to a particular task at a particular time will influence one's ability to complete the task successfully (Posner & Snyder, 1975; Schneider & Fisk, 1982).

All of us have experienced what it is like when resources are diverted or fragmented. Attempting to set the VCR while talking on the phone often results in a missed program. Writing a report while neighboring construction hammers away in the background makes for slow, error-prone work. The competition between listening to an opera on the radio and reading unfamiliar highway signs often results in either the radio being turned down or a wrong turn being made. Strangely though, when we hang up the phone to program the VCR, move to a location where there is no construction noise, or turn off the radio, we return to our full capacities almost immediately. This sensation is linked to the manner in which many psychologists think about cognitive resources (Gilbert, 1989; Smith, 1994). Before continuing, perhaps an analogy would aid in clarification.

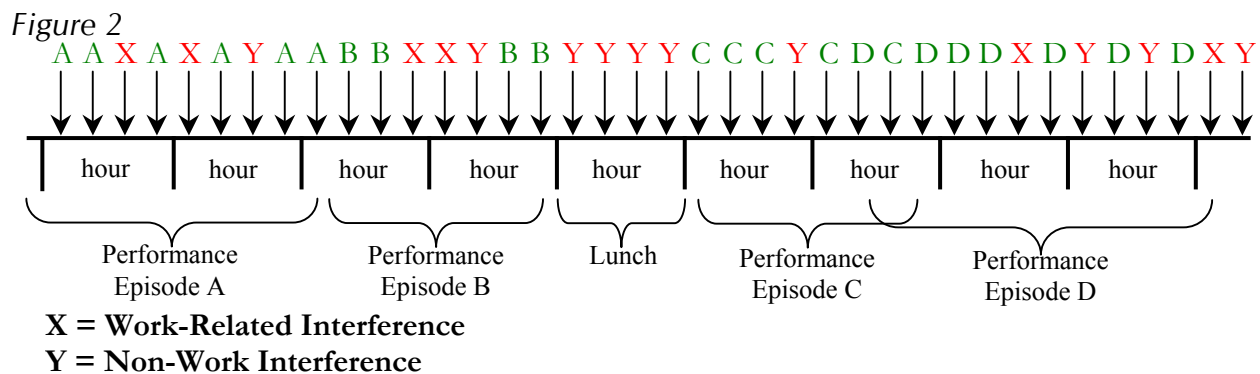
For a moment, consider our cognitive resources as being similar to a power plant. A power plant has a certain total capacity that is based upon many different factors, such as city revenue devoted to power, and the ability to transfer power effectively from other locations. These power resources deliver needed electricity to the various homes and businesses in the community. Under normal conditions, a city's power plant is able to handle the load of power requirements; however, when something taxes the system, such as a heat wave, the power plant's resources become burdened, which may result in reduced functioning to certain areas in the community. Once the burden is removed - the heat wave passes - the plant's power resources

return to normal levels. Thus, while it may appear at times that a power plant suddenly has too few resources to achieve normal functioning, in actuality, the resources are stable but are spread too thin to accommodate increased power demands.

If we apply this analogy to our own cognitive resources, we observe many similarities. We have a certain total capacity that is based upon many different factors, like total cognitive ability, health, etc. We devote these cognitive resources to myriad tasks and thoughts on a constant basis. Under normal conditions, our resource capacity is able to handle the “load” of tasks that consume resources; however, when multiple tasks demand our attention or we are distracted away from the focal task, our resources are burdened and the result may be ineffective functioning on one or more of the tasks. Once the burden is removed - a distracting stimulus is removed, or a secondary task is eliminated - our resources return to full capacity. Thus, at times it may appear that we have fewer cognitive resources than normal. But in actuality, the same amount of cognitive resources is being utilized, but too many tasks or distractions are present.

The Allotment of Cognitive Resources

For successful performance, it is not enough to have a large store of cognitive capacity. Certainly, as we have said, the total amount of cognitive resources that particular individuals have can determine how well they perform relative to others (Hunter & Hunter, 1984; Ree, Earles, & Teachout, 1994). However, for our within-person perspective, what is more important is the proportion of those resources that are devoted to relevant tasks. At any particular moment during a performance episode, our cognitive resources are either on-task or off-task. Each performance episode encompasses a number of moments; the percentage of these moments that are spent focusing on-task represents how well a particular person performs during that particular episode. We have illustrated this idea in Figure 2.



In Figure 2, the horizontal line represents a hypothetical worker's day. The line is broken down in two ways: the vertical lines designate hours, and the braces indicate performance episodes. Above the line there are arrows that represent "snapshots" of attentional focus. The letters tell us where the worker had placed his or her attentional focus at that particular moment. The letters A, B, C, and D refer to specific focal performance episodes, and the letters X and Y refer to instances when some other activity interfered with one of the focal performance episodes. The X's refer specifically to a work-related interference, such as being interrupted by your boss or a taking a phone call from a client. The Y's refer specifically to non-work interferences such as a break for lunch or taking a phone call from one's spouse. The green versus red colors of the letters make the simple distinction between on-task and off-task.

One consequence of this conceptualization of performance is that the particular contents of off-task thoughts are less important than one might expect. It does not matter whether off-task thoughts concern family matters, other work-related matters, or simple flights of fancy; the fact that they are thoughts irrelevant to the particular task at hand means they hinder performance during that episode. Thus, in Figure 2, it does not matter whether the interference is designated as an X or a Y, as both are equal in their capacity to draw attention away from a focal performance episode. Later, we will discuss the role of off-task thoughts more thoroughly, but for now our contention is that *the percentage of moments on task during the episode determines the relative level of performance, irrespective of the content of off-task thoughts.*

Because we are concerned primarily with modeling a single person's performance at multiple time points, the level of performance during a particular episode is of great importance. For example, if we find that a service member's performance episodes fluctuate in a pattern that corresponds to the presence of certain QoL issues, we are likely tapping into the relation between the processes of QoL and the processes of performance.

A concrete example might serve to clarify: Let us say that we are examining the performance episodes of MSG Slater, who was experiencing difficulties associated with an upcoming PCS in the opening scenario. Throughout each performance episode, we track the extent to which he is focused on the task at hand, as well as the extent to which he ruminates about his upcoming move. Our hypothesis, in its most basic form, is that the extent to which he reflects upon his PCS will interfere with his ability to focus on the task, and therefore will impact his level of performance during any given episode. We then would expect that fluctuations

across performance episodes would be indicative of the extent to which the PCS is a topic of concern to MSG Slater.

Cognitive Demands

The obvious assumption in the previous example is that off-task cognition does impair our ability to perform at a particular moment. Our justification for this assumption comes from several areas of research. As such, we will devote this section to describing the nascent scientific research that documents the impact of off-task thought on performance, as well as how this process happens. We note that, for the most part, these researchers have not benefited from collaboration or integration. As a result, there are several redundancies and inconsistencies in each topic, and we will do our best to clarify and alter the concepts with a view toward a more cohesive presentation. Our goal is to present a classification of cognitive demands that can occupy our cognitive resources and a description of how these demands affect performance.

Cognitive interference. Although research in this area has a great deal of breadth, a general notion of cognitive interference can be defined as “thoughts that detract from on-task activity” (Yee & Vaughan, 1996, p. 78). The particular content of these thoughts, however, has driven much of the research and spans numerous domains. For example, initial research on this topic found that decrements in test performance were due not to anxiety-based arousal, but to the interference of self-deprecatory thoughts generated by the anxious state (Ganzer, 1968). Similar efforts in the areas of anxiety and depressive disorders have found that these individuals suffer chronically from the intrusion of such interfering thoughts, and that these thoughts may perpetuate their conditions (Segal, 1996). Researchers have characterized cognitively interfering thoughts as relatively enduring (I. G. Sarason, Pierce, & B. R. Sarason, 1996) or fleeting (Klinger, 1996), wanted (e.g., daydreaming) or unwanted (e.g., worry) in nature. In addition, aspects of the individual’s environment can generate these interfering thoughts or they can be a reflection of an internal state. All of these distinctions make it difficult to isolate the causes and consequences of the phenomenon; we will therefore highlight the key distinctions that are essential to the performance episode, particularly when examined in conjunction with QoL factors.

One of the more useful distinctions among the varieties of cognitive interferences is that of internal versus external generation. We will use the term *distracting thoughts* to refer to those

that are externally generated and retain *cognitive interference* for those that are internally generated.

To be precise, externally generated distracting thoughts are those that arise through features of one's environment and, for good reason or not, require immediate attention. These features can range from background noises to phone calls to planned meetings. They are considered distracting inasmuch as they require an allotment of cognitive resources and are not involved in the completion of a focal performance episode. For example, a planned meeting might not seem to be a source of distracting thoughts unless the focal performance episode is a task that is interrupted by the meeting. Then, the resources allocated in service of the meeting could constitute a distraction from the focal performance episode. A more mundane and momentary example of externally generated distracting thought might be a brief phone call at the office. For the duration of the call, some amount of resources is devoted not to the focal performance episode, but to concentrating on the phone conversation.

Internally generated cognitive interferences differ from those that are externally generated in that they represent mental efforts devoted to tasks unrelated to the focal performance episode. For example, let us say that one receives a phone call while working on the task of repairing a motor vehicle. The phone call certainly represents a distraction and will hinder performance of the focal task for the duration of the call. Perhaps, however, the phone call is from the wife of the mechanic, and the content of the conversation concerns the couple's credit difficulties. The mechanic might be inclined to have thoughts concerning the call and their credit situation after the phone conversation is over. These thoughts constitute cognitive interferences to the extent that they occupy resources needed to perform the focal task of repairing the motor vehicle. They are separable from distractions because they are internally generated.

Rumination. Rumination refers to a more enduring class of thoughts than those described in the previous section. Some researchers in the cognitive interference area have included what we are calling ruminative thoughts (e.g., Mikulincer, 1996), but again, we maintain that the distinction between fleeting distractions or other unwanted thoughts and continuing ruminations is a useful one. Because distractions and interfering thoughts usually stem from momentary interruptions, their relation to QoL may represent only brief disturbances. Rumination, however, implies that one's thoughts are continually interrupted by the same

concern. We therefore see potential utility in separating this class of enduring cognitive interference.

The primary characteristic of rumination is the preoccupation with internal emotional states. Martin and Tesser (1996) discuss many different kinds of ruminative thoughts and detail how these thoughts persist and color perceptions of objects and events in the environment. Thus, the influence of ruminative thought on focal performance episodes occurs not only through direct interruption of on-task cognitions, but also in the interpretation of events that occur in the environment before and during such rumination. Moreover, rumination is thought to occur as a result of not attaining a particular goal. Because of the failure to reach one's goal and the emotions that are experienced as a result, people may ruminate about the goal until they attain it, or it becomes important to them to focus on another goal.

The extent to which QoL represents a topic of rumination obviously constitutes a key to understanding the link between QoL and performance. Perhaps certain QoL domains have great ruminative potential and therefore become prime suspects for interfering with on-task cognition. If this is the case, then merely counting the categories of off-task cognitions will not accurately gauge the extent to which performance suffers from interference. For example, if the upcoming PCS move of the Slater family is a topic that has substantially greater ruminative potential than other QoL concerns, then the sheer number of QoL concerns may not matter; his performance episodes will be riddled with thoughts of one topic alone.

Distractions, cognitive interferences, and rumination represent functional categories of off-task cognition that affect the on-task cognition necessary for high levels of performance during the episodes that fill our workdays. They do not, however, help to explain why someone would choose to focus on off-task topics instead of remaining devoted to on-task topics while at work. It is apparent that such mental dedication to work-related tasks is impossible to sustain for the entirety of a workday, but what is not apparent is the process by which we shift our focus to a particular topic. Fortunately, the psychological literature is far from silent on what we refer to as the process of self-regulation.

Self-Regulation

The Nature of Self-Regulation

Cognitive resources obviously play a large role in allowing us to focus on the task at hand; when multiple sources demand our attention, we are less able to perform up to par. Equally important, however, are our conscious decisions to engage in on-task activities. It is true that sometimes we are unable to avoid a ringing phone, a talkative co-worker, or a particularly provocative event. Other times, however, it is simply the choice of where to focus our attention: “Shall I do this task or shall I go to lunch?” “Shall I work on these reports, or is it more important to respond to my email?” “Shall I have that talk with my unit members, or should I put it off until next week?” These all are examples of efforts at self-regulation -- the control of our own behavior.

Carver and Scheier (1998) have noted that acts of self-regulation are organized around efforts to create and maintain the desired conditions of our lives. These desired conditions or goals can vary from abstract and far-reaching, such as the goal to achieve the rank of Colonel, to concrete and mundane, such as the goal to finish a report by lunch. One of the first comprehensive theories of self-regulatory behavior, control theory (Carver & Scheier, 1981; cf. Powers, 1973), posited that our goals are hierarchically organized, such that accomplishment of the lower order goals - finishing report by lunch - gives way eventually to the accomplishment of higher order goals -attaining the rank of Colonel). In between the lowest and highest order of goals are a multitude of intermediate goals of varying levels of abstraction. We progress toward higher-order goals by comparing one’s current state to a desired state (Carver & Scheier, 1990). That is, our behaviors are evaluated in terms of their potential to move us toward our goals, or move us away from our goals.

For example, in deciding whether to complete a task or go to lunch, an evaluation will be made of the extent to which each behavior will affect a higher-order goal. Perhaps this goal is to win the approval of a commanding officer. In this case, one may decide that it is appropriate to complete the task before lunch because it will place the person closer to the desired goal. If, however, the choice of behaviors has no relevance to the goal, maybe because the commanding officer might be unaware of the unit member’s zeal in completing the task before lunch, then other criteria, such as the goal to socialize with one’s unit members, may determine the choice of behavior. Sometimes, simple hunger pangs may be the deciding factor. This example also

highlights the idea present in control theory that goals differ in their importance. In the current situation, winning the approval of the commanding officer takes precedence over socializing with unit members.

Obviously, the hierarchy of goals is complex and far reaching. We have summarized this model to give you a feel for how these processes differ from traditional cognitive processes such as attention and memory. In particular, people can have limitless cognitive resources, but if they do not appropriately self-regulate, they will not be able to focus on the task at hand and their level of performance will suffer as a result. Given this realization, it becomes apparent that self-regulatory functions at work are of vital importance.

Fortunately, many theories in I/O have addressed issues concerning self-regulation in work environments. One such theory, Kanfer and Ackerman's (1989) resource allocation model, provides a great amount of detail on regulatory processes in work-related task acquisition and performance. They describe two main categories of regulatory processes: distal and proximal.

Distal processes concern whether an individual will put forth the effort required to accomplish a task and greatly resemble traditional notions of expectancy theory (e.g., Naylor, Pritchard, & Ilgen, 1980; Mitchell, 1974; Vroom, 1964). Put simply, individuals determine the level of resources to allocate toward a new skill by asking themselves, "What happens if I perform? Will I succeed if I try? Is it worth the effort?"

Proximal processes determine how an individual will regulate the resources that are immediately available. Kanfer (1987, 1990) has described three self-regulatory processes that make up proximal motivations.

1. Self-monitoring involves the regulation of attention toward specific aspects of an individual's behavior, as well as the consequences of that behavior (Kanfer & Ackerman, 1989).
2. Self-evaluation simply is the comparison of observed behaviors (i.e., self-monitoring) with desired goal states.
3. Self-reaction processes entail feelings of satisfaction and efficacy that occur as a result of self-evaluation.

We note that Kanfer and Ackerman's and Carver and Scheier's (1981; 1998) perspectives are similar in that observed behaviors are compared to desired states (i.e., goals) and outcomes from these states.

Regulatory Resources

We stated earlier that our ability to complete a task ultimately is determined by the amount of cognitive resources devoted to that task. We described the total pool of available resources through the use of a power plant analogy. We have also described a second process that is essential to successful momentary performance, namely, self-regulation. If cognitive processes ultimately are determined by a finite resource, is there a similar resource that controls regulatory processes? If so, does this resource also follow the power plant analogy? These questions represent some of the more recent thinking on the topic of self-regulation, and evidence has surfaced suggesting self-regulatory processes are fueled by an altogether different resource. Furthermore, unlike cognitive resources, this resource does not follow a power plant analogy; it appears to behave analogously to a muscle.

Muscle strength is at its maximum after a period of sufficient rest. Once the muscle begins to work, however, its strength decreases continually over time. Unlike the power plant analogy, strength does not return to full potential once the strain is removed. The muscle requires some amount of rest before it can regain the strength initially exhibited. In addition, a muscle's strength potential can increase with repeated use. One can see how this model is quite different than the functioning of a power plant. If our electrical resources were managed in a manner similar to a muscle, we would go for long periods of time with no electricity while the power plant "rested." Also, power plants would become more effective over time as their strength increased through repeated usage. Finally, more power would be available immediately after a rest period, but it would become evermore scarce throughout the day.

The absurdity of the muscle analogy in relation to a power plant highlights how our regulatory resources differ from our cognitive resources. Unlike cognitive resources, each additional regulatory demand further diminishes our ability to regulate our own behavior unless a period of rest occurs (Baumeister, Bratslavsky, Muraven, & Tice, 1998). After sufficient rest, we can face regulatory demands with renewed strength (Muraven, Tice, & Baumeister, 1998). With continued use of our regulatory resources we find it easier and easier to deal with the same regulatory burdens, and even take on new demands of this resource, as in the beneficial effects of training on our overall strength (Muraven, Baumeister, & Tice, 1999).

The above depiction is, admittedly, only an analogy, but recent research suggests that it describes our regulatory resources with some amount of accuracy. In particular, Muraven and

Baumeister (2000) review a vast amount of research that supports the strength model of regulatory resources. In addition, these authors suggest that regulatory resources apply to all aspects of self-regulation. So, we are using our regulatory “muscle” whether we are coping with stress, managing our emotions, avoiding temptation, or simply trying to stay on-task.

It is apparent, then, that relative levels of regulatory resources play a large role in modeling our within-person conception of performance. At various times of the day, depending upon the regulatory demands that have occurred throughout the day, our ability to regulate our focus toward the task at hand will fluctuate in accordance with this resource. Thus, *regulatory resources determine our ability to focus our cognitive resources on the task at hand*. Beyond the implications for the performance of a single person across the workday, it seems likely that the overall level of resources will vary from person to person, suggesting an area of individual differences that should predict performance, particularly on tasks that require greater levels of regulation for successful completion.

Regulatory Demands

As we have said, during any performance episode, attention or the direction of resources can shift to on-task or off-task. The extent and nature of this shifting will influence the quality of episodic performance. It should be clear by now that performance tasks compete with external concerns for attentional focus. Self-regulation is the process by which people are able to maintain task focus in the midst of attentional competitors and the level of regulatory resources available at a particular time is part of what determines success in achieving that objective.

However, it should also be clear that regulatory resources are only half of the regulatory picture. The other half consists of the regulatory demand of the environment, both external and internal. We have already alluded to these issues in our discussion of distraction, interference, and rumination. Our point there was that the external environment can present simple distractors to task focus. Sometimes these distractors are minor but still consequential, such as noise, telephone calls, etc. Sometimes these distractors are more substantive and longer lasting in their influence on attention. Here we refer to emotional states, problems at home, etc. Sometimes these distractors are event-driven, as in a meeting with a supervisor or a call from one’s spouse. Sometimes they are more chronic, as is the case with bouts of anxiety or depression. The literature, while fragmented, is extensive and points to the performance-debilitating effects of

emotional events and states through cognitive interference, rumination, and other aspects of cognitive demand.

Turning to regulatory demand, we note that an important influence at any given moment, one that is particularly relevant to QoL issues, is the emotional state of the person. In this area, consequences arise from one main aspect of emotional experiences.

In addition, emotions themselves generate regulatory activities that can reduce the level of regulatory resources available to a person. Extensive research indicates that people engage in numerous cognitive and behavioral activities to regulate the experience and expression of their own emotions (Gross, 1999; Larsen, 2000; Parkinson, Totterdell, Briner, & Reynolds, 1996). This *emotion regulation* is closely related to the processes involved in coping with stress, and stress is another important influence on regulatory demand. Emotion regulation, however, can be seen as a broader concept than coping. Coping focuses on efforts to deal with the negative and taxing situations of stress. Emotion regulation focuses on regulating emotional experiences and states, regardless of whether they are positive or negative, or whether they are taxing or not.

Larsen (2000) describes a model of mood regulation designed to account for the regulation of both positive and negative mood states. More specifically, he presents a discussion of the strategies people use to manage their mood states that compares cognitive - ways to think - and behavioral - things to do - strategies as well as strategies that focus on the mood itself versus those strategies that focus on changing the situation. Larsen's taxonomy should be particularly useful for work researchers examining how mood states influence immediate performance. Such influences appear to come from both the potential interfering nature of the mood regulation activities and the overall depletion of regulatory resources. The relevance of QoL factors to the generation of these emotional states is both apparent and under-researched.

Another factor that feeds into regulatory demand is what many organizational psychologists have termed *emotional labor*. Generally, this term refers to "the effort, planning, and control needed to express organizationally desired emotions during interpersonal transactions" (Morris & Feldman, 1996, p. 987). Most researchers have used this term in conjunction with the service industry, where the display of emotion is particularly necessary for effective performance. The notion, however, can be extended to any work situation where the appropriate display of emotion is important. We have already discussed how cognitive resources are necessary for the regulation of emotion, but this research has shown that the successful

regulation of emotion comes at a price. Consequences of emotional labor include higher levels of stress, lower levels of job satisfaction, and a propensity toward leaving the organization and other withdrawal behaviors (Grandey, 2000).

We suggest that emotional labor also carries with it the potential to negatively affect current or future performance episodes. A prime example of a self-regulatory activity is the modulation of emotion display, which is likely to deplete regulatory resources. These resources then will be less able to aid in the control of behaviors directed toward the focal performance episode. This is true particularly for performance episodes that occur after emotional labor has had time to tap regulatory resources over the course of the day. Although researchers in this area have not examined this implication of emotional labor, we consider it a natural extension of the consequences that have been documented.

Task Attentional Pull

To this point we have discussed the factors that divert our attention away from performance tasks and the processes and resources of self regulation that keep us focused in the face of extraneous demands on resources. However, in addition to these factors that pull our attention away from performance tasks there are counteracting factors that help maintain the grasp of task-focused attention. Here we are referring to such things as the importance of the task, the intrinsic interest of the task, the presence and difficulty of task goals, the existence of deadlines, etc. While the factors that produce interference have been well studied, the factors that enhance task-focused attention have not been studied in a consistent, integrative manner.

Take goals, for example. It is well known that specific, difficult goals enhance performance (Locke & Latham, 1990). Locke and Latham suggest this performance effect is the consequence of three processes: increased effort, persistence, and task-focused attention. Research on the first two processes is extensive. Research on the third is minimal. Another example involves research on intrinsic motivation (e.g., Deci, Koestner, & Ryan, 1999; Harackiewicz & Elliot, 1993; Pintrich & de Groot, 1990). If the task itself generates significant interest to employees, then it should be far easier for these employees to regulate their attention toward the task as opposed to other potential distractions, including interfering emotional events. To the extent that tasks are intrinsically motivating, they should have a relative advantage over less intrinsically motivating tasks in terms of combating cognitive interference. Similarly,

Csikszentmihalyi and his colleagues (e.g., Csikszentmihalyi & LeFevre, 1989) have described the concept of “flow” in ways similar to our concept of task attentional pull, but the integration of the flow concept with the broader issues of performance and regulation has not been attempted. Our consideration of these issues incorporates many aspects of these motivational theories and specifies one common element of particular importance for episodic performance: Factors such as setting goals, intrinsically motivating tasks, or the match between the demands of the task and our own abilities all make it easier to focus one’s attention on the task, and thereby free regulatory resources for future use.

Summary of Key Processes

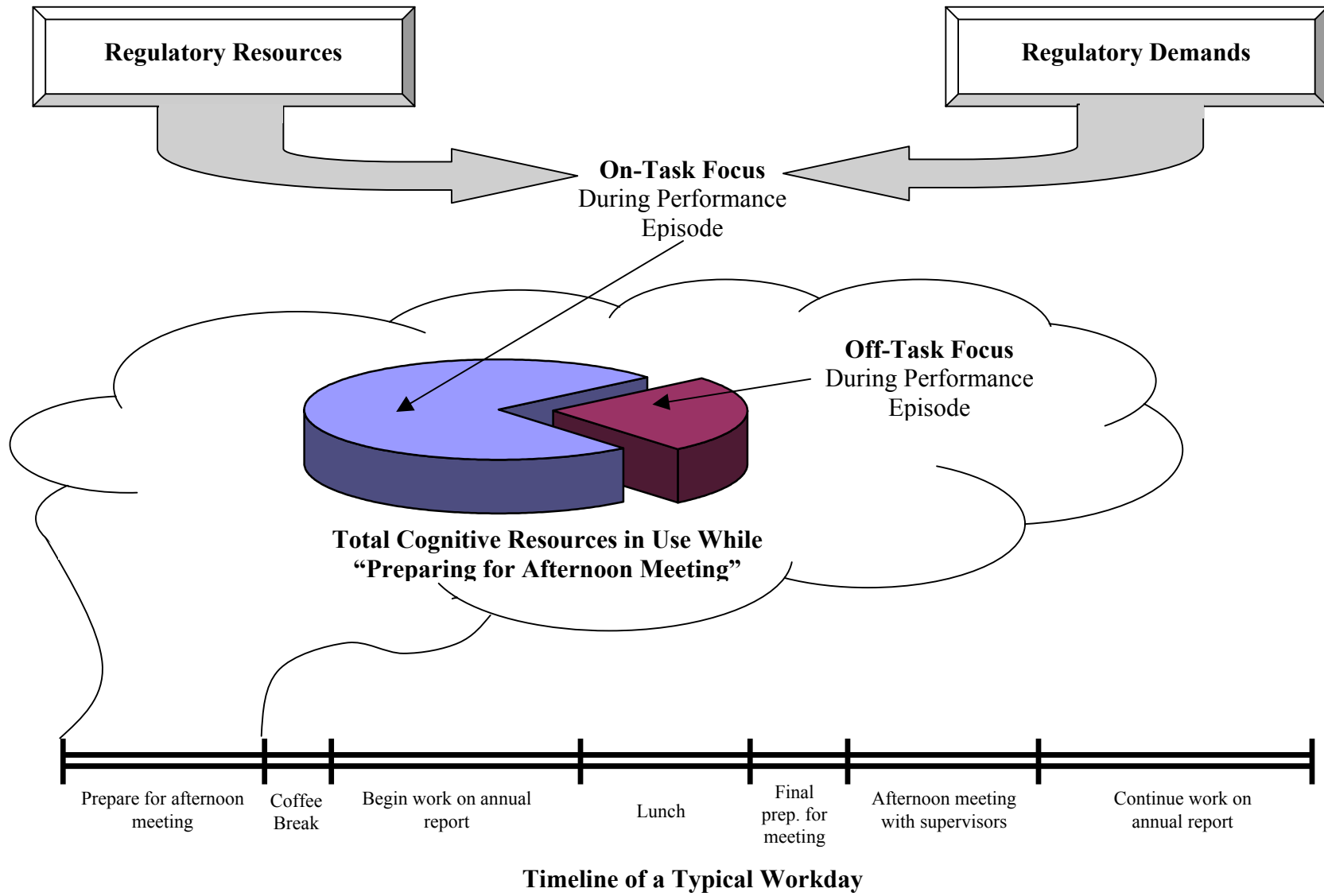
Regulatory and cognitive demands serve as the primary routes through which QoL factors affect momentary performance. For example, let us say that MSG Slater, from our opening scenario, is preparing for an afternoon meeting. This task constitutes the focal performance episode. The extent to which he can attend to this task ultimately will determine his level of performance for the episode, and therefore his performance can be gauged by the percentage of time, over the course of the entire episode, that he spends on-task versus off-task. Now, at the same time there are a multitude of events, thoughts, and activities that may arise and attempt to pull his attention away from the task. These factors represent potential cognitive and regulatory demands. Of these events, thoughts, activities, his concerns about the PCS move, and the affective consequences of these concerns are particularly prominent. To combat the temptation of dwelling on these off-task concerns, MSG Slater draws upon his available regulatory resources. Remember, however, that these resources become depleted with continuous use. If the demands are not eliminated, MSG Slater will find it progressively more difficult to remain on-task, and eventually the percentage of off-task thoughts will increase, resulting in a decrement in performance.

This example illustrates the core micro-processes in our theory of quality of life and performance. Figure 3 illustrates how these processes build up to determine the percentage of on-task versus off-task cognition and ultimately performance during a particular episode. We also summarize our position with a set of propositions:

- *Proposition 1:* Task engagement can be organized into *performance episodes* with self-defined beginnings and endings.

- *Proposition 2:* During any performance episode, attention can shift on or off task to influence episodic performance.
- *Proposition 3:* Tasks compete with external concerns (cognitive demands) for attentional focus.
- *Proposition 4:* Self-regulation is the process by which we maintain task focus in the midst of attentional competitors.
- *Proposition 5:* The ability to maintain attentional focus on the task is a joint function of regulatory demand and regulatory resources.
 - *Proposition 5a:* Regulatory demand is a function of attentional distractors, such as problems at home, emotional states, etc., that pull attention away from the task and the attentional pull of the task, such as goals, task importance, etc.
 - *Proposition 5b:* Regulatory resources are a function of the amount of self-regulation already engaged and the ability to replenish regulatory resources through rest, positive mood, etc.

Figure 3



At the Crossroads of Cognitive and Regulatory Demands

Each source of distraction, cognitive interference, and rumination may have an effect upon our cognitive resources as well as our regulatory resources. Initially, this statement appears to confound cognitive and regulatory resources. If they are separable resources, then how can a single demand occupy both cognitive and regulatory resources? The answer is actually fairly intuitive. Cognitive resources involve immediate mental functioning: our ability to attend to and use our minds in the service of a focal task. Regulatory resources involve the ability to direct our cognitive resources. Thus, a distraction may occupy some amount of our cognitive resources by impairing our ability to perform a given task. The same distraction may also deplete regulatory resources to the extent that we try to ignore it (Muraven & Baumeister, 2000; Ward & Mann, 2000).

For example, if we simply gave up working on a focal task and devoted our full attention to every phone call that rang through, our cognitive resources would be completely occupied by the distraction, but our regulatory resources would not be affected at all. Because we are not attempting to regulate our behavior in favor of a focal performance episode, such as avoiding phone calls so that we can accomplish a task, our regulatory resources are not affected. If, however, we attempt to answer phone calls while simultaneously working on a task, the phone call will represent both a burden on our cognitive resources as well as a source of depletion for our regulatory resources. Ultimately, if we choose to regulate our behavior in response to distractions, cognitive interferences, or rumination, then our regulatory resources will be depleted to some extent. If we choose, however, to give in completely to the cognitive demands of the distraction, interference, or rumination, then, somewhat ironically, we spare our regulatory resources. Of course, the rather sizeable downside to this scenario is that our cognitive resources are completely diverted away from the task at hand.

Skills and Behavioral Styles

We have stated in previous sections that resource allocation and self-regulatory processes are the main factors affecting the successful execution of immediate performance. Without the cognitive or self-regulatory resources demanded by a given task, a performance episode will suffer. Nevertheless, even if cognitive resources are not diverted and self-regulatory efforts are

successful, there still is another factor that might cause performance differences: behavioral styles.

We have discussed how differences in skills and abilities constitute a major factor in determining performance differences among workers. Despite constant efforts of organizations to improve employee performance through training, performance differences still will be observed because of varying levels of natural ability that cannot be overcome by greater experience, knowledge, motivation, or practice. In such cases, organizations attempt to select employees with high levels of relevant skills and abilities.

Just as individuals differ in the skills and abilities they bring to a task, they also differ in performance-relevant behavioral styles. Most personality measures in use by organizations are intended to measure these behavioral styles. For example, some people tend to structure and organize their environment; they are methodical and manage their time well, and usually practice spontaneous goal setting (e.g., conscientious individuals; Digman, 1990). These typical behaviors might be very important for performance on certain jobs where there are minimal supervision or goals established externally, such as independent salesmen, writers, etc. Another example characterizes extraverted individuals as being enthusiastic, confident, active, and energetic (Mount, Barrick, Stewart, 1998). The behaviors typical of this disposition would probably be more essential for the successful performance of a lawyer defending cases in court than for a computer programmer.

Differences in behavioral styles captured by personality dispositions are clearly important for understanding differences in performance. They are primarily important, however, for understanding performance differences between people; they help us understand why, *averaged over time*, one person performs better than another. However, because personality dispositions are concepts that focus on stable characteristics of people, they are of less help in explaining why individual people perform differently from one time to another than are dynamic characteristics. This limitation, as we have seen, is very important, as the performance of single individuals over time is likely to vary as much if not more than will the performance differences across people averaged over time.

Another, more transitory facet of behavioral styles constitutes an additional factor affecting immediate performance. This aspect of behavioral styles refers to behaviors that are directly fostered by transitory affective phenomena. These performance relevant behavioral

styles are more variable over time and therefore are relevant to understanding episodic performance. Of particular importance to QoL issues are behavioral styles that are the result of momentary changes in affective states, such as moods and emotions.

Research on the effects of moods and emotions on behaviors, judgments, creativity, etc., is extensive (See Weiss, in press, for a review.). For example, research indicates that moods and emotions bias ratings and judgments in the direction of the state. People evaluate all manner of things (reports, other people, etc.) all through the work day, and these evaluations tend to be more positive when they are in a positive affective state and more negative when they are in a negative affective state (Bower, 1981; 1991; Weiss, in press). Research also indicates that being in a positive mood seems to lead to a more heuristic processing style with more reliance on existing knowledge structures. In addition, perhaps the most widely supported finding regarding positive moods is that they enhance innovation and creative problem solving (Isen, 1999; 2000).

In contrast, negative moods foster a more systematic information processing style that is more reliant on a detailed examination of the available information (Fiedler, 2001; Schwarz, 2000). People in negative moods have been found to rely less on stereotypes (Park & Banaji, 2000) and to be less persuaded by weak arguments than those in positive moods (Bless, Mackie, & Schwarz, 1992). In addition, affective states influence various social behaviors. Isen and Baron (1991) review the evidence demonstrating that positive mood promotes helping behavior. Furthermore, positive mood seems to promote cooperation during negotiations (Baron, 1990; Forgas, 1998). Isen (2000) asserts that positive mood, in general, leads to better interactions with others.

When moods and emotions occur at work they are likely to have direct effects on episodic performance. At least for the duration of the affective state, certain behavioral styles are favored above others. Whether a particular affective state will contribute to or hinder a performance episode will depend on the match between the performance requirements of the situation and the particular consequences of the specific affective state (Weiss & Cropanzano, 1996). For example, an escape reaction caused by fear might prevent us from being hurt in most situations, but it might not help us perform at work.

It is possible, however, to think of direct positive effects of negative emotions on performance. For example, an employee unable to perform a task because a different area of the organization is not providing adequate information might benefit from a *little* anger. In this case,

anger might promote a more vigorous complaint to the unresponsive area, which might solve the employee's specific performance problem. On the other hand, anger can certainly have negative consequences on performance. Pilluta and Murnighan (1996) found that anger reactions lead negotiators even to reject offers that are economically more convenient for them.

Considering that moods and emotions are affected by events that occur in the work sphere as well as outside of it, and that they vary from moment to moment, identifying the behavioral styles that affective states tend to favor is essential for the understanding of immediate performance and its variability within-person.

TRAVELING THE PATH FROM QUALITY OF LIFE TO EPISODIC PERFORMANCE

Our primary objective was to develop a way of thinking that would help us understand the performance consequence of quality of life issues (QoL) and events. This last section begins the discussion of the QoL/performance connection. Our strategy is to concretize the concepts that we have introduced throughout the paper in the form of four hypothetical scenarios from a week in the life of Master Sergeant (MSG) Tom Slater. In each scenario, we make explicit the links between various QoL events and conditions and the work situations of this hypothetical service member.

Background Information for Scenarios

Among the many duties for which MSG Slater is responsible, he recently was asked to teach a training course in weapons systems to a group of Sergeants. Although his regular duties keep him quite busy, he felt this was an opportunity to display his expertise and skill as a teacher, hopefully advancing his career toward officer candidacy. He feels that attaining officer status is important because he and his wife Kathy are expecting their third child. In addition to teaching the training course, MSG Slater is a member of a steering committee of senior enlisted personnel who meet each week to discuss issues related to the readiness of the enlisted members at his installation.

Scenario 1

It is 7 in the morning and MSG Tom Slater is ready to leave for his training course. His wife Kathy is busy preparing breakfast for the kids. She comments that since he started the training course, she and the boys do not seem him much. She tells him that he not only leaves early everyday, but also comes back late almost everyday. Tom begins to feel a small amount of irritation: he agreed to teach the training course primarily with his family's future in mind. However, he also understands that his wife is pregnant and that she has a lot more work at home since he is busier with his new responsibilities. He makes a conscious effort not to display his anger in front of her, and his attempt to regulate his emotions is successful. He tells Kathy that the longer hours are only temporary, and that as he gets becomes accustomed to the new responsibilities, things will change for the better.

At his office, right before teaching his class, MSG Slater continues to ruminate and feel angry at his wife's complaint. At the same time, however, he understands that it is completely unrelated to his task of teaching class. He again makes a successful effort to control his anger and frustration.

Throughout class, everything seems fine. Toward the end of the class, however, he notices that his students are not paying enough attention. He feels frustrated, but realizes that a good instructor should be able to hold their interest for the entire class, so he does not react negatively and keeps teaching, attempting to regain their full attention.

Later that same morning, MSG Slater meets with the steering committee. They are discussing several potential proposals for improving morale among the junior enlisted personnel. Tom does not feel particularly creative this afternoon, but at the same time he criticizes almost all of the opinions that he hears. After more than an hour of discussion, most of which is plagued by Tom's opposition to any idea, nothing gets done and the group decides they should meet on a different day. Afterward, Tom is somewhat surprised by what happened during the meeting. In particular, he does not understand why he was being so obstinate and uncooperative.

Several concepts in our model are illustrated in this scenario. To briefly review the sequence of events, MSG Slater experiences a family event - his wife's complaint - that evokes negative emotions. Later he teaches a class, a performance episode where he does not want to be interrupted by his emotions. Finally, he has another performance episode, the committee meeting, during which his behavior impedes group performance. From the performance hypotheses presented in this report, we suggest that the following processes are operating in this situation:

- A) Many affective states might be inappropriate for particular behaviors required at work, thus they need to be regulated in order to maintain a high level of performance.*

The regulation of emotions is a pervasive occurrence at work. In several situations, as in the case of MSG Slater controlling his anger and frustration during his class, individuals are successful in those attempts and their performance episodes are thereby protected from emotional interferences. Nonetheless, the extensive use of self-regulatory resources has ramifications for self-control during future events.

- B) Emotion regulation at work will have negative consequences on subsequent performance episodes.*

Despite MSG Slater's success at finishing his class without the interference of his emotions, he performed poorly in a different episode later in the day. Our model predicts that while the regulation of emotions can be perfectly successful at one point in time, the consequential depletion of regulatory resources will result in a lowered ability to engage in self-control at later points in time. Thus, during his team meeting, it is apparent that MSG Slater was unable to control the most minimal disagreements with the other members of the committee; his emotions emerged unchecked and impeded the performance of the team.

Scenario 2

Early in the morning, MSG Slater is in his office preparing training course materials for a lecture on weapons delivery using the Global Positioning System, one of the more difficult topics he will teach to this group of sergeants. Despite its difficulty, he likes the topic and is particularly concerned with making this lecture interesting for the trainees. He has been working for an hour, but his attention has been wandering on and off the task the entire time. He is worried about not having accompanied his wife to an important doctor's appointment. Minutes later he gets a phone call from his wife who just came back from the doctor's appointment. She has very good news: The apparent health problems she was having with the pregnancy are gone – she is completely healthy – and she tells him that the baby is a girl!

MSG Slater and his wife are thrilled. They were really hoping for a girl. As much as they love their boys, they already have two of them, and having a baby girl is simply their dream come true. The couple talks on the phone for a few minutes, but both are very busy and agree to talk more later in the evening. MSG Slater goes back to preparing his lecture. After 10 minutes, however, he realizes that he has not accomplished much. He notices that no matter how hard he tries, his thoughts continually turn toward his soon-to-be-born girl, and imagining life with her and the rest of his family. Still, he needs to go back to his task. Despite his intentions to complete his lecture, 20 minutes later, MSG Slater catches himself with an involuntary smile on his face, and very little, if any, progress made on his lecture. He decides to take a coffee break.

Although our second scenario has not concluded, we should stop for a minute to examine what has happened up to this point. In terms of the concepts involved, it is evident that MSG Slater has just finished a performance episode that was not particularly successful. The reason for not being productive at this particular moment is clear: his wife's phone call. Interestingly, the situation is somewhat counterintuitive. Common sense would support the notion that positive

moods should contribute to better performance, not worse. Our theory brings to mind several factors that might account for such situations. For example, positive events might create as much rumination as negative events, thereby representing a source of interference with episodic performance. Regardless of whether the event is positive or negative, a more important factor in determining the amount of off-task rumination is the relative importance of the goal, and whether the event is blocking progress toward that goal (Martin & Tesser, 1996).

A positive event, especially one that is related to an important goal, such as successfully raising a family), might create as much rumination as a negative event of similar importance. In this particular example, the news about his wife and baby girl represented a very important goal for MSG Slater. Unfinished tasks and unattained goals generate greater rumination than finished tasks or attained goals (Martin & Tesser, 1996). Despite the positive characteristics of the news that MSG Slater received – his wife’s good health and finding out he will be having a baby girl – the ultimate goals of his wife’s good health and having a newborn baby girl have not yet been attained. As a result, the occurrence of a related event has spurred continued thoughts about MSG Slater’s goal, and made it exceedingly difficult to shift his attention to the task at hand.

In addition to the goal-relevancy factors involved in MSG Slater’s news, there is an additional factor concerning emotion regulation. The regulation of emotions can be difficult, and frequently unsuccessful, when the emotions are intense. Intense emotions imply strong self-regulatory demands that are not easy to override. In MSG Slater’s case, the happiness produced by the good news was intense and involved a strong self-regulatory demand that might have required the use of too many self-regulatory resources. Those resources were either not available or he was not willing to use them at the time, perhaps because of the motivational issues surrounding ruminative thoughts. For more on this, refer to section A, above.

Scenario 2, continued

On his way to the coffee-break area, MSG Slater finds his friend Staff Sergeant Swain, who asks how his wife Kathy is doing. This question opens the door for a 15-minute talk about the Slater family, in which Tom Slater clearly shows how much they were hoping for a girl, and how happy they are now. SSG Swain listens carefully and congratulates him about the good news. After the break, MSG Slater goes back to work on the lecture.

Once in his office, MSG Slater concentrates easily, new creative ideas come to his mind, and the lecture is completed within the next 45 minutes. Slater

considers how remarkable it is that he could complete 90% of his task in such a short period of time when the first 10% took the better part of two hours.

The second part of MSG Slater's morning is characterized by a break and one performance episode. It is worth noting that this performance episode had the same objective and content as the performance episode that occurred earlier in the morning. Despite the similarity of the tasks, however, we have broken them into separate episodes as MSG Slater did by taking a coffee break. Although both episodes had similar purposes, the second performance episode obviously is quite different in terms of its effectiveness. The following hypotheses characterize the processes occurring in this situation:

- A) In conditions of high self-regulatory demands, such as intense emotions, attempts at self-regulation might fail because of the strength of the demand. In such situations, responding to the natural tendency might be a better strategy than attempting to self-regulate.*

We hypothesize that there is a point of equilibrium between exerting self-regulation and its antithesis – giving in to the temptation – that should facilitate performance requiring high levels of self-regulation. In the case of MSG Slater, his performance earlier in the morning might have been facilitated if instead of talking about the positive event for only five minutes with his wife, he would have spent a longer period of time enjoying that happy moment. The fact that MSG Slater performed much better during his second performance episode might have been the result of the fact that he could give in to his emotion during the coffee break, thereby making self-regulation no longer necessary when he was back in his office. Although counterintuitive, in some situations giving in and attending to distractions, which would otherwise constitute momentary interference, might be the best way to improve performance in the long run. Although the hypothesis presented above offers an interesting explanation for processes involved in self-regulation and performance, we need to acknowledge that research has not provided direct evidence for this hypothesis. It is clear that the situation above is one plausible sequence of events, but research demonstrating that “giving in” is a plausible mechanism for enhancement of self-regulatory resources has yet to be accomplished. Accordingly, we offer the above depiction as an interesting possibility; undoubtedly, however, there are many situations in which the “giving in” strategy will be ineffective.

B) *The compensatory nature of the task may affect the extent to which people use their cognitive and regulatory resources to combat cognitive and regulatory demand.*

People may react differently to demands in their environment when they realize that they cannot compensate for immediate poor performance. For example, in the first scenario, MSG Slater did well at containing his irritation from the class despite their inattentiveness. He was probably well aware of the potential consequences of losing his temper with the sergeants in his training course. The behavior would have reflected negatively upon his ability to handle a leadership position, the class might in turn respond negatively to him, and it would make the remainder of the training course more difficult for everyone involved. He was also well aware that in order to avoid these consequences, he must regulate his emotions *during the current performance episode*. It would be of little help to blow up at his class and then make up for it by being nice during a later class. He could not compensate for the damage that was already done.

In comparison, the task portrayed in the second scenario – preparation for a training course lecture – does not carry the same sense of immediacy because it is compensatory. Despite not performing well after the call from his wife, MSG Slater undoubtedly was aware that he could try to make up for the poor performance later on. Indeed, his indulgence in a short break allowed him to eliminate some of the demands for his attention and he was then able to compensate for the earlier poor performance. It is possible that people utilize their resources differently depending upon the compensatory or non-compensatory nature of the task. Again, this is a potential implication of our model, but currently does not have support from empirical research.

Scenario 3

MSG Slater starts the morning with multiple activities. First, he attends a brief birthday celebration for one of his commanding officers. The presence of birthday cake at the event requires the exertion of some self-control for Slater as he has had some trouble passing recent physical fitness tests at a level that he would like. He is tempted to eat a piece of the birthday cake, but he successfully overrides the temptation. His first work-related episode is to review the personnel files for each member of his company. It is somewhat of an onerous task, but it must be done, so Slater plows through it. Around 9:30 he gets a phone call from his son Billy's schoolteacher. She again is calling to discuss Billy's discipline problems during class time. After talking with Billy's teacher, Tom feels down and is disappointed in the behavior of his oldest son. Nevertheless, he continues reviewing files, and at 10:30 he leaves

to attend an operations meeting with First Sergeant Cole. Although MSG Slater does not enjoy the content of these meetings, he believes FSG Cole to be a great soldier, and therefore he puts in extra effort to be on top of things in meetings with the FSG.

At the end of the morning, he attends a leadership-training course that he really enjoys. The topic of this class is interesting for MSG Slater, and the lieutenant who is teaching it tends to explain the topics very well. Slater's back is hurting a little bit, however, and the pain distracts him during the class. He makes a conscious effort to ignore the pain and concentrate, but it does not seem to work. Moreover, it is not just the back pain; little things, such a conversation in the hall outside the class, distract him. By the end of one of his favorite activities, he can barely repeat a few coherent ideas presented in the class.

This example illustrates two basic characteristics of our model of performance. First, it shows the episodic nature not only of work, but also of other daily activities, such as co-worker celebrations, phone calls, and various performance episodes. In particular, this scenario depicts several key aspects involved in self-regulation.

A) Three key factors that determine the success or failure of a self-regulatory activity are: 1) the level of self-regulatory resources (i.e., how capable are you?), 2) the level of self-regulatory demand (how difficult is it?), and 3) the motivation to engage in the focal regulatory activity (i.e., how important is successful self-regulation?).

During most of the morning MSG Slater successfully faced a wide variety of self-regulatory demands. He followed his diet, he worked efficiently on a task he did not like, he did not allow negative emotions concerning his son to greatly interfere with work, and he tried to be alert and effective in his meeting with FSG Cole. Ironically, the culmination of all these demands resulted in a less successful performance episode for something in which MSG Slater is highly motivated to perform: his leadership training class. Thus, as self-regulatory demands increase, levels of self-regulatory resources decrease leading to an increase in self-regulatory failures. Without sufficient rest, increased demands can even override the benefits of being motivated to perform. To put this in terms of our scenario, MSG Slater's ability to pay attention in his leadership training class, one of his favorite work activities, had been eroded during the course of the morning's other, rather effortful activities.

An extension of this thinking predicts that the order in which one organizes daily activities is not trivial, especially with respect to activities requiring high levels of self-

regulation. Essentially, MSG Slater placed many difficult activities one right after another, to the point where cognitive interference with his favorite performance episode was unavoidable.

Scenario 4

The next morning in his office, MSG Slater is very excited because he needs to learn a new software application for teaching weapons system skills. He finds the software challenging and potentially useful for his work; in an hour he has checked its main capabilities. Twenty minutes before finishing with that performance episode, the Army band begins its practice right outside MSG Slater's office. Nonetheless, his engagement on the task does not seem to be disrupted. Once he is finished, he encounters SSG Swain who asks him whether he could work at all with all the noise made by the band. Slightly surprised, MSG Slater replies that honestly he did not even notice the band.

Slater's next activity is to complete his review of the personnel files for his company, certainly not his favorite task. The band continues to practice outside. Not too surprisingly, this time MSG Slater is completely distracted by it. He tries to concentrate on the files, but he does not really begin to work efficiently until the band concludes its practice. Once back on the task, he makes some progress until he remembers something else. He must pick up his younger boy and take him to a dentist's appointment right after lunch. As much as he wants to see his son, he also has many other work pressures. He checks his schedule and realizes that he will have to rearrange a couple of meetings that overlap with the time he needs to pick up his son. Thus, he stops working on the personnel files, and focuses on trying to rearrange his meetings. Just before he picks up the phone, he gets a call from Kathy. She had a change in her own schedule and offers to pick their son up for him. Tom is very glad she called and thanks her very much for her help. Free of all non-task worries, he returns to his work, finishing the task without a problem.

Once again, a variety of factors occur over a brief period of time that help determine SMG Slater's level of performance. For example:

- A) Tasks that have greater attentional pull are more resistant to off-task cognitive and regulatory demands, as a result such tasks are more easily accomplished.*

MSG Slater clearly is more motivated to perform his first task of the day. He has no problem giving his undivided attention to evaluating the weapons system software, despite the cognitive demands generated by the practicing band. In contrast, when Slater engages in a task with a lower attentional pull, like the review of personnel files, the same stimulus that earlier was scarcely noticed now becomes an unavoidable distraction. In this particular case, the actual demands involved in tuning out the band have not changed. The attentional pull of the task,

however, has moved from high to low. The result is lower performance while reviewing the personnel files because it is too difficult for Slater to regulate his attention away from the music. An implication of this scenario is that knowing either the nature of the task or the impediments in the work environment alone cannot predict effective momentary performance; both components need to be taken into account simultaneously. Despite the amount of attentional pull that a task might have, an argument with a family member or even a noisy coworker might generate enough interference to affect that particular episode.

Another implication of the last scenario concerns functional spousal support and its effect on momentary performance. By freeing resources that otherwise would be allocated to non-task issues, family factors can have positive consequences for work. Although we focused on functional support as an example of the concrete positive effects of family factors on performance, we also should mention the obvious benefits of emotional and psychological support from one's family. Having a family often can require additional resources that otherwise might be devoted to work, but one's family also can operate as an additional resource during stressful times. In this example, MSG Slater's wife was able to help so that he could stay and finish an important work task. Generally, researchers have examined these issues from a between-persons perspective, relying on perceptions of or memory for family support (for an exception see Bolger, Zuckerman, & Kessler, 2000). In keeping with the general perspective of this paper, however, we believe that a within-person perspective will allow stronger linkages between actual instances of support and fluctuations in performance episodes.

THE AGGREGATION OF PERFORMANCE EPISODES

Now that we have set forth what we consider to be the most important determinants of episodic performance, we will turn to a discussion of a more practical nature: what can episodic performance tell us about the global performance of individuals and teams? By global, we refer to an overall performance level that allows comparisons between particular units; for example, global individual performance would be an estimate of performance that allowed us to compare individuals. Mainly, our discussion of global performance involves an understanding of how episodes aggregate up to higher levels of performance. In general, one would assume that an average of episodes across time for a particular person would translate well into an assessment of global individual performance, and that an average of group member episodes across time would translate well into an assessment of global team performance. There are several issues to consider, however, which call such assumptions into question. First, we will examine difficulties that arise in the aggregation of performance episodes to the level of the individual. Then, we will discuss issues that are unique to the aggregation of performance episodes to the group level.

Aggregation to the Individual Level

Before we begin describing the factors that interfere with aggregating performance episodes to the individual level, we must discuss what we mean by aggregation and why it is necessary. Frequently, managers in organizations are not interested in the performance of an individual at a specific moment in time, but rather the average level of performance that can be expected from a given individual. The reasons for this assessment preference probably stem from the perception that something can be done about a poorly performing individual (e.g., replace with a more qualified employee, completion of additional training, etc.), but specific instances of poor performance are more difficult to track down and alter. Indeed, our model of episodic performance is intended to provide insights into such alterations, and, as we have noted, few others have taken this perspective in the past.

The utility of obtaining global assessments of individual performance becomes obvious when we consider the many purposes for which managers use such assessments. Measures of global individual performance can be used to properly utilize existing employees within an

organization, to appropriately award or promote those employees who score highly, and to identify employees who require or would otherwise benefit from additional training. Note that the common element to all of these purposes is that they depend upon a comparison among individuals. Therefore, global individual performance assessments are appropriate.

If we leave our within-person perspective for a moment, we can begin to examine how one might use the rich information from the assessment of performance episodes to address questions of between-person comparisons. It is this endeavor that invokes the use of aggregation; if the lowest level of interest is a single person, then we should use all available information about this person in determining his or her global level of performance. The easiest and most frequently used method is simply to take an average of every available performance estimate for a given person. If the performance estimates are based upon episodes, then an average of episodes would provide the most accurate assessment.

Although the above averaging procedure for individual performance is intuitively appealing, there are several issues to consider that make simple averages inaccurate for the assessment of individual performance. Below we present a consideration of several of these issues. We do not intend this discussion to be comprehensive; there likely are many factors that make a simple average of performance episodes unsuitable for a measure of global performance. Our discussion, however, highlights what we believe to be the major contributing factors.

Compensatory Versus Non-Compensatory Tasks

Of the variety of possible tasks that the military requires of its members, there is a distinction that has particular relevance for the assessment of episodic performance. A *compensatory* task is one that does not require a particular level of performance at all times. One can perform this task less than maximally at one time, but then can make up for poorer performance by performing better at a later time. Averaging to achieve an assessment of global performance, however, assumes that all episodes contribute approximately equally to the global performance – that there are no critical episodes that can compensate for or have greater impact than other performance episodes.

Unfortunately, we know this not to be the case, as many tasks can be described as *non-compensatory*. An excellent example of this category is the performance episode of landing a plane. If the pilot's performance is deficient, then it is impossible to compensate at a later time.

Indeed, one can think of many jobs for which there are “critical” episodes – episodes that cannot suffer from inadequate performance or that can disproportionately bolster an otherwise lackluster level of individual performance. We suspect that the compensatory/non-compensatory distinction represents ends of a continuum rather than two discrete categories. Some tasks are probably more compensatory in nature than other tasks, and a number of tasks, such as landing a plane, are completely non-compensatory.

When aggregating performance episodes to the level of the individual, one cannot treat compensatory and non-compensatory tasks equally. Episodes that involve compensatory tasks carry the possibility that the person made up for lost time, or, equally possible, slacked off because he or she was ahead of schedule. Non-compensatory tasks have no later counterpart and therefore provide a more accurate picture of an individual’s true performance abilities. If we had information for a single person who had completed both types of tasks, then a simple average would be an inaccurate measure of overall performance. Thus, if there is a mixture of compensatory and non-compensatory tasks, then one might wish to look at all of the episodes involving a particular task first, and then average across the tasks.

Typical Versus Maximal Performance

Tasks that are being evaluated by direct observation (e.g., a commanding officer is evaluating performance on a particular task) often cause the performer to put forth unusually high levels of effort (Brewer, 1995). This maximal performance reflects someone’s potential for high performance, but does not necessarily reflect how the person performs during normal day-to-day or unobserved tasks. Thus, we can make a distinction between performance episodes that evoke typical versus maximal performance. Obviously, the extent to which an individual engages in typical versus maximal performance episodes will have ramifications for assessments of individual performance.

For example, let us say that we assess a random sample of performance episodes from two service members. One member is an Air Force special missions pilot and the other member is an Army civil engineer. It is likely that a large proportion of the pilot’s performance episodes will reflect maximal performance, as they involve missions or training that are evaluated closely by other officers. The civil engineer probably has many performance episodes that are not observed whatsoever. Thus, the engineer’s performance is more representative of typical

performance. When aggregating their performance episodes to obtain an assessment of individual performance, the aggregation of pilot performance provides information about individual performance potential, whereas the aggregation of engineering performance provides information about typical performance. The simple aggregation of performance episodes, in this situation, does not allow for equivalent comparisons between people.

Measurement Issues

Assuming that the above characteristics of episodic performance can be addressed, there are other issues that arise when using averages as indicators of individual performance. From a test theory perspective, the accuracy of the aggregate assessment will depend largely upon the number of episodes available for each person. That is, if the pilot from our previous example has his performance rated during three separate episodes over the course of a week, and the civil engineer has her performance rated during 12 performance episodes over the course of the week, then obviously we will have much more confidence in the assessment of the engineer, assuming that each episodic assessment is equally reliable).

In addition, the sampled performance episodes must occur over a relatively representative stretch of time on the job. If only one week is examined for each person, then it is entirely possible that fluctuations that cycle for a week or longer in duration will be ignored. As an example, let us say that our pilot has recently moved to a new duty station. During this time period, there are many factors at home and in the new location that could affect his performance throughout the day. Once the officer has adapted to the new location, however, performance may stabilize and return to pre-move levels. If the sample of performance episodes occurs during one week immediately after the move, however, then it is likely that the performance rating will be incorrectly interpreted as a level beneath the true performance level of the pilot.

All forms of performance assessment carry with them numerous measurement difficulties. The above examples of measurement issues in the aggregation of performance are common to many performance assessment methods, particularly those that occur over time for the same person (see Beal & Weiss, 2002; for an in-depth discussion of these issues). It is important to note, however, that the benefits of multiple measurements over time are generally considered to outweigh the difficulties (Schwartz & Stone, 1998). Careful planning of the

number and timing of performance assessments will help assure that an aggregation of performance episodes accurately reflects individual performance.

From Individual to Group Performance

When we consider the next level of aggregation – aggregation to the group level – we can assume that much of what we have said regarding individual level aggregation applies here as well. We frequently require estimates of global individual performance before we can make assessments of global performance for groups of individuals. Beyond these considerations, global group performance carries with it even more complexity. Whereas assessments of global individual performance revolved around the aggregation of performance across time for a single individual, global group performance can be aggregated across both time and individuals. Thus, one option for group performance might be to first aggregate performances of each individual over time, following with an aggregation of the individuals within each group to arrive at global group performance. Alternatively, one could aggregate all of the performance episodes available, across time and people, to arrive at global group performance. Finally, one could aggregate individuals to each group at each time, and then aggregate the group performances across all time periods. The differences here are noteworthy if there are differing amounts and types of individual performances across time.

Given these complexities in assessing group performance, it is not surprising that a considerable amount of scientific literature has been devoted to its understanding. Most of this literature has concerned itself with aggregating individuals to the group level at one point in time. Because this topic has been explored extensively elsewhere (see Guzzo & Dickson, 1996; Tesluk, Mathieu, Zaccaro, & Marks, 1997, for more details on group performance issues), we will provide only a brief overview of the key reasons why individual performances cannot simply be averaged to the group level.

To begin, let us state the fundamental idea that we are challenging: If the aggregation of episodic performances across time for one person represents an estimate of an individual's global performance, then one might conclude that an aggregation of individual global performances would be the most appropriate estimate of team performance. There are several factors, however, that again make simple aggregation inaccurate. First and foremost are processes that facilitate team functioning but are not necessarily a part of an individual's performance. For example, the

global performance of a tank team may, in part, be attributable to the success of each member's separate performance episodes. A great deal of the team's success, however, will be a function of how well the members communicate, coordinate, cooperate, and capitalize on each other's individual abilities and knowledge. All of these factors are important because they highlight how individual aggregations alone cannot capture the entirety of team performance.

To help understand how these factors predict team performance independent of individual performance, we will continue with our tank team example. During a given time period, each member of the team may experience what would be considered a successful performance episode; their particular duties are carried out as close to flawless as possible. The nature of the team and the task, however, requires that the information generated by each member's performance be communicated to other members of the team. This portion of the *team's* performance is not directly related to the individual level of performance. Nonetheless, without effective communication, the team may not be successful (Gladstein, 1984).

Similarly, if a particular sequence of individual performances is not lined up correctly with the performances of other members, the team may not be successful despite the effectiveness of each member separately. This situation embodies coordination, and represents another factor that contributes to team effectiveness above and beyond aggregations of individuals' performances (Tesluk & Mathieu, 1999). A successful performance for the gunner and a successful performance for the driver do not translate into a successful team performance if they do not coordinate their efforts.

The third factor mentioned, cooperation, also contributes to team performance independently of individual performances. At times, the success of the team will depend upon all of the members' motivations to achieve success for the entire team (Kolodny & Kiggundu, 1980). If members are concerned only with their own individual performance, then a lack of cooperation will interfere with the success of the team.

A final, synergistic element to team performance concerns the members' ability to capitalize on the expected abilities of other members. That is, each member is likely to carry with him or her specific knowledge or expertise beyond that of other members. If team members are aware of the knowledge areas of other members, then they can place greater focus on their own areas of expertise without being distracted by learning or performing the functions of other team members. This shared knowledge of teams, known in the empirical literature as *transactive*

memory (Hollingshead, 2000; Moreland & Myaskovsky, 2000; Wegner, 1986), provides an added avenue to successful performance not experienced by individuals working separately.

Were we to obtain accurate assessments of the above four factors as well as accurate assessments of individual performance, our aggregations still would not represent an accurate model of team performance. Much like most of the literature examining individual performance, the above factors focus only on variation that occurs across teams at a single moment in time (or, perhaps, during a single performance episode). By now, the reader should understand that this perspective is only half of the picture. Teams, like individuals, perform across time. Thus, a complete understanding of team performance must also consider this within-team variation.

As mentioned before, the job characteristics discussed as factors affecting the aggregation of individual performances also impact the aggregation of group performances across time. Groups can engage in compensatory or non-compensatory tasks, and they can exhibit typical or maximal performance. In addition, measurement issues associated with assessing the same groups over time (e.g., stable estimates from multiple measurements, accounting for cycles in the performance, etc.) must be addressed. We mention these facets of group aggregation across time because they represent important issues for future research. Unfortunately, neither theoretical nor empirical treatments of this topic have yet surfaced.

CONCLUSION

In this paper, we have theorized about the processes that determine how a person will perform during any given episode at work. We feel that such a theory is important because the performances of a single person across multiple episodes are likely to vary as much as performances vary across people. Given that we are delving into relatively uncharted territory in the world of performance, we expect that there are myriad factors relevant to understanding within-person performance that we have overlooked. It is our hope, therefore, that our theorizing stirs the interests of other researchers and encourages them to identify these other relevant factors involved in episodic performance. In addition, we are excited to see whether our ideas concerning the episodic structure of performance, particularly how it matches with the episodic structure of other life experiences, are useful for I/O psychologists. In writing this paper, we often felt that the number of connections to other interesting areas of research soon would reach insurmountable levels. Indeed, as often is the case, the most difficult aspect of writing by far was in limiting our scope. Despite such limitations, we believe our theory to be rich with implications for academics and practitioners alike.

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FOOTNOTES

¹Certainly, knowledge can increase and problem-solving skills can develop over time. However, this does not invalidate the idea that at any given time the pool is limited in size.