

Cybernetic Theory of Stress, Coping, and Well-Being:
Review and Extension to Work and Family

Jeffrey R. Edwards

Kenan-Flagler Business School

University of North Carolina

Chapel Hill, NC 27599-3490

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Cybernetic theory provides a useful general framework for understanding human behavior. Cybernetic theory was originally developed to describe the functioning of self-regulating systems (Ashby, 1966, Wiener, 1948). According to cybernetic theory, the purpose of self-regulating systems is to minimize discrepancies between environmental inputs and internal standards that serve as reference criteria. This purpose is achieved through the negative feedback loop, which assesses discrepancies between environmental input and internal standards and attempts to minimize these discrepancies by changing the environment, adjusting standards, or both. Cybernetic theory has been adapted to explain human behavior, often under the rubric of control theory (Carver & Scheier, 1981; G. Miller, Galanter, & Pribrum, 1960; Powers, 1973), and has been further elaborated to explain specific psychological and behavioral phenomena, such as motivation (Hyland, 1988; Klein, 1989; Lord & Hanges, 1987; Taylor, Fisher, & Ilgen, 1984), goal-setting (Campion & Lord, 1982), impression management (Bozeman & Kacmar, 1997), and mental and physical health (Hyland, 1987; Pyszczynski & Greenberg, 1987; Seeman, 1989).

Principles of cybernetic theory have also been applied to theories of stress and coping (Carver & Scheier, 1985; Cummings & Cooper, 1979; Edwards, 1992; Latack, Kinicki, & Prussia, 1995; McGrath, 1976; Tapp, 1985). Drawing from cybernetic theory, Edwards (1992) developed an integrative theory of stress, coping, and well-being in organizations. This theory views stress, coping, and well-being as critical elements of a negative feedback loop, in which discrepancies between environmental inputs and internal standards induce stress, which damages well-being and stimulates coping efforts intended to resolve discrepancies between the environment and standards. This theory integrates other theories that define stress in terms of person-environment congruence and incorporate feedback relationships linking coping to the sources of stress (e.g., Beehr & Newman, 1978; Cummings & Cooper, 1979; French, Caplan, & Harrison, 1982; Kahn, Wolf,

Quinn, Snoek, & Rosenthal, 1964; Lazarus & Folkman, 1984; McGrath, 1976; Newman & Beehr, 1979; Schuler, 1980).

This chapter reviews and extends the cybernetic theory of stress, coping, and well-being presented by Edwards (1992). First, basic principles of cybernetic theory are summarized, and recent criticisms of the application of cybernetic theory to human behavior are addressed. Second, definitions and core mechanisms of the theory proposed by Edwards (1992) are discussed. Third, empirical evidence relevant to cybernetic stress theory is summarized. Fourth, the theory is extended to encompass stress, coping, and well-being associated with work and family. The chapter concludes by discussing implications of the extended theory to stress and coping research.

Overview of Cybernetic Theory

Basic Principles

A basic model of the cybernetic control process is shown in Figure 1 (Carver & Scheier, 1982). Starting at the bottom, the model shows that the environment is sensed by the input function, which then feeds information regarding the environment into the comparator. The comparator evaluates environmental input relative to internal standards, which are provided by the reference criterion. If this comparison indicates a discrepancy between the environment and standards, the output function is engaged, which attempts to resolve the discrepancy by changing the environment. The model shows that the environment may also be influenced by a disturbance emanating from outside the control system. This basic model represents a negative feedback loop, given that its purpose is to minimize (i.e., negate) discrepancies between environmental input and internal standards.

Insert Figure 1 About Here

Applications to Human Behavior

Applications of this basic model to human behavior (e.g., Carver & Scheier, 1981; G. Miller et al., 1960; Powers, 1973) have translated the components of the model into perceptual, cognitive, and behavioral constructs. Specifically, the input function represents the person's perception of the environment, and the reference criterion corresponds to the desires, values, or goals of the person. The comparator signifies the cognitive comparison of the perceived environment to the person's desires, values, or goals. The output function refers to behavioral attempts by the person to influence the environment, and the disturbance represents forces other than the person (e.g., powerful others, social structures, chance events) that may impact the environment.

Most applications of the basic model in Figure 1 to human behavior include two important elaborations. First, a path is often added from the output function to the reference criterion, thereby indicating that the person can resolve discrepancies by adjusting standards to conform with the environment (e.g., Campion & Lord, 1982; Klein, 1989; Lord & Hanges, 1987; Taylor et al., 1984). Second, the single feedback loop in Figure 1 is viewed as one element in a system of multiple feedback loops (Carver & Scheier, 1981; Powers, 1973). These loops are arranged hierarchically, with each level of the hierarchy representing feedback and regulation with respect to standards at a particular level of abstraction. Standards at higher levels of abstraction signify superordinate goals, whereas standards at low levels represent subordinate goals. Throughout this goal hierarchy, feedback loops at higher levels act by specifying standards for one or more feedback loops at lower levels. For example, a salesperson with an ambitious superordinate goal regarding sales performance may set high subordinate goals regarding new accounts, repeat business, and customer satisfaction. These subordinate goals invoke feedback processes that specify goals at even lower levels, such as making calls, providing samples, and offering discounts to potential customers. The fulfillment of subordinate goals creates changes in the environment that provide input to feedback

loops throughout the hierarchy. This input is interpreted at a level of abstraction appropriate for each feedback loop. Thus, calling a targeted number of potential customers in a day not only provides input relevant to the goal of calling customers, but also generates input for the goals of generating new accounts and meeting overall sales targets.

Criticisms of Cybernetic Models of Human Behavior

Applications of cybernetic theory to human behavior capture the dynamic process by which people appraise the environment relative to internal standards, how these appraisals stimulate efforts to change or adapt to the environment, and how this process operates at different levels of abstraction to guide behavior. Despite the general utility of cybernetic theory, applications of the theory to human behavior have generated criticism (e.g., Bandura, 1989; Locke, 1991, 1994; Locke & Latham, 1990). Most of these criticisms fall into four areas. First, critics argue that, although cybernetic theory may describe the behavior of mechanical systems, it cannot describe the conscious, self-motivated behavior of humans. Adaptations of the theory to human behavior have borrowed concepts from other theories and, according to critics, these adaptations leave little that is unique to cybernetic theory. Second, critics have asserted that the sole purpose of cybernetic systems is discrepancy reduction. Given this assertion, the easiest way to reduce discrepancies is to merely lower standards, thereby obviating the need to change the environment. This narrow view of discrepancy reduction is obviously at odds with the behavior of humans, who create discrepancies by setting goals and resolve discrepancies by striving to attain goals, often by changing the environment rather than by lowering goals. Third, cybernetic models have been characterized as reactive, meaning they predict behavior in response to feedback but do not account for behavior arising from forethought regarding future goals and potential discrepancies. Finally, critics have noted that cybernetic theories of human behavior were derived deductively, arguing that this approach to theory development is inferior to an inductive, grounded theory approach. Based

on these criticisms, some critics recommend that we abandon all cybernetic theories of human behavior (Locke, 1994).

Closer examination of cybernetic theories of human behavior indicate that these criticisms are specious and unwarranted. First, cybernetic theories of human behavior have indeed elaborated basic cybernetic principles to reflect the complexity of human cognition and action. However, these elaborations have left intact the core mechanism of cybernetic theory, i.e., the negative feedback loop (Klein, 1989). Moreover, these elaborations address the very criticisms of cybernetic theory as mechanistic, thereby rendering the theory appropriate for human behavior. Furthermore, Powers (1978) has pointed out that cybernetic theory was originally developed to facilitate the design of control systems that mimic human behavior, such as automated servomechanisms that control production processes. Thus, cybernetic theory has not been adapted to describe human behavior, but rather was initially developed to describe translate human behavior as it naturally occurred.

Second, cybernetic theories of behavior involve not only discrepancy reduction, but also discrepancy creation (Klein, 1989; Lord & Levy, 1994). Cybernetic control begins with the selection of a standard. Unless this standard happens to match environmental input, a discrepancy is created. Moreover, cybernetic theories of behavior emphasize that feedback loops are arranged hierarchically, such that loops at higher levels set standards for loops at lower levels (Carver & Scheier, 1981; Powers, 1973). Through this mechanism, higher-level loops create discrepancies for lower-level loops, and efforts to resolve discrepancies at lower levels serve to resolve discrepancies at higher levels. Resolving discrepancies by simply lowering their standards is unlikely, because doing so would fail to resolve discrepancies at higher levels. One could argue that all discrepancies could be resolved by simply lowering the standard for the loop at the highest level. However, the standard at this level represents basic conditions for survival (Powers, 1973), and lowering this standard would be tantamount to giving up on life.

Third, cybernetic models of behavior do not rule out forethought. Standards at higher levels, such as the system level described by Powers (1973), entail long-term goals (e.g., live a full, healthy life) that may take years to achieve. These higher-level goals engage control processes at lower levels that, in combination, are expected to facilitate ongoing progress toward long-term higher-level goals. Setting standards at lower levels requires forethought as to which standards are likely to generate behavior that will ultimately fulfill long-term goals. Moreover, control processes at lower levels occur more rapidly than those at higher levels (Campion & Lord, 1982; Carver & Scheier, 1982; Lord & Levy, 1994), and as these processes unfold, the person may shift attention between lower and higher levels to ensure that current efforts to resolve short-term discrepancies facilitate the gradual fulfillment of long-term discrepancies. Thus, forethought is integral to the selection and setting of lower-level standards to achieve higher-level goals.

Finally, theory development may occur both inductively and deductively (Dubin, 1976), and neither approach is inherently superior. Indeed, many recent cybernetic theories of behavior were derived deductively, tracing their core ideas to classic sources such as Ashby (1966), J. Miller (1965), Wiener (1948), and von Bertalanffy (1968). However, these sources contain cybernetic models with inductive origins, in that they attempted to account for the observed behavior of living systems. In any case, cybernetic theories of human behavior should be judged on their inherent merits, not their origins (Klein, 1989). Moreover, debates regarding the internal logic of cybernetic theories must be supplemented with empirical research. Of particular value are studies that compare predictions from cybernetic theory with those from competing models, such as goal-setting theory (Phillips, Hollenbeck, & Ilgen, 1996). Due to the paucity of such studies, the utility of cybernetic theories relative to other theories of human behavior has yet to be determined.

Cybernetic Theory of Stress, Coping, and Well-Being

Definitions of Core Constructs

This section provides an overview of the cybernetic theory of stress, coping, and well-being developed by Edwards (1992). According to this theory, stress refers to a discrepancy between the perceptions and desires of the person, provided this discrepancy is viewed as important by the person (Cummings & Cooper, 1979; Harrison, 1978; Schuler, 1980). Perceptions are non-evaluative subjective representations of events, situations, and conditions, including the physical and social environment surrounding the person and the person's own characteristics (e.g., gender, social status, competence, physical appearance). Perceptions are not limited to the present, but may entail recollections of the past or anticipations of the future. Desires represent what the person consciously wants and encompass goals, values, and interests (Cummings & Cooper, 1979; Locke, 1976; Schuler, 1980). Importance is the degree to which the person considers a discrepancy central to his or her overall well-being (Beehr & Bhagat, 1985; Schuler, 1980).

Some investigators define stress as a situational condition or event (e.g., Cooper & Marshall, 1976; Kahn & Quinn, 1970; Matteson & Ivancevich, 1979) or as a psychological or physiological response of the person (e.g., Ivancevich & Matteson, 1980; Martin & Schermerhorn, 1983; Parker & DeCotiis, 1983; Selye, 1956). Situational definitions overlook individual differences in how situations are cognitively appraised. Moreover, situational definitions usually denote a situation as stressful only if it damages well-being, thereby confounding stress with one of its primary outcomes. Response definitions ignore differences in the subjective meaning of situations that may generate the same psychophysiological outcome (Lazarus & Folkman, 1984), as when danger and exercise both produce physiological arousal. Response definitions also exclude episodes in which coping successfully avoids or ameliorates stress, thereby preventing damage to well-being. The definition of stress employed here avoids

these problems by incorporating cognitive appraisal as the subjective comparison of perceptions to desires and by defining stress independent of its hypothesized outcomes (i.e., well-being, coping).

Several theories define stress as a discrepancy between environmental demands and the abilities of the person, indicating that stress arises when demands exceed abilities and failure to meet demands has important consequences (Beehr & Bhagat, 1985; Cox, 1987; Lazarus & Folkman, 1984; Shirom, 1982). This definition of stress is consistent with the demands-control model, which posits that strain results when demands exceed decision latitude, a situational determinant of ability (Karasek & Theorell, 1990). The view of stress as excess demands has been challenged by Harrison (1978), who contends that excess demands are stressful only when: (a) failure to meet demands prevents the receipt of desired outcomes (e.g., rewards, approval); or (b) demands are internalized by the person as desired goals, motives, or rules of behavior. In either case, excess demands generate stress only if they create discrepancies between perceptions and desires. Hence, excess demands do not constitute stress itself, but rather are a potential cause of stress. Discrepancies between demands and abilities may also influence coping efficacy, in that coping strategies are more likely to succeed when the demands of the strategy are within the person's abilities (Edwards, 1988, 1992).

Three other key constructs in Edwards' (1992) theory are duration, well-being, and coping. Duration refers to the amount of time the person spends thinking about a discrepancy (Beehr & Bhagat, 1985; D. G. Gardner, Dunham, Cummings, & Pierce, 1989). Duration captures the person's awareness of a discrepancy, which is a necessary condition for the experience of psychological stress (Lazarus & Folkman, 1984; McGrath, 1976). Well-being refers to psychological and physical health, including short-term affective and physiological outcomes and chronic, long-term mental and physical functioning. Unlike strain, which focuses on dysfunction

(French et al., 1982), well-being ranges from mental and physical illness to positive mental health and physiological growth and regeneration (Edwards & Cooper, 1988; Karasek, Russell, & Theorell, 1982; Seeman, 1989). Coping represents efforts to prevent or reduce the negative effects of stress on well-being. To avoid confounding coping with its outcomes, coping is defined as efforts to influence stress and well-being, not as the successful implementation of these efforts (Edwards, 1988; Lazarus & Folkman, 1984).¹ Coping involves a decision-making process in which coping strategies are selected and implemented. This process may range from a careful generation, evaluation, and selection of coping strategies to an intuitive or preconscious coping response (Edwards, 1988). Each coping strategy signifies a causal pathway by which coping may affect stress and well-being. These pathways are described later when the effects of coping are discussed.

Relationships Among Core Constructs

Interrelationships among the core constructs of Edwards' (1992) cybernetic theory are depicted in Figure 2.² Starting at the left, perceptions are influenced by objective characteristics of the person (i.e., self-perception) and the physical and social environment. Perceptions of the self and environment are filtered, modified, and supplemented by cognitive construction processes (Weick, 1979) and social information (Salancik & Pfeffer, 1978). Social information also affects desires and importance through cues from others regarding the relevance and significance of evaluative standards (Kahn et al., 1964; Salancik & Pfeffer, 1978). Perceptions are cognitively compared to desires, yielding a subjective representation of the magnitude and direction of their discrepancy. This comparison may range from a conscious evaluation to a nearly automatic assessment (Klein, 1989; Lord & Hanges, 1987; Lord & Levy, 1994; Taylor et al., 1984).

Insert Figure 2 About Here

Discrepancies between perceptions and desires affect well-being and coping. These effects may take various functional forms, depending on the type of desire involved in the discrepancy (French et al., 1982; Klein, 1989; Naylor, Pritchard, & Ilgen, 1980; Rice, McFarlin, Hunt, & Near, 1985). For desires that represent optima or ideal amounts, either positive or negative discrepancies will damage well-being and stimulate coping. Similar effects will be produced by desires that signify a range of tolerance, provided that perceptions deviate beyond the tolerable range. For desires that represent minimum thresholds, negative discrepancies will damage well-being and evoke coping, whereas positive discrepancies will slightly improve well-being. In contrast, for desires that represent maximum limits, positive discrepancies will damage well-being and produce coping, whereas negative discrepancies will slightly improve well-being. In Figure 2, the direct effect of discrepancies on coping indicates that the person may attempt to avoid or reduce stress before well-being is damaged. The indirect effect of discrepancies on coping through well-being signifies that coping may occur after well-being has been damaged.

Figure 2 shows that the effects of discrepancies on well-being and coping are moderated by importance and duration. Importance intensifies the effects of discrepancies on well-being and coping (Hyland, 1988; Mobley & Locke, 1970; Rice et al., 1985; Taylor et al., 1984). Likewise, the effects of discrepancies on well-being and coping are intensified by duration, such that well-being and coping are influenced more by those discrepancies upon which the person focuses his or her attention (Beehr & Bhagat, 1985; Carver & Scheier, 1981; D. G. Gardner et al., 1989; Hollenbeck, 1989). Importance and duration are affected by discrepancy size, such that larger discrepancies are considered more significant and draw more attention (Lord & Hanges, 1987; Lord & Levy, 1994). Importance also affects duration, with greater attention devoted to discrepancies considered more consequential to the person's overall well-being (Carver, 1994; Klein, 1989; Lord & Hanges, 1987; Lord & Levy, 1994).

As shown in Figure 2, coping may influence well-being both directly and indirectly through the determinants and moderators of stress. Coping targeted directly at well-being has been labeled emotion-focused coping (Billings & Moos, 1981; Lazarus & Folkman, 1984) and includes relaxation, catharsis, alcohol and drug use, and other efforts to dampen symptoms without influencing their causes. Coping may affect perception by altering personal characteristics or the physical and social environment, representing problem-focused coping directed toward the self and situation, respectively (Lazarus & Folkman, 1984). Coping may also influence perception through cognitive reconstruction or the selection, reinterpretation, or rejection of social information. Additionally, coping may align desires with perceptions or devalue the importance of stressful discrepancies, both of which represent forms of cognitive reappraisal (Billings & Moos, 1981; Latack, 1986; Lazarus & Folkman, 1984). Finally, coping may reduce duration by diverting attention from discrepancies, signifying avoidant coping (Lazarus, 1983).

Figure 2 shows that the effects of discrepancies on coping are moderated by environmental and personal factors. Environmental factors include opportunities or constraints regarding coping strategy choice (Mattlin, Wethington, & Kessler, 1990; Terry, 1994) and access to coping resources, such as social support (Cohen, 1988; House, Umberson, & Landis, 1988). Personal factors refer to coping styles that arise from personality traits (e.g., locus of control, Type A behavior) and cognitive schema that elicit scripted coping strategies (Edwards, 1988; Lord & Hanges, 1987; Menaghan, 1983). Environmental and personal factors also moderate the effects of coping on the sources and moderators of stress. For example, as noted previously, coping efforts are more likely to succeed when the demands of the chosen coping strategy are within the abilities of the person. Likewise, physical constraints and powerful others may impact coping strategy success (Edwards, 1992).

Hierarchy of Multiple Feedback Loops

The basic feedback loop shown in Figure 2 is a component of a hierarchy of feedback loops. Powers (1973) classifies this hierarchy into nine levels. At the top of the hierarchy is the system level, which regulates discrepancies involving self-esteem and survival (Carver & Scheier, 1981; Powers, 1973). Next is the principle level, which comprises discrepancies regarding guiding principles or rules such as being a reliable employee or a conscientious boss. Below is the program level, where sequences of behaviors analogous to scripts (Schank & Abelson, 1977) are enacted (e.g., arrive at work on time, provide feedback to subordinates). Lower levels, which primarily involve sensory and motor control, rarely require conscious attention (Powers, 1973) and therefore do not directly influence psychological stress (Edwards, 1992).

The present theory specifies three mechanisms by which higher-level loops activate lower-level loops. First, higher loops may shift desires in lower loops to create discrepancies (Carver & Scheier, 1981; Powers, 1973). For example, a discrepancy regarding progress toward tenure may prompt a professor to increase goals for publication, teaching, and service. Second, higher loops may raise the importance of lower loops. For instance, the desire for job security may heighten the importance of meeting specific performance objectives, such that even small discrepancies regarding these objectives are not tolerated. Third, higher loops may affect duration by directing attention to lower loops, focusing on those loops that are most instrumental to resolving discrepancies at higher levels (Lord & Levy, 1994). These mechanisms may operate concurrently, such that discrepancies created by shifting desires may be assigned greater importance and command more attention.

Higher-level loops may also deactivate loops at lower levels through these three mechanisms. Thus, a lower loop may be deactivated by adjusting its desires to align with perceptual input. Alternately, the importance of a lower loop may be decreased through a reprioritization of desires, values, or goals. Finally, duration may be reduced by ignoring or

denying a lower loop. Deactivation of a lower loop is likely when ongoing attempts to resolve its discrepancy fail (Klinger, 1975). Once a lower loop is deactivated, other lower loops linked to the same higher loop may be activated in an attempt to find alternative means for resolving the discrepancy of the higher loop (Hyland, 1988). If all lower loops are exhausted, the higher loop itself may be deactivated, meaning that the desire or goal associated with the higher loop is forsaken (Abramson, Seligman, & Teasdale, 1978).

Loops at lower levels may resolve discrepancies in loops at higher levels through two mechanisms. First, environmental factors regulated at lower levels may influence environmental factors at higher levels. This is illustrated by the tenure example cited earlier, in which publishing articles, earning high teaching ratings, and performing service activities lead to the receipt of tenure. Second, loops at different levels may monitor the same feature of the environment but interpret it at different levels of abstraction (Powers, 1973; Carver & Scheier, 1981). For example, carrying out the program of arriving at work on time may be interpreted as being a reliable employee at the principle and as enhancing one's overall self-esteem at the system level.

Summary

Edwards' (1992) cybernetic theory views stress, coping, and well-being as critical elements of a negative feedback loop. Stress refers to a discrepancy between perceptions and desires, and the effects of this discrepancy intensify as its importance and duration increase. Stress damages well-being and stimulates coping, which signifies efforts to improve well-being either directly or by altering the determinants and moderators of stress. These basic feedback processes are embedded in a hierarchy of feedback loops, in which loops at higher levels activate loops at lower levels, and efforts to resolve discrepancies at lower levels help resolve discrepancies at higher levels. Thus, this theory depicts the dynamic, ongoing process by which people appraise the environment as stressful or benign and attempt to alter or adapt to the environment to reduce stress and improve well-being.

Empirical Studies of Cybernetic Stress Processes

To date, few studies have explicitly tested propositions derived from Edwards (1992) cybernetic theory. However, evidence regarding certain aspects of the theory is available from studies in the stress, satisfaction, motivation, and control theory literatures. These studies are briefly reviewed in this section, with an emphasis on studies that provide evidence relevant to the core processes underlying Edwards' (1992) theory. This review is intended to provide a general overview of relevant evidence rather than an exhaustive description of individual studies, and more detailed reviews are cited as appropriate.

Determinants of Perceptions

Studies of stress typically measure environmental stressors and perceived stress using self-report measures (M. Burke, Brief, & George, 1993). Because of this, very little evidence is available regarding the effects of the objective physical and social environment on perceptions. Evidence across various domains of organizational research indicates that the relationship between objective and self-report measures is modest (Starbuck & Mezias, 1996). However, these studies often construct objective measures based on descriptions from key informants, such as supervisors, job analysts, or the researchers themselves. It is questionable whether these descriptions should be considered objective, given that they are essentially self-reports from alternative perspectives. Despite the shortcomings of available evidence, it appears that perceptions may depend on input from sources other than the objective environment. Two sources indicated by the model in Figure 2 are social information and cognitive construction processes, and research supports the contention that perceptions are influenced by these two sources (Thomas & Griffin, 1983; Weick, 1979). However, the relative effects on perceptions of the objective environment, social information, and cognitive construction have yet to be examined.

Effects of Discrepancies Between Perceptions and Desires on Well-Being and Coping

Numerous studies have examined how discrepancies between perceptions and desires relate to various indices of well-being (Assouline & Meir, 1987; Edwards, 1991; Michalos, 1986). Most of these studies have operationalized well-being as self-reported affect, such as job satisfaction. Overall, these studies suggest that satisfaction is related to the discrepancy between perceptions and desires. However, the functional form of this relationship is unclear, because most studies have operationalized the discrepancy between perceptions and desires using either an algebraic, absolute, or squared difference score (Edwards, 1991). Studies using all three of these scores have shown that, for a given data set, each score may yield a significant relationship with well-being (French et al., 1982). Moreover, studies using difference scores to operationalize discrepancies between perceptions and desires suffer from numerous methodological problems that render their results inconclusive (Edwards, 1994; Johns, 1981).

Problems created by using difference scores to represent the discrepancy between perceptions and desires are avoided by studies using polynomial regression analysis to examine the joint relationship of perceptions and desires with well-being (Edwards, 1993, 1994, 1996; Edwards & Harrison, 1993; Elsass & Veiga, 1997; Hesketh & D. Gardner, 1993; Livingstone, Nelson, & Barr, 1997). This procedure is based on the premise that perceptions, desires, and well-being are distinct constructs, and their relationship should therefore be viewed as a three-dimensional surface in which perceptions and desires constitute two horizontal axes and well-being represents the vertical axis (Edwards, 1994; Edwards & Parry, 1993). Studies using this procedure have revealed that well-being often decreases as perceptions deviate from desires, although the decrease in well-being is sometimes more pronounced when perceptions fall short of desires than when perceptions exceed desires. These studies have also indicated that, when perceptions match desires, well-being is often higher when perceptions and desires are both high

than when both are low. Further generalizations are difficult to draw, however, because surfaces relating perceptions and desires to well-being vary according to the content dimension on which perceptions and desires are assessed (e.g., Edwards, 1993, 1994; Edwards & Harrison, 1993; Hesketh & D. Gardner, 1993).

Although numerous studies have examined how discrepancies between perceptions and desires relate to well-being, few studies have examined the effects of discrepancies on coping. According to Edwards (1992), these effects should mirror those for well-being, such that discrepancies simultaneously reduce well-being and increase coping efforts. Available evidence suggests that coping efforts intensify as discrepancies increase (Caplan, Naidu, & Tripathi, 1984; Mayes & Ganster, 1988) and that the choice of coping strategies may depend on personal characteristics such as gender (Eagan & Walsh, 1995). Relevant evidence is also provided by studies of the effects of goal-performance discrepancies on subsequent performance and goals (e.g., Bandura & Cervone, 1986; Campion & Lord, 1982; Kernan & Lord, 1989; Wood & Bandura, 1989). These studies suggest that, when goals are appraised as attainable, people attempt to resolve goal-performance discrepancies by raising performance. However, when goals seem unattainable, people tend to resolve discrepancies by lowering goals. Goals may seem unattainable if discrepancies are particularly large (Bandura & Cervone, 1986; Kernan & Lord, 1989) or if repeated attempts to achieve goals have failed (Campion & Lord, 1982; Carver, Blaney, & Scheier, 1979). In terms of the cybernetic model, these studies suggest that the decision to focus coping efforts on changing the environment or adjusting desires depends in part on whether the discrepancy is appraised as resolvable. However, these studies focused on task performance, and it is unclear whether their findings generalize to other types of discrepancies regarding the situation or self. Furthermore, none of the studies reviewed included measures that encompass the full range of coping strategies specified by the cybernetic theory. Edwards and

Baglioni (1993) developed measures of coping as efforts to change perceptions, desires, importance, duration, and well-being, but their study focused on the inherent psychometric properties of these measures rather than their relationships with other constructs.

Moderating Effects of Importance and Duration

Several studies have examined whether the effects of discrepancies between perceptions and desires on well-being are moderated by importance (Edwards, 1996; Locke, 1969; McFarlin & Rice, 1992; Mobley & Locke, 1970). Most of these studies have focused on affective dimensions of well-being, such as job satisfaction. Overall, these studies support the contention that, as importance increases, discrepancies between perceptions and desires have greater effects on satisfaction. However, the magnitude of the moderating effect of importance is typically small, explaining much less variance in satisfaction than the discrepancy itself. In addition, most of these studies have used difference scores to operationalize the discrepancy between perceptions and desires, thereby obscuring the form of the moderating effect of importance. One exception is Edwards (1996), who used moderated polynomial regression analysis. This study found that, when importance was low, well-being increased as perceptions exceeded desires and decreased as perceptions fell short of desires. When importance was at its mean, well-being was greatest when perceptions matched desires and decreased as perceptions deviated from desires in either direction. Finally, when importance was high, well-being not only increased when perceptions matched desires, but also increased when perceptions and desires were both high. These findings did not emerge when well-being was operationalized as self-reported tension.

Studies also provide indirect evidence regarding the moderating effects of duration on the relationship between discrepancies and well-being. For example, studies have shown that reactions to perceived work conditions are stronger when employees focus their attention on work (D. G. Gardner et al., 1989; Siegall & McDonald, 1995). Although these studies did not examine

both perceptions and desires regarding work conditions, their findings are consistent with the assertion that, as duration increases, appraisals of the environment have stronger effects on well-being. Relevant evidence is also reported by studies of private self-consciousness (PSC; Fenigstein, Scheier, & Buss, 1975). Some studies have found that PSC dampened the relationship between stressful life events and symptoms of ill health (Mullen & Suls, 1982; Suls & Fletcher, 1985), suggesting that PSC facilitates the detection and resolution of discrepancies (Scheier & Carver, 1983). In contrast, other studies have found that the relationship between chronic work stressors and ill health is stronger among persons high in PSC (Frone & McFarlin, 1989). One resolution to these conflicting findings involves the person's beliefs regarding coping efficacy (Carver et al., 1979; Hollenbeck, 1989). Specifically, if the person believes a discrepancy cannot be resolved, self-focus merely draws attention to experienced stress, and well-being should decrease. However, if the discrepancy is considered resolvable, decreases in well-being caused by self-focus may be offset by its beneficial effects on self-regulation and discrepancy reduction. This line of reasoning is consistent with available evidence (Carver et al., 1979; Hollenbeck, 1989; Kivimaki & Lindstrom, 1995).

Effects of Coping on Stress and Well-Being

Numerous studies have investigated strategies by which people cope with stress (Dewe, Cox, & Ferguson, 1993; Menaghan, 1983; Silver & Wortman, 1980). Most of these studies have examined the direct effect of coping on well-being or the moderating effects of coping on the relationship between stressors and well-being (Edwards, Baglioni, & Cooper, 1990). Studies of the direct effect of coping on well-being are relevant to the present discussion, as this effect is included in the cybernetic model (see Figure 2). Although coping strategies investigated in these studies vary widely, most can be classified as problem-focused coping (e.g., instrumental action, negotiation), cognitive reappraisal (e.g., minimization, emphasizing the positive), attention

deployment (e.g., escapism, denial), or symptom management (e.g., relaxation, exercise, venting emotions). Overall, these studies suggest that well-being is positively related to problem-focused coping and negatively related to attention deployment and symptom management, whereas findings for cognitive reappraisal have been mixed. However, most of these studies are cross-sectional, making it impossible to determine whether well-being stimulated coping, coping influenced well-being, or both. This ambiguity is critical, as the effects of well-being on coping should be negative (i.e., as well-being worsens, coping intensifies), whereas the effects of coping on well-being should be positive (i.e., as coping efforts increase, well-being improves). Because a cross-sectional design cannot disentangle the causal ordering of coping and well-being, it provides no basis for predicting a priori whether their relationship should be positive or negative.

In contrast to the numerous studies of the relationship between coping and well-being, few studies have examined the relationship between coping and stress. Anderson, Hellreigel, and Slocum (1977) studied coping among small business owners following damage from a flood and found that economic recovery was positively related to problem-focused coping and negatively related to symptom management. Similarly, Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen (1986) found that problem-focused coping was related to reports that a stressful situation had been resolved, whereas attention deployment was related to reports that the situation had not been adequately resolved or had worsened. In contrast, Menaghan and Merves (1984) found that problem-focused coping, cognitive reappraisal, and selective attention were unrelated to subsequent occupational problems. Unfortunately, the stressful situations examined in these studies cannot be differentiated into perceptions, desires, importance, and duration. Therefore, results from these studies provide only suggestive evidence regarding the effects of coping on stress as specified by the cybernetic theory.

Summary

Studies from diverse areas of research provide evidence relevant to the cybernetic theory of stress. However, this evidence pertains primarily to individual effects embedded within the theory. To date, no study has employed a longitudinal design to assess the cyclical relationships among the major constructs specified by the theory. Therefore, we have little evidence regarding the ongoing process by which discrepancies between perceptions and desires affect well-being and coping, how these effects are moderated by importance and duration, or how coping contributes to the resolution of discrepancies and the improvement of well-being. Moreover, no studies have examined the hierarchical relationships among feedback loops central to the cybernetic theory. Thus, although available evidence provides general support for selected aspects of the cybernetic theory, a comprehensive test of the theory awaits future research.

Extension to Stress, Coping, and Well-Being

In Multiple Life Domains

The cybernetic theory developed by Edwards (1992) focuses on stress, coping, and well-being at work, and evidence pertaining to the theory was drawn primarily from studies conducted in work settings. However, the principles underlying the cybernetic theory may be applied to other life domains. In this section, the theory is extended to the family domain. Focusing on stress, coping, and well-being in the work and family domains is important, for three reasons. First, work and family have been identified as the two most central domains of human life (R. Burke & Greenglass, 1987; Zedeck, 1992). Therefore, experiences in these domains have great potential for generating stress and influencing well-being. Second, work-family research emphasizes constructs subsumed within stress research, such as role stressors, interrole conflict, satisfaction, coping, and mental and physical health (R. Burke & Greenglass, 1987; Eckenrode & Gore, 1990; Greenhaus & Parasuraman, 1986; Gutek, Repetti, & Silver, 1988; Voydanoff, 1989). Therefore, work-family research would benefit from an integrative theory of stress, coping, and well-being that

encompasses the work and family domains. Third, many indices of well-being, such as depression, anxiety, and physical illness, are not specific to a single life domain, but instead reflect the overall health of the person. These indices of well-being would be better understood by considering stress and coping in multiple life domains, such as work and family.

To establish a foundation for the extended theory, it is necessary to define work and family. For this discussion, work is defined as instrumental activity intended to provide goods and services to support life (Piotrkowski, Rapoport, & Rapoport, 1987). This definition does not characterize work as a physical location, because many instrumental activities that qualify as work are not confined to the workplace, particularly with the advent of advanced communications technology. Rather than implying a location, work signifies membership in a market or organization that gives the worker rewards (e.g., compensation, goods, services) in exchange for his or her contributions (R. Burke & Greenglass, 1987; Kabanoff, 1980). Family is defined as persons related by biological ties, marriage, social custom, or adoption (R. Burke & Greenglass, 1987; Piotrkowski et al., 1987). Like work, family implies membership in a social organization to which the person contributes (Zedeck, 1992). However, these contributions are not intended to gain extrinsic rewards, but rather are intended to promote the well-being and stability of the family itself.

Hierarchy Spanning Work and Family Domains

The hierarchy of feedback loops described earlier provides the architecture for developing a cybernetic theory of stress that encompasses the work and family domains. The present discussion will focus on the top three levels of Powers' (1973) hierarchy, i.e., the system, principle, program levels. These levels dominate the conscious attention of the person and are therefore particularly relevant for understanding psychological stress associated with work and family. As indicated previously, the system level is concerned with overall self-esteem and survival. These concerns are not specific to work or family, but instead pertain to life as a whole. The principle level entails rules

that govern behavior in service of the person's overall self-esteem and survival. At this level, rules that pertain to work and family may be distinguished. In the work domain, these rules may be differentiated according to the various roles occupied by the person, such as supervisor, coworker, and subordinate. Likewise, rules in the family domain may be differentiated according to roles such as parent, spouse, sibling, and offspring. Finally, the program level guides behaviors that, in combination, help the person live according to work and family rules specified at the principle level.

Figure 3 provides a heuristic representation of a three-level hierarchy of feedback loops spanning the work and family domains. Each loop in this hierarchy is a shorthand representation of the detailed feedback loop shown in Figure 2. For simplicity, this hierarchy includes a single loop at the system level devoted to the maintenance and enhancement of overall self-esteem. The principle level is limited to one loop each in the work and family domains, with the former focused on fulfilling the role of subordinate and the latter focused on fulfilling the role of parent. The program level contains three loops each in the work and family domains. In the work domain, these loops guide behaviors regarding work quantity, work quality, and attendance, representing typical components of subordinate role performance. In the family domain, the loops are characterized in terms of the support a parent may provide to a child, including teaching, advice, and instruction (i.e., informational support), displays of warmth and caring (i.e., emotional support), and providing food, shelter, and clothing (i.e., material support). These dimensions represent common distinctions in models of social support (Cohen, 1988; House et al., 1988).

Insert Figure 3 About Here

Figure 3 shows three types of relationships between the feedback loops contained within the hierarchy. First, arrows labeled "a" correspond to mechanisms by which higher loops may active

lower loops. For example, a discrepancy regarding the subordinate role (e.g., falling short of one's general desire to be a good subordinate) may prompt the person to raise standards, increase importance, and focus attention on work quantity, work quality, and attendance. Likewise, a discrepancy regarding the parent role may lead the person to increase desires, importance, and attention with regard to the informational, emotional, and material support provided to a child. Second, arrows labeled "b" represent the process by which behaviors at lower levels facilitate the resolution of discrepancies at higher levels. Thus, by engaging in behaviors that resolve discrepancies regarding work quality, work quantity, and attendance, a person may reduce a general discrepancy regarding his or her role as a subordinate. Similarly, behaviors that resolve discrepancies regarding the informational, emotional, and material support provided to a child may help resolve a general discrepancy regarding the person's role as a parent. Reducing discrepancies for the subordinate and parent roles, in turn, may contribute to the attainment of the ideal self, thereby enhancing the person's overall self-esteem (Brook, 1991; Pelham & Swann, 1989).

Figure 3 also indicates that arrows linking higher and lower loops may span life domains. For example, a parent may wish to model responsible behavior for his or her children. This desire may activate a lower loop in the work domain regarding attendance, and maintaining regular work attendance would then contribute to the higher loop of parental role fulfillment. These sequential effects are represented by the "a" and "b" arrows linking the parent role to work attendance in Figure 3. Analogously, to manage impressions with his or her boss, a subordinate may want to display the image of a conscientious parent (Bozeman & Kacmar, 1997). This desire may activate a lower loop in the family domain regarding informational support, manifested by sending children to prestigious schools. These effects are shown by the "a" and "b" arrows linking the subordinate role to informational support in Figure 3. Of course, these examples are merely illustrative and do not

preclude other relationships between higher loops in one domain and lower loops in the other domain.

Third, Figure 3 shows that loops at the same hierarchical level may be related, as indicated by arrows labeled “c.” For example, loops may be instrumentally related, such that resolving a discrepancy in one loop helps resolve a discrepancy in another loop. Thus, achieving work goals regarding performance quantity and quality may generate financial rewards that provide material support for the family (R. Burke & Greenglass, 1987; P. Evans & Bartolome, 1986; Kanter, 1977). Instrumental linkages such as these imply positive relationships between the environmental characteristics controlled by loops at the same level. Alternately, loops may be in conflict, such that resolving a discrepancy in one loop exacerbates discrepancies in other loops. Within the work domain, this conflict is exemplified by the familiar tradeoff between performance quantity and quality (Erez, 1990). Within the family domain, this conflict is illustrated by the tension between disciplining children and encouraging their autonomy and independence. Between the work and family domains, conflict is epitomized by the tradeoff between time devoted to work and family (Eckenrode & Gore, 1990; Greenhaus & Beutell, 1985; Small & Riley, 1990; Staines, 1980). In cybernetic terms, this conflict represents a negative relationship between the attention (i.e., duration) associated with work and family loops, such that attending to discrepancies in one domain consumes attention needed to resolve discrepancies in the other domain (Carver & Scheier, 1981; Lord & Levy, 1994; Simon, 1967). In Figure 3, work-family conflict is symbolized at the principle level by the arrows connecting the subordinate and parent roles (e.g., committing time to satisfying one’s boss takes time away from one’s children) and at the program level by the arrows connecting attendance and informational support (e.g., rigidly adhering to a work schedule makes one unavailable to answer

spontaneous questions from an inquisitive child). Additional horizontal linkages may be added to Figure 3 to depict other forms of work-family conflict.

Clarifying Work-Family Linking Mechanisms

The extended cybernetic model may be used to explain mechanisms that link the work and family domains. Three linking mechanisms that have received extensive attention in work-family research are spillover, compensation, and segmentation (R. Burke & Greenglass, 1987; P. Evans & Bartolome, 1986; Lambert, 1990; Staines, 1980; Voydanoff, 1989; Zedeck, 1992). Although these linking mechanisms are central to work-family research, they have not been incorporated into models of work and family stress (e.g., Eckenrode & Gore, 1990; Frone, Yardley, & Markel, 1997; Greenhaus & Parasuraman, 1986; Higgins, Duxbury, & Irving, 1992; Kopelman, Greenhaus, & Connolly, 1983; Martin & Schermerhorn, 1983). Incorporating these linking mechanisms into the present model integrates two major streams of work-family research, one focusing on how work and family experiences influence stress and well-being, and the other concerning mechanisms that link these two life domains. This integration provides a foundation for studying such important phenomena as the transfer of stress between work and family (Bolger, DeLongis, Kessler, & Wethington, 1989; Eckenrode & Gore, 1990), the dynamic allocation of coping efforts between work and family (Beutell & Greenhaus, 1983; Fondacaro, & Moos, 1987; Pearlin & Schooler, 1978), and the cumulative effects of work and family stress on overall well-being (Bhagat, McQuaid, Lindholm, & Segovis, 1985; Rice et al., 1985).

Spillover. Spillover refers to the transfer of attitudes, feelings, and behaviors from one domain to the other (R. Burke & Greenglass, 1987; Lambert, 1990; Staines, 1980; Zedeck, 1992). Two versions of spillover prevalent in work-family research are mood spillover (Gutek et al., 1988; Piotrkowski, 1979; Repetti, 1987; Rice, Near, & Hunt, 1980; Staines, 1980) and skill transfer (Crouter, 1984; Payton-Miyazaki & Brayfield, 1976). The following discussion elucidates the

process underlying these two versions of spillover using the extended cybernetic model of work and family stress.

Mood is represented in the cybernetic model as an affective dimension of well-being (Edwards, 1992; Watson & Tellegen, 1985). Therefore, mood spillover may be viewed as a positive relationship between work and family well-being (Tenbrunsel, Brett, Maoz, Stroh, & Reilly, 1995). The cybernetic model suggests two processes by which work and family well-being may be positively related. First, this relationship may arise from instrumental linkages connecting feedback loops in the work and family domains. For example, financial rewards from work may not only increase work satisfaction, but may also meet material needs for the family, thereby enhancing family satisfaction (R. Burke & Greenglass, 1987; P. Evans & Bartolome, 1986; Kanter, 1977). Second, personal characteristics at the system level may generate a spurious positive relationship between work and family well-being. For example, generalized coping skills (Spivack, Platt, & Shure, 1976) may facilitate the resolution of discrepancies for both work and family, thereby enhancing well-being in both domains. Analogously, affective dispositions such as negative affectivity (NA) may prompt people to experience low levels of well-being across life domains, including work and family (Frone, Russell, & Cooper, 1994; Watson & Pennebaker, 1989). The effects of NA on work and family well-being may reflect the maintenance of unreasonably high standards (i.e., desires) for work and family, such that experiences in both life domains are rarely appraised as satisfactory (Parkes, 1990). Alternately, NA may inhibit effective coping by reducing perceived coping efficacy or by alienating potential sources of social support (M. Burke et al., 1993), thereby exacerbating stress and damaging well-being for both work and family.

Some investigators characterize mood spillover as the expression of emotion generated in one domain while physically present in the other domain, such as venting work frustrations while at

home or worrying about family matters while at work (Eckenrode & Gore, 1990; P. Evans & Bartolome, 1986; Piotrkowski, 1979; Voydanoff, 1989). Unlike the aforementioned version of mood spillover, this phenomenon does not represent a relationship between work and family well-being. Instead, it signifies that, while physically present in one domain, the person may attend to discrepancies associated with the other domain and express emotions corresponding to those discrepancies (Edwards, 1992). Attention to discrepancies associated with another domain may occur when the discrepancies in that domain are larger or more important than discrepancies in the domain in which the person is physically present (Lord & Hanges, 1987; Lord & Levy, 1994).

The extended cybernetic model may also be used to capture spillover as the transfer of skills between work and family. Skills are represented in the model as personal characteristics that act as coping resources to enhance the success of coping efforts. Coping skills may be intentionally transferred between domains (Crouter, 1984; Eckenrode & Gore, 1990) or may become embedded in scripts and applied across life domains without conscious evaluation of their suitability (Greenhaus & Beutell, 1985; Lord & Hanges, 1987; Repetti, 1987; Schank & Abelson, 1977). In either case, the transfer of coping skills is more likely when stressful experiences in work and family entail similar coping requirements or convey similar situational cues, thereby eliciting similar coping strategies. Work and family coping skills may also be similar due to the effects of personal characteristics at the system level, such as general coping skills (e.g., analytical ability; Spivack et al., 1976) and coping styles that represent habitual ways of coping with stress (Menaghan, 1983).

Compensation. Compensation represents efforts to offset dissatisfaction in one domain by seeking satisfaction in another domain (R. Burke & Greenglass, 1987; Lambert, 1990; Zedeck, 1992). Compensation is achieved by decreasing involvement in the dissatisfying domain and increasing involvement in another potentially satisfying domain, yielding a negative relationship

between involvement in the two domains (Lambert, 1990). Although compensation is often described in these general terms, it implies different processes depending on whether involvement is conceptualized as the perceived importance of a domain (Champoux, 1978; Frone et al., 1992; Lambert, 1990; Lobel, 1991), psychological absorption with a domain (Kanter, 1977; Small & Riley, 1990; Voydanoff, 1987), or time devoted to a domain (Lobel, 1991). The following discussion is organized in terms of these three conceptualizations of involvement.

The extended cybernetic model suggests two forces that may generate a negative relationship between work and family importance. First, the person may cope with large irresolvable discrepancies in a domain by reducing the importance of that domain (Edwards, 1992; Schuler, 1985). The person might then assign greater importance to the other domain, provided discrepancies in that domain are tolerable or more manageable than those in the initial domain. This reprioritization of life domains signifies the operation of a superordinate coping strategy at the system level in which overall well-being is enhanced by shifting importance between work and family, deactivating the domain with large irresolvable discrepancies and activating the domain with discrepancies that are tolerable or can be resolved (Champoux, 1978; P. Evans & Bartolome, 1986). Second, work and family importance may be negatively related due to life stage or socialization forces that influence the prioritization of work and family. For example, work is often a top priority in early adulthood, whereas family often becomes more important in later years (P. Evans & Bartolome, 1986; Piotrkowski, 1979). Analogously, subscription to traditional gender roles may increase the importance of work relative to family for men and the importance of family relative to work for women (Aryee & Luk, 1996; Gutek, Searle, & Klepa, 1991; Voydanoff, 1988).

Psychological absorption refers to focusing attention on a domain (Small & Riley, 1990; Voydanoff, 1987) and therefore corresponds to duration in the cybernetic model. As noted

previously, if a discrepancy cannot be resolved, the person may cope by attempting to ignore or deny the discrepancy (Lazarus, 1983). This reasoning can be generalized to discrepancies in an entire life domain. That is, if the majority of discrepancies in a domain are appraised as irresolvable, the person may attempt to divert attention from that domain. Attention diverted from the dissatisfying domain will presumably shift to domains that require monitoring and regulation (Carver & Scheier, 1981; Lord & Levy, 1994). If discrepancies in those domains can be successfully managed or are considered tolerable, overall well-being will be enhanced (Carver et al., 1979; Bhagat et al., 1985; Hollenbeck, 1989; Rice et al., 1985).

Time devoted to a domain exposes the person to the physical and social environment in that domain, which in turn increases time spent thinking about the domain, or duration. These effects are imperfect, given that the person may dwell on a domain removed in place and time from his or her surroundings (Edwards, 1992; D. G. Gardner et al., 1989; Siegall & McDonald, 1995). Nonetheless, if the person spends less time in one domain and more time in another, duration is likely to decrease for the former domain and increase for the latter domain. Hence, reallocating time devoted to work and family may be viewed as one method for shifting duration associated with the two domains. Beyond its effects on duration, time devoted to a domain should not generate stress or influence coping or well-being, given that a domain cannot elicit stress unless the person is consciously aware of events and circumstances in the domain (Lazarus & Folkman, 1984; McGrath, 1976).

Segmentation. Segmentation refers to the separation of work and family, such that experiences in the two domains do not influence one another (Lambert, 1990; Zedeck, 1992). Although segmentation was originally viewed as a natural division between the work and family domains (Blood & Wolfe, 1960; Dubin, 1973), subsequent research debunked the view that work and family are inherently separate (R. Burke & Greenglass, 1987; Kanter, 1977; Voydanoff,

1987). Thus, recent research characterizes segmentation as active attempts to maintain a boundary between work and family (Lambert, 1990; Piotrkowski, 1979).

The extended cybernetic model suggests two processes by which active segmentation may occur. First, segmentation may operate through duration, such that attention is focused solely on the domain in which the person is physically present (Piotrkowski, 1979). The person is likely to devote attention to the physically present domain when discrepancies in that domain are large or important, particularly when compared to discrepancies in the other domain (Carver, 1994; Crouter, 1984; Klein, 1989; Lord & Hanges, 1987; Lord & Levy, 1994). Alternately, if discrepancies in another domain are irresolvable, the person may avoidant thinking about that domain and focus attention on the physically present domain (Carver, Scheier, & Weintraub, 1989; Folkman et al., 1986; Lazarus, 1983). Either of these mechanisms would cause the person to focus his or her attention on the domain in which he or she is physically present, mentally segmenting the work and family domains.

Second, segmentation may be manifested as the conscious utilization of different coping strategies in the work and family domains (Kabanoff, 1980). The use of different coping strategies for work and family stress may arise from the recognition of different coping requirements in the two domains. For example, coping at work may require problem-focused strategies such as direct confrontation, but these strategies may be ineffective or counterproductive in the family domain (Folkman & Lazarus, 1980; Eckenrode & Gore, 1990; Greenhaus & Beutell, 1985; Pearlin & Schooler, 1978). Differentiation of work and family coping requirements is more likely when the person consciously evaluates the suitability of alternative coping strategies, which may occur when discrepancies are large, important, novel, or persistent (Edwards, 1992).

Work, Family, and Total Life Stress and Well-Being

Based on the extended cybernetic model, stress and well-being may be conceptualized separately for work, family, and life as a whole. Specifically, overall work stress can be viewed as the sum of all discrepancies between perceptions and desires within the work domain. The contribution of each discrepancy to overall work stress depends on its importance and duration, such that important discrepancies that command much attention would contribute greatly to overall work stress. Given that attention is rarely focused below the program level (Powers, 1973), most discrepancies contributing to overall work stress occur at the program and principle levels. Likewise, overall family stress refers to the sum of all discrepancies between perceptions and desires in the family domain, with each discrepancy weighted by its importance and duration. It follows that total life stress is the sum of stress associated with all life domains, including work, family, and other relevant domains (e.g., leisure). The logic underlying these conceptualizations of work and family stress is consistent with definitions of stress that encompass multiple life domains (Bhagat et al., 1985; Rice et al., 1985).

Well-being may also be conceptualized for work, family, and life as a whole. Some dimensions of well-being, such as satisfaction, may be differentiated between work and family and at different hierarchical levels within these domains. Returning to the model in Figure 3, satisfaction may refer to work quantity, work quality, attendance, or work as a whole (Ironson, Smith, Brannick, Gibson, & Paul, 1989). Moving up in the hierarchy, satisfaction may refer to work, family, or life as a whole (Kelly & Kelly, 1994). Other dimensions of well-being, including many symptoms of mental and physical illness (e.g., depression, hypertension, peptic ulcer), refer to the person's overall well-being and therefore cannot be differentiated according to specific life domains. Naturally, the causes of these symptoms may emanate from different life domains, but the symptoms themselves are not specific to a domain.

The foregoing discussion may tempt researchers to create aggregate measures of work, family, and overall stress and well-being by summing measures of their components. This approach should be avoided. In empirical research, work, family, and overall stress should be examined not by using summated weighted discrepancy scores, but rather by using multivariate methods for testing discrepancy and moderation effects (Edwards, 1993, 1994; Edwards & Parry, 1993; M. Evans, 1991). To examine stress at a particular hierarchical level, researchers should measure perceptions, desires, importance, and duration at that level, as opposed to measuring these constructs at lower levels and aggregating the resulting measures. Likewise, measures of well-being should be specified at the hierarchical level of interest, rather than aggregating measures of well-being at lower levels. For example, overall satisfaction with work should be measured with multiple indicators of one's general affective response to work, not as the sum of indicators representing satisfaction with different facts of work (Ferratt, 1981; Scarpello & Campbell, 1983).

Summary

The extended cybernetic model of work and family stress, coping, and well-being operates through a hierarchy of feedback loops that encompasses the work and family domains. This hierarchy traces the mechanisms by which feedback loops are related vertically and horizontally, and how these relationship may span the work and family domains. The extended cybernetic model provides a foundation for translating work-family linking mechanisms, such as spillover, compensation, and segmentation, into relationships between constructs embedded in feedback loops in the work and family domains. Thus, the model permits the integration of research on work and family stress, coping, and well-being with research into mechanisms that link the work and family domains. The model also provides a basis for conceptualizing stress and well-being for the work domain, the family domain, and life as a whole.

Implications for Practice

The cybernetic theory discussed in this chapter suggests several implications for the management of stress. First, stress results from the appraisal of environmental conditions relative to the desires of the person. Given that people hold different desires, it follows that stress management interventions must be individualized, representing a clinical rather than an epidemiological approach to the reduction of stress. Second, people are continually engaged in coping efforts intended to resolve stressful discrepancies, reduce their importance or duration, improve well-being directly, or some combination thereof. These different methods of coping signify different avenues of intervention for stress management efforts. For example, when stress management interventions cannot alleviate environmental stressors, such as an impending plant closing, they may focus on other methods to help employees cope with stress. For example, displaced employees may be counseled to lower their financial aspirations or reprioritize work relative to family until they are reemployed (Leana & Feldman, 1988). Third, the extended cybernetic model suggests that interventions intended to help employees manage family stress may also help reduce work stress, and vice-versa. Further suggestions for stress management interventions are unwarranted, however, due to the paucity of empirical studies based on the cybernetic theory. Future research may yield specific guidelines linking stress management interventions to the ongoing self-regulation processes posited by the theory.

Summary and Conclusion

This chapter reviewed the fundamental constructs and processes of the cybernetic theory of stress, coping, and well-being proposed by Edwards (1992). This theory integrates other theories in the stress literature and holds promise for understanding the dynamic, reciprocal relationships between stress, coping, and well-being. Although few studies have directly examined the theory, available evidence provides tentative support for several of its core

propositions. The theory also provides a general foundation for examining stress and coping processes in multiple life domains, as illustrated by the extension of the theory to work and family. This extended model was also used to explain mechanisms linking work and family (i.e., spillover, compensation, segmentation) and to conceptualize stress and well-being regarding work, family, and life as a whole. Additional research is needed to test cybernetic stress and coping processes within and between the work and family domains and their ultimate effects on individual well-being.

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Footnotes

¹ Latack et al. (1995, p. 328) incorrectly state that Edwards (1992) defines coping as the successful implementation of coping efforts. This statement is incorrect. Quoting directly from Edwards (1992), coping is defined as “efforts to prevent or reduce the negative effects of stress on well-being” [emphasis in original] (p. 253). Latack et al. (1995) omitted the word “efforts” from their quotation of this definition.

² Although Edwards (1992) proposed that duration moderates the effects of discrepancies on well-being and coping, he did not include duration in the figure depicting the cybernetic model (Edwards, 1992, Figure 3, p. 248). For clarity, the present chapter depicts the moderating effects of duration in Figure 2.

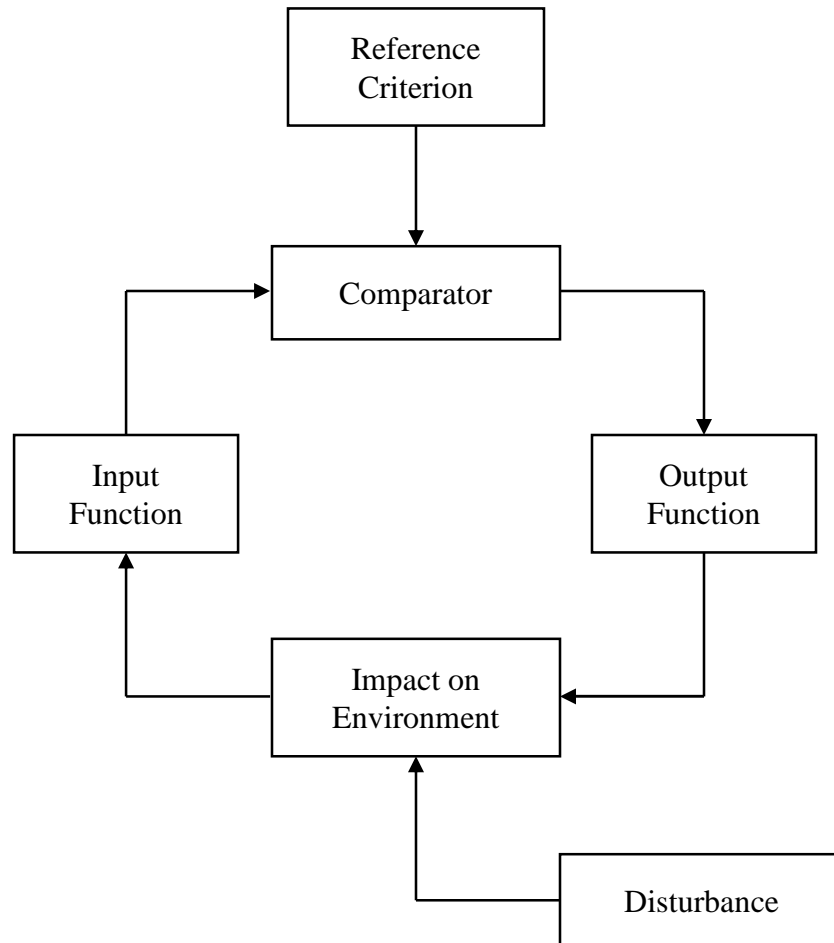


Figure 1: Basic model of the cybernetic control process (adapted from Carver & Scheier, 1982).

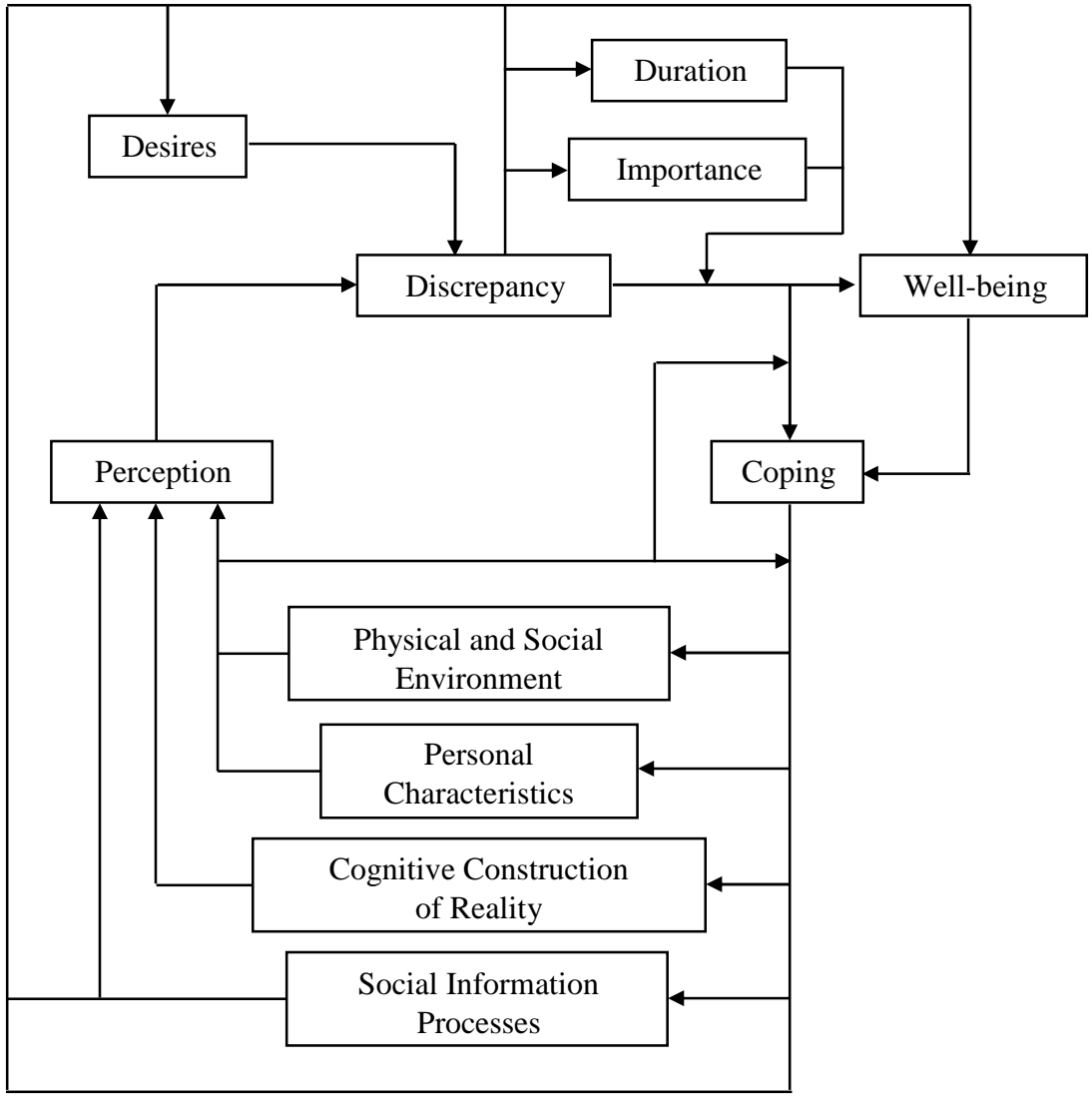


Figure 2: Cybernetic model of stress, coping, and well-being (adapted from Edwards, 1992).

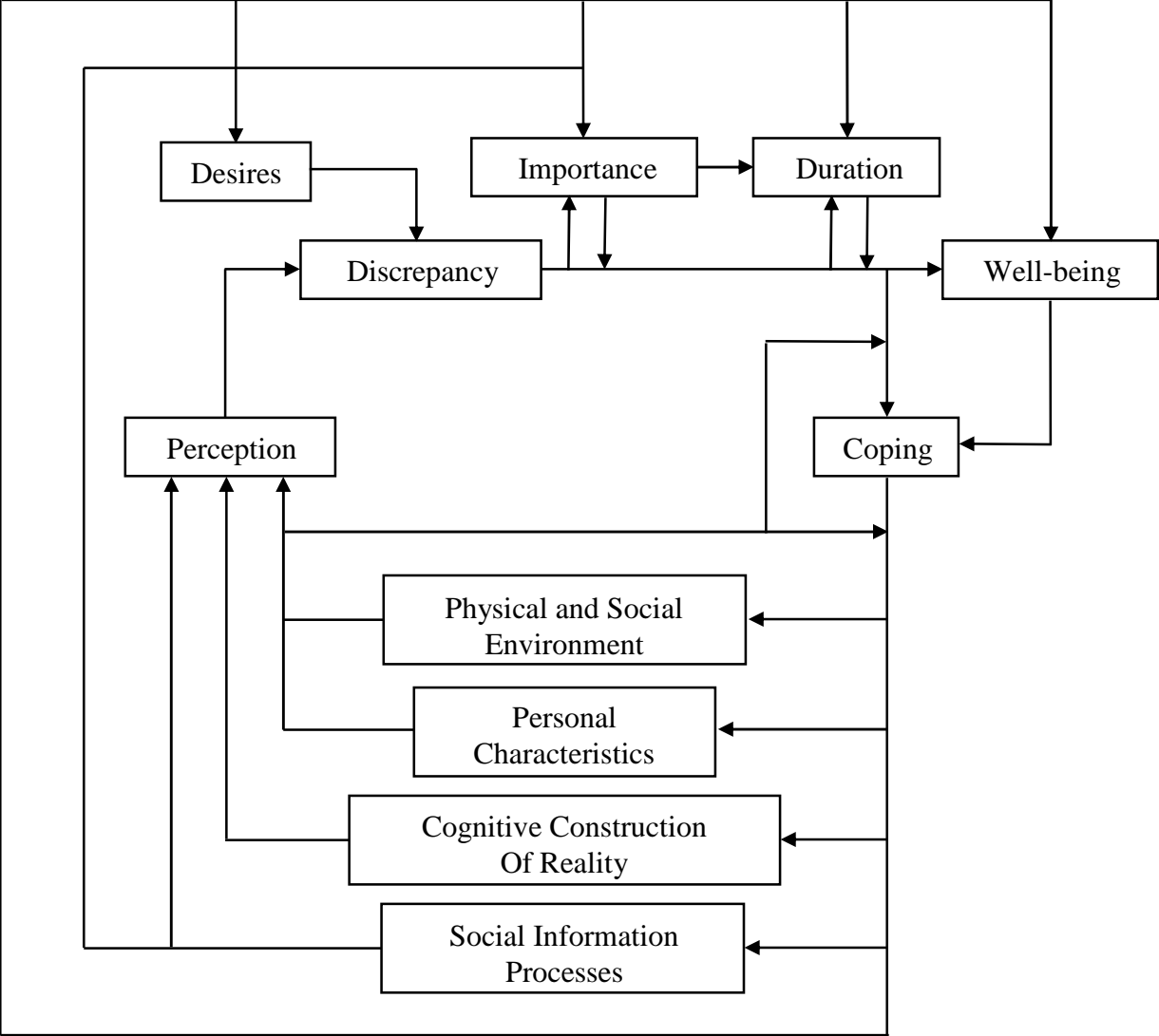


Figure 2: Cybernetic model of stress, coping, and well-being (adapted from Edwards, 1992).