Person-Environment Fit Theory:
Conceptual Foundations, Empirical Evidence, and Directions for Future Research

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Theories of stress have long recognized the importance of both the person and environment in understanding the nature and consequences of stress. Person constructs relevant to stress research include Type-A behavior (Friedman & Rosenman, 1959), locus of control (Rotter, 1966), hardiness (Kobasa, 1979), and coping styles (Menaghan, 1983). The environment has been construed as stressful life events (Rabkin & Struening, 1976), daily hassles (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982), and chronic stressors such as role conflict and ambiguity (R. Kahn, Wolf, Quinn, Snoeck, & Rosenthal, 1964; Jackson & Schuler, 1985), role overload and underload (French & Caplan, 1972), and job demands and decision latitude (Karasek & Theorell, 1990). This dual emphasis on the person and environment in stress research is characteristic of the interactive perspective in psychology (Lewin, 1951; Magnusson & Endler, 1977; Murray, 1951; Pervin, 1989), which indicates that behavior, attitudes, and well-being are determined jointly by the person and environment.

The contributions of the person and environment to stress have been formalized in the person-environment (P-E) theory of stress (Caplan, 1983, 1987a,b; Caplan & Harrison, 1993; French, Caplan, & Harrison, 1982; French, Rodgers, & Cobb, 1974; Harrison, 1978, 1985). The core premise of P-E fit theory is that stress arises not from the person or environment separately, but rather by their fit or congruence with one another. This simple yet powerful notion is reflected in numerous theories of stress and well-being (Cummings & Cooper, 1979; Edwards, 1992; McGrath, 1976; Rice, McFarlin, Hunt, & Near, 1985; Schuler, 1980) and is largely responsible for the widespread impact of P-E fit theory in stress research (Edwards & Cooper, 1990; Eulberg, Weekley, & Bhagat, 1988).

The purpose of this chapter is threefold. First, we provide a conceptual overview of P-E fit theory, defining its core constructs and examining its basic mechanisms. This overview

encompasses presentations of P-E fit theory from the original work by French and colleagues (French & R. Kahn, 1962; French et al., 1974) through later developments and refinements by Caplan (1983, 1987a,b), Harrison (1978, 1985), and Edwards (1996; Edwards & Cooper, 1990). Second, we summarize empirical research relevant to P-E fit theory, including the original studies conducted at the Institute for Social Research at the University of Michigan (Caplan, Cobb, French, Harrison, & Pinneau, 1980; French et al., 1982) and other studies relevant to the basic propositions of P-E fit theory (Assouline & Meir, 1987; Edwards, 1991; Michalos, 1986; Spokane, 1985). Third, we discuss conceptual and methodological issues pertaining to future research into P-E fit theory. As this discussion will show, existing research has addressed only the most basic propositions of P-E fit theory, and many unanswered questions regarding the meaning and consequences of P-E fit remain to be investigated. Collectively, these questions constitute an agenda for a second generation of P-E fit research that may substantially advance our knowledge of how the person and environment combine to influence stress and well-being.

Overview of P-E Fit Theory

Conceptual Foundations

Basic concepts and distinctions. As noted previously, the fundamental premise of P-E fit theory is that stress arises from misfit between the person and environment. The core elements of the theory are shown in Figure 1, which depicts three basic distinctions central to P-E fit theory. The first and most basic distinction is between the person and environment. This distinction is a prerequisite for the conceptualization of P-E fit and provides the basis for examining reciprocal causation between the person and environment. The second distinction is between objective and subjective representations of the person and environment. The objective person refers to attributes of the person as they actually exist, whereas the subjective person

signifies the person's perception of his or her own attributes (i.e., the person's self-identity or self-concept). Analogously, the objective environment includes physical and social situations and events as they exist independent of the person's perceptions, whereas the subjective environment refers to situations and events as encountered and perceived by the person. As shown in Figure 1, the objective person and environment are causally related to their subjective counterparts (Harrison, 1978). These relationships are imperfect due to perceptual distortions (e.g., repression, denial), cognitive construction processes (Weick, 1979), limited human information processing capacities (March & Simon, 1958), and organizational structures that limit access to objective information (Caplan, 1987b; Harrison, 1978).

Insert Figure 1 About Here

The two distinctions described above combine to yield four types of correspondence between person and environment constructs: (1) objective P-E fit, which refers to the fit between the objective person and the objective environment; (2) subjective P-E fit, or the fit between the subjective person and the subjective environment; (3) contact with reality, meaning the degree to which the subjective environment corresponds to the objective environment; and (4) accuracy of self-assessment (or accessibility of the self; French et al., 1974), representing the match between the objective person and the subjective person (Caplan, 1983; French et al., 1974; Harrison, 1978). Initial presentations of P-E fit theory (French et al., 1974; Harrison, 1978) indicated that good mental health is signified by minimal discrepancies on objective P-E fit, subjective P-E fit, contact with reality, and accuracy of self-assessment. However, subsequent refinements of the theory (Caplan, 1983, 1987a,b; French et al., 1982; Harrison, 1985) point out that objective P-E

fit has little impact on mental health unless it is perceived by the person and thereby translated into subjective P-E fit (cf. House, 1974; R. Kahn et al., 1964; Lazarus & Folkman, 1984). Moreover, Caplan (1983) notes that, when stressors are potentially overwhelming, some disengagement from objective aspects of the situation or self may dampen anxiety and facilitate adaptation, thereby promoting mental health (Lazarus, 1983; Taylor & Brown, 1988). Hence, current treatments of P-E fit theory emphasize subjective P-E fit as the critical pathway to mental health and other dimensions of well-being. The nature of the relationship between subjective P-E fit and well-being is examined in greater detail later in this chapter.

A third distinction shown in Figure 1 differentiates two types of P-E fit. The first involves the fit between the demands of the environment and the abilities of the person. Demands include quantitative and qualitative job requirements, role expectations, and group and organizational norms, whereas abilities include aptitudes, skills, training, time, and energy the person may muster to meet demands. A second type of P-E fit entails the match between the needs of the person and the supplies in the environment that pertain to the person's needs. P-E fit theory characterizes needs in general terms, encompassing innate biological and psychological requirements, values acquired through learning and socialization, and motives to achieve desired ends (French & R. Kahn, 1962; Harrison, 1985). Supplies refer to extrinsic and intrinsic resources and rewards that may fulfill the person's needs, such as food, shelter, money, social involvement, and the opportunity to achieve (Harrison, 1978).

Commensurate person and environment constructs. For both needs-supplies fit and demands-abilities fit, P-E fit theory requires that person and environment constructs are commensurate, meaning they refer to the same content dimension. For example, needs-supplies fit regarding achievement should entail the comparison of need for achievement with

opportunities for achievement in the environment. Likewise, demands-abilities fit regarding quantitative work load would involve comparing the amount of work to be done with the amount of work the person can do. Commensurate dimensions are required for the conceptualization and measurement of P-E fit, because the degree of fit between the person to the environment can be determined only if both refer to the same content dimension and can be measured on the same metric. Without commensurate dimensions, it is impossible to determine the proximity of the person and environment to one another, and the notion of P-E fit becomes meaningless. The requirement of commensurate dimensions distinguishes P-E fit theory from more general interactionist models of the person and environment, such as those examining the moderating effects of personality on the relationship between environmental stressors and health (Cohen & Edwards, 1989; Parkes, 1994).

Definition of stress. Although P-E fit theory holds a central position in stress research (Eulberg et al., 1988), the concept of stress is not explicitly depicted in Figure 1. The omission of stress does not threaten the internal validity of the theory, which is primarily concerned with the nature and consequences of P-E fit. Thus, some presentations of P-E fit theory have defined stress (Caplan et al., 1980; French et al., 1982; Harrison, 1978, 1985), whereas others have avoided the term (Caplan, 1983, 1987a,b; French, 1973; French et al., 1974). Although stress is ancillary to P-E fit theory, the meaning of stress has generated considerable debate in the stress literature (Lazarus & Folkman, 1984; Parker & DeCotiis, 1983; Schuler, 1980), and proposing a definition of stress consistent with P-E fit theory may help position the theory within the broader stress literature and facilitate its comparison with other theories.

For this chapter, we draw from the definition of stress proposed by Harrison (1978, 1985), who states that stress arises when: (1) the environment does not provide adequate supplies

to meet the person's needs; or (2) the abilities of the person fall short of demands that are prerequisite to receiving supplies. Three features of this definition should be underscored. First, stress is defined not in terms of the person or the environment, but rather as their degree of misfit. This definition avoids problems with definitions of stress as a characteristic of the environment or as a psychological or physiological response by the person (for criticisms of such definitions, see Edwards, 1992; Lazarus & Folkman, 1984). Second, contrary to some definitions of stress (Shirom, 1982), this definition stipulates that misfit between demands and abilities itself does not itself constitute stress. Rather, excess demands generate stress only if meeting demands is required to receive supplies, or if demands have been internalized as goals or motives of the person, as when norms or role expectations are accepted by the person as guidelines for his or her own behavior. Third, as noted previously, P-E fit theory views subjective misfit as the critical pathway from the person and environment to strain (see Figure 1). Therefore, we view stress as subjective rather than objective misfit between person and environment constructs. In sum, we define stress as a subjective appraisal indicating that supplies are insufficient to fulfill the person's needs, with the provision that insufficient supplies may occur as a consequence of unmet demands.

Outcomes of P-E misfit. According to P-E fit theory, subjective P-E misfit leads to two sets of outcomes. One set of outcomes comprises psychological, physical, and behavioral strains, defined as deviations from normal functioning (Caplan et al., 1980; Harrison, 1978). Psychological strains include dissatisfaction, anxiety, dysphoria, or complaints of insomnia or restlessness. Physiological strains include elevated blood pressure, elevated serum cholesterol, and compromised immune system functioning. Behavioral symptoms of strain include smoking, overeating, absenteeism, and frequent utilization of health care services. When such responses

constitute risk factors for disease, as in the case of smoking, overeating, and elevated blood pressure, the cumulative experience of strains over time can lead to mental and physical illnesses such as chronic depression, hypertension, coronary heart disease, peptic ulcer, and cancer. Conversely, sustained good P-E fit can produce positive health outcomes (Edwards & Cooper, 1988; Harrison, 1978, 1985).

A second set of outcomes involves efforts to resolve P-E misfit, depicted in Figure 1 as coping and defense. Coping entails efforts to improve objective P-E fit, either by changing the objective person (i.e., adaptation) or the objective environment (i.e., environmental mastery) (French et al., 1974). For example, a person experiencing excess work demands may seek training to enhance his or her abilities or attempt to negotiate a decreased work load with his or her supervisor (Harrison, 1978). Defense involves efforts to enhance subjective P-E fit through cognitive distortion of the subjective person or environment (e.g., repression, projection, denial) without changing their objective counterparts (French et al., 1974). For instance, a person may respond to role overload by overestimating his or her abilities or by downplaying or ignoring excess demands. Harrison (1978) notes that defense may also include the denial of experienced strain, such that the person acknowledges subjective P-E misfit but discounts its resulting negative impacts on health. Another form of defense is described by French et al. (1974), who indicate that a person may respond to subjective misfit by reducing the perceived importance of the dimension on which misfit occurs, as when a person disengages from unattainable goals (Klinger, 1975; Schuler, 1985). The terms coping and defense do not imply that defense is more primitive or undesirable than coping (Caplan, 1987a). Indeed, defense mechanisms such as denial can be adaptive, particularly when the objective person and environment cannot be changed (Lazarus, 1983). The choice from among these alternative methods of adjustment is

influenced by various person and environment factors, such as stable preferences, coping styles, and environmental resources and constraints.

These two sets of P-E fit outcomes are likely to be interrelated. For example, coping may reduce or eliminate objective misfit, which may in turn resolve subjective misfit and reduce strain. Alternately, defense may attenuate the effects of objective misfit on subjective misfit, thereby influencing strain. In either case, coping and defense influence strain through their effects on subjective P-E fit. Conversely, strain may influence the choice or success of attempts to resolve P-E misfit via coping and defense. For instance, prolonged strain may lead to depression, which in turn may hinder social interactions and alienate potential sources of social support (Cole & Milstead, 1989). This withdrawal of social support may limit the person's options for resolving P-E misfit, forcing the person to rely on defensive reappraisals rather than instrumental coping efforts directed toward the objective person or enironment (Valentiner, Holahan, & Moos, 1994).

Relationships Between P-E Fit and Strain

Relationship of needs-supplies fit to strain

P-E fit theory specifies three basic relationships between fit and strain. These relationships are illustrated in Figure 2, which depicts the effects of needs-supplies fit on strain. The horizontal axis represents the comparison of needs to supplies, with positive scores indicating that supplies exceed needs, negative scores indicating that supplies fall short of needs, and a score of zero indicating perfect fit between supplies and needs. The vertical axis represents some form of strain (e.g., job dissatisfaction).

Insert Figure 2 About Here

The solid line in Figure 2 depicts a decrease in strain as supplies increase toward needs. This relationship is hypothesized for all need-supply dimensions. Thus, insufficient food, money, love, social companionship, achievement, and opportunity for growth will produce strain, whereas increases in these supplies up to the point of perfect fit will decrease strain (Harrison, 1978).

The relationship between needs-supplies fit and strain becomes more complicated as supplies exceed needs. Three prototypical relationships between excess supplies and strain are shown in Figure 2. These three curves correspond to different hypothesized effects of excess supplies for needs on other dimensions. When excess supplies do not influence need fulfillment on other dimensions, strain should remain constant (curve A), yielding an overall asymptotic relationship between needs-supplies fit and strain. For example, food and water reduce strain until hunger and thirst are satiated, and additional consumption of these supplies will not further reduce strain (French, 1973; Harrison, 1978). Likewise, employee benefits such as health insurance reduce strain up to the point of covering health care costs but have little effect on strain beyond this point.

Curve B indicates that strain decreases as supplies exceed needs, yielding an overall monotonic relationship with strain. This relationship may occur when excess supplies for one dimension are used to satisfy needs on another dimension (French et al., 1982; Harrison, 1978). For example, once a person's need for control is satisfied (Burger & Cooper, 1979), excess supplies for control may be used to bring about desired changes at work, thereby attaining needs-supplies fit on other dimensions. The relationship corresponding to curve B may also occur when excess supplies can be preserved for later use, as when funds beyond one's current expenses are saved for later use (French et al., 1982; Harrison, 1978). These two mechanisms by which excess

supplies may reduce strain have been termed carryover and conservation, respectively (Edwards, 1996).

Finally, curve C shows that strain increases as supplies exceed needs, producing a U-shaped relationship between needs-supplies fit and strain. Excess supplies may increase strain when they inhibit the fulfillment of needs on other dimensions. For example, interaction with coworkers may fulfill one's need for companionship as supplies increase toward needs but then interfere with one's need for privacy as supplies exceed needs (Eidelson, 1980; French et al., 1974; Harrison, 1978). French et al. (1982) note that the quality of the specific strain response may differ on either side of the U-shaped relationship corresponding to curve C. For example, too little contact with others may create feelings of loneliness and boredom, whereas too little privacy may lead to irritation. Nonetheless, both types of responses would be associated with overall dissatisfaction. Excess supplies may also increase strain if they deplete supplies that could otherwise be used to satisfy needs in the future. For instance, obtaining excess financial resources from one's supervisor on one occasion may inhibit efforts to obtain needed resources on later occasions. These explanations for increased strain resulting from excess supplies have been labeled interference and depletion, respectively (Edwards, 1996).

Relationship of demands-abilities fit to strain. Relationships between demands-abilities fit and strain are shown in Figure 3, in which the horizontal axis signifies the comparison of demands to abilities and the vertical axis represents strain. These relationships are analogous to those for needs-supplies fit, given that demands-abilities misfit influences strain by inducing needs-supplies misfit (French et al., 1982; Harrison, 1978). Strain should increase as demands exceed abilities, assuming that excess demands inhibit the receipt of supplies required to fulfill needs (Harrison, 1978). In contrast, excess abilities may increase, decrease, or have no effect on

strain. Excess abilities will not influence strain when they cannot be used to acquire supplies (curve A). For example, excess technical skills specific to a particular job demand may be of little use for meeting other demands or fulfilling other work needs or goals. Excess abilities may decrease strain (curve B) by providing supplies for needs, as when being able to complete one's work more quickly than required creates time for reading, socializing, or other pleasurable activities (Harrison, 1978). Alternately, excess abilities may decrease strain by allowing the person to conserve personal resources (e.g., time, energy) to apply toward future demands. These two mechanisms by which excess abilities may reduce strain represent carryover and conservation, as discussed with regard to the reduction of strain associated with excess supplies (Edwards, 1996). Finally, excess abilities may increase strain (curve C) by creating insufficient supplies for motives, as when the inability to utilize valued skills results in boredom and lowered self-esteem (Harrison, 1978). Excess abilities may also increase strain when they threaten the fulfillment of future demands. For example, unused knowledge or skills may be forgotten, making the person susceptible to task overload if demands increase in the future. These two processes correspond to interference and depletion, respectively (Edwards, 1996).

Insert Figure 3 About Here

Factors Affecting the Relationship Between P-E Fit and Strain

Dimension content. As the foregoing discussion suggests, the shape of the relationship between P-E fit and strain varies according to the content of the dimension along which the person and environment are conceptualized (French, 1973). The concepts of carryover, conservation, interference, and depletion constitute a set of principles that may be used to

logically derive relationships between P-E fit and strain that apply to specific dimensions (Edwards, 1996). However, P-E fit theory does not provide a comprehensive taxonomy of content dimensions and their mappings onto particular relationships between P-E fit and strain. Rather, P-E fit theory represents a process theory (J. Campbell, Dunnette, Lawler, & Weick, 1970), in that it articulates the mechanisms by which person and environment constructs combine to influence strain without specifying the particular content dimensions on which person and environment should be examined (Harrison, 1985).

Dimension importance. P-E fit theory also indicates that the shape of the relationship between P-E fit and strain depends on the importance of the dimension on which the person and environment are considered, meaning the priority of the dimension in terms of the person's overall hierarchy of needs (Harrison, 1985). Hence, importance may be viewed as a moderator of the relationship between P-E fit and strain. Misfit on more important dimensions will have greater effects on strain (French et al., 1974; Harrison, 1985), such that the curves shown in Figures 2 and 3 will become steeper as the importance of a dimension increases. The use of importance as a moderator of the relationship between P-E fit and strain is consistent with theories of satisfaction and well-being (Locke, 1976; Mobley & Locke, 1970; Naylor, Pritchard, & Ilgen, 1980; Rice et al., 1985).

Extensions and Refinements of P-E Fit Theory

Alternative relationships between P-E fit and strain. Since its initial development, several important extensions and refinements of P-E fit theory have been proposed. Building on the relationships shown in Figures 2 and 3, Kulka (1979) describes three sets of models regarding the effects of P-E fit on strain. Cumulative difference models indicate that the effects of P-E misfit are cumulative and continuous, such that strain varies gradually as misfit increases. Curve A in

Figure 4 shows a cumulative difference model for a U-shaped relationship between P-E fit and strain.[1] Critical difference models specify a range of tolerance around perfect P-E fit, such that strain varies only when P-E misfit exceeds a certain threshold. A U-shaped critical difference model is illustrated by curve B, which shows that strain remains constant for small amounts of P-E misfit but then increases when P-E misfit exceeds a range of tolerance. Finally, optimal congruence models assume that strain results from P-E misfit and from perfect P-E fit (see curve C). For example, extreme misfit may exhaust adaptive resources, whereas perfect fit may result in stagnation and lack of stimulation. In either case, overall strain would increase. In contrast, small amounts of misfit may reduce strain, as when a slight excess for task complexity fulfills the person's desire for challenge. Kulka (1979) discusses variations of the curves shown in Figure 4 in which the effects of misfit may be curvilinear or linear and symmetric or asymmetric.

Insert Figure 4 About Here

Past, present, and future P-E fit. Another noteworthy extension of P-E fit theory concerns the relationships among past, present, and future P-E fit and their combined effects on strain. These issues are examined by Caplan (1983), who explores various mechanisms by which past and anticipated P-E fit may influence present P-E fit and strain. According to Caplan (1983), past fit constitutes a standard by which current fit may be judged as an improvement, worsening, or continuation of previous fit. Consequently, current misfit may be experienced as benign if it was preceded by a substantially larger degree of misfit, whereas current misfit may be considered highly stressful if no misfit had been experienced in the past. Analogously, anticipated fit influences evaluations of current fit by indicating whether fit is expected to decrease, increase, or

remain constant. Thus, current misfit may seem innocuous if conditions are expected to worsen but may be stressful if no misfit is expected in the future. Collectively, these effects of past and anticipated fit on current fit are termed contrast effects, because they assume that current fit is contrasted with or compared to fit in other time frames. A competing process discussed by Caplan (1983) and elaborated by Harrison (1985) concerns the vicarious effects of fit in other time frames, as when dwelling on past or anticipated misfit increases strain, analogous to the effects of current misfit (cf. Edwards, 1992). Caplan (1983) elaborates the relationships among past, present, and anticipated fit by decomposing these relationships into effects linking person and environment constructs at different points in time, yielding different predictions for strain depending on whether change in P-E fit represents change in the person, the environment, or both.

P-E fit and organizational effectiveness. A third extension pertains to P-E fit from the perspective of the person and the organization. Harrison (1985) points out that, just as the person's functioning and survival depend on the fulfillment of needs, the effectiveness and survival of an organization depend on the fulfillment of demands it places on its employees. These demands are manifestations of the needs of the organization, and employees' abilities may be viewed as supplies by which the needs of the organization can be fulfilled (Caplan, 1983). For example, the functional and operational needs of an organization may be translated into position descriptions that articulate specific job demands, and human resource personnel may seek to fulfill these needs by attracting, selecting, and retaining a supply of qualified employees (Schneider & Schmitt, 1992). Analogously, needs expressed by employees place demands on an organization, and supplies received by employees reflect the organization's ability to meet these demands. Thus, organizations that are able to meet demands that signify salient employee needs

may experience less turnover than organizations that cannot meet these demands (Irving & Meyer, 1994; Wanous, Poland, Premack, & Davis, 1992). Harrison (1985) also examines objective and subjective person and environment constructs from the perspective of the organization. Contact with reality represents the accuracy of employee assessment and appraisal procedures, and accuracy of self-assessment translates into the organization's awareness of the demands it places on employees and the rewards it provides to employees. In developing these parallels regarding P-E fit for the person and organization, Harrison (1985) notes that the organization serves as a metaphor for organizational members, such as supervisors, coworkers, or staffing personnel. Thus, the principles developed by Harrison (1985) may be readily applied to the study of fit in dyadic relationships (Shumaker & Brownell, 1984).

Boundaries and Limitations of P-E Fit Theory

P-E fit theory provides a useful conceptual framework for understanding how person and environment constructs combine to produce strain and how coping and defense may resolve P-E misfit. Nonetheless, the theory has several boundaries and limitations.

Content of person and environment dimensions not specified. Although P-E fit theory describes the process by which person and environment jointly influence strain, it does not specify the content of person and environment dimensions. In this regard, P-E fit theory is a pure process theory (J. Campbell et al., 1970), and the content of person and environment dimensions must be obtained from other theories. For example, the content of needs may be obtained from theories that specify taxonomies of needs (Maslow, 1954), preferences (Amabile, Hill, Hennessey, & Tighe, 1994; Pryor, 1983), or values (Rokeach, 1973; Schwartz, 1994; Super, 1973), and the content of supplies may be derived from theories of job characteristics (Campion & Thayer, 1985; Hackman & Oldham, 1980) or activities (McCormick, 1979). Analogously,

abilities may be obtained from conceptual frameworks of human aptitudes, abilities, and skills (Fleishman & Reilly, 1992; Lubinski & Dawis, 1990; Spenner, 1990), and demands may be based on theories of job requirements (Borman & Brush, 1993; Fleishman & Mumford, 1991).

Specific relationships with strain not predicted. P-E fit theory does not propose a priori hypotheses regarding the relationship between P-E fit and strain. Rather, the theory identifies a set of possible relationships, such as those shown in Figures 2, 3, and 4, but treats P-E fit relationships for specific content dimensions and indices of strain as an empirical matter. An initial foundation for hypothesizing specific relationships is provided by the concepts of carryover, conservation, interference, and depletion discussed by Edwards (1996). However, these concepts have been applied to only a limited set of content dimensions (Edwards, 1996; Livingstone, Nelson, & Barr, 1997). Furthermore, evidence suggests that the relationship between P-E fit and strain may differ not only across content dimensions and indices of strain, but also across occupations (Caplan et al., 1980). Developing hypotheses for major content dimensions, indices of strain, and occupations represents a significant, if not overwhelming, undertaking for future P-E fit research.

Specific coping and defense strategies not predicted. P-E fit theory devotes limited attention to coping and defense. For example, the theory does not specify the criteria by which the person will choose from among various methods for resolving P-E misfit. According to the theory, subjective P-E misfit may be resolved directly through cognitive distortion (i.e., defense) or indirectly by reducing objective misfit (i.e., coping), which in turn would reduce subjective misfit. The theory also indicates that subjective P-E misfit may be tolerated by reducing the importance of the dimension on which misfit occurs. However, the theory does not articulate the conditions under which each of these various methods of adaptation will be used. Moreover,

coping and defense may occur in an ordered progression, such that defensive adaptation strategies are implemented only after attempts to change the objective person and environment have failed. The selection and sequencing of these methods of adaptation are not addressed by P-E fit theory.

Summary of Empirical P-E Fit Research

Relevant literature. As noted previously, numerous studies have examined the combined effects of the person and environment on strain. Results from these studies are relevant to P-E fit theory if they satisfy the following conditions:

- Commensurate measures. Person and environment measures must refer to commensurate dimensions. Hence, studies that combine noncommensurate person and environment variables, as when personality is viewed as a moderator of the effects of environmental stressors on strain (Cohen & Edwards, 1989; Parkes, 1994), are not relevant to P-E fit theory.
- Needs-supplies fit or demands-abilities fit. Person and environment variables must correspond to needs and supplies or abilities and demands, respectively. This criterion excludes studies of value congruence (Adkins, Russell, & Werbel, 1994; Cable & Judge, 1996; Judge & Bretz, 1992; Lovelace & Rosen, 1996; Meglino, Ravlin, & Adkins, 1989, 1992) and interpersonal similarity (e.g., Cable & Judge, 1996; Day & Bedeian, 1995; O'Reilly, Caldwell, & Barnett, 1989; Tsui & O'Reilly, 1989; Turban & Jones, 1988; Zalesny & Kirsch, 1989), as these studies involve comparisons between persons rather than between the person and environment.
- Needs and demands as amount, frequency, or intensity. For needs-supplies fit, needs should be measured as desired amount, frequency, or intensity of a dimension rather than the importance of a dimension. For example, needs-supplies fit regarding pay should compare

actual pay to desired pay, not to the importance of pay. P-E fit theory views importance not as the standard by which supplies are evaluated, but rather as a moderator of the relationship between needs-supplies fit and strain (French et al., 1974; Harrison, 1985; see also Locke, 1969, Mobley & Locke, 1970; Rice et al., 1985). Thus, studies of the fit between supplies and need importance (e.g., Bizot & Goldman, 1993; Rounds, Dawis, & Lofquist, 1987; Scarpello & J. Campbell, 1983; Vandenberg & Scarpello, 1990; Wood, 1981) are not relevant to P-E fit theory. Likewise, for demands-abilities fit, demands should be measured as the required amount, frequency, or intensity of a dimension, not as the importance of the dimension. Hence, studies that operationalize demands as the importance of job competencies (e.g., Caldwell & O'Reilly, 1990) are not relevant to P-E fit theory.

- Analytical approach. Studies must use a method of analysis that captures the fit, match, or similarity between the person and environment. Studies that use the interaction between person and environment to signify P-E fit (e.g., Chan, 1996; Joyce, Slocum, & von Glinow, 1982; Moskowitz & Cote, 1995; O'Reilly, 1977; Ostroff, 1993; Puffer & Meindl, 1992; Rahim, 1981; Schein & Diamante, 1988) are therefore excluded, because the interaction between person and environment variables does not reflect their proximity to one another (Edwards & Cooper, 1990).
- Strain, coping, or defense as outcomes. P-E fit should be used to predict strain, coping, or defense. Studies using P-E fit to predict task performance (e.g., McGrath, 1976; Westman & Eden, 1992, 1996) are not directly relevant to P-E fit theory, because task performance may result from coping efforts but does not itself represent coping efforts. Studies of the relationship between P-E fit and vocational choice (Meier, 1991) or job change (Breeden, 1993; Wilk & Sackett, 1996) are tangentially relevant to P-E fit theory, given that choosing

or changing a vocation or job influences the objective environment, which is one method of coping with P-E misfit. However, these studies rarely examine changes in the person as a response to misfit and therefore provide a biased perspective on coping with P-E misfit. For this reason, these studies are not reviewed here.

Relevant studies prior to the develoment of P-E fit theory. Empirical research on P-E fit theory began in the early 1970s, after the conceptual foundations of the theory were developed (Caplan et al., 1980). However, earlier studies of concepts analogous to P-E fit provide evidence relevant to P-E fit theory. Many of these studies focused on need satisfaction, using the difference between needs and supplies to predict satisfaction with various aspects of work (Evans, 1969; Hulin & Smith, 1965; Katzell, 1964; Locke, 1969; Wanous & Lawler, 1972). Overall, these studies suggest that satisfaction increases as supplies increase toward needs. However, these studies provide limited evidence regarding the relationship of excess supplies with satisfaction, because few respondents in these studies reported excess supplies (Evans, 1969). Moreover, most of these studies operationalized needs-supplies fit using difference scores that imposed an a priori relationship between excess supplies and satisfaction (i.e., a positive relationship for an algebraic difference, a negative relationship for an absolute difference). An exception is Locke (1969), who plotted the relationship between needs-supplies fit and satisfaction and found a positive monotonic relationship for pay and an inverted-U relationship for length of work week.

Direct tests of P-E fit theory. Of the studies explicitly designed to test P-E fit theory, the most comprehensive was conducted by French, Caplan, Harrison and colleagues (Caplan et al., 1980; French et al., 1982). Relationships between P-E fit and strain were examined using a random stratified sample of 318 workers in 23 occupations. Needs and supplies were measured

for job complexity, role ambiguity, responsibility for persons, workload, income, and overtime, and demands and abilities were assessed in terms of education and length of service. P-E fit was operationalized using various difference scores between person and environment measures. Algebraic difference scores were used to test monotonic relationships between P-E fit and strain (curve B, Figures 2 and 3), right- and left-censored difference scores[2] were used for asymptotic relationships (curve A, Figures 2 and 3), and absolute and squared difference scores were used U-shaped relationships (curve C, Figures 2 and 3). Data were also obtained on 18 psychological, physiological, and behavioral strains (e.g., job dissatisfaction, blood pressure, cigarette smoking). Relationships between P-E fit and strain were tested using bivariate correlations and by examining the increment in variance explained by P-E fit measures after controlling for E and P.[3]

Although the results of this study are too extensive to fully review here, several general findings may be summarized. First, P-E fit was related to psychological strains and, to a lesser extent, physiological and behavioral strains. These relationships were strongest for needs-supplies fit regarding job complexity, role ambiguity, responsibility for persons, and workload. Second, all three relationships predicted by P-E fit theory (i.e., monotonic, asymptotic, U-shaped) were detected. In general, relationship between psychological strains and needs-supplies fit on job complexity and role ambiguity were U-shaped, whereas relationships for responsibility for persons and workload were either U-shaped or asymptotic, with the latter indicating that strain increased for excess supplies but remained constant for deficient supplies (note that this relationship is the <u>opposite</u> of that shown in Figure 2). Third, difference scores used to depict nonlinear relationships between P-E fit and strain (i.e., censored, absolute, and squared differences) often yielded statistically significant increments in explained variance after controlling for P and E, particularly for job complexity.

Evidence for a U-shaped relationship between P-E fit and strain is illustrated in Figures 5 and 6, which show the relationship between depression and needs, supplies, and needs-supplies fit regarding job complexity based on data from French et al. (1982; Caplan et al., 1980). As Figure 5 shows, depression exhibits weak negative relationships with needs and supplies. In contrast, Figure 6 indicates that depression increases as supplies deviate from needs in either direction, yielding a U-shaped relationship between needs-supplies fit and strain. Moreover, the slope of the relationship is greater when supplies exceed needs than when supplies fall short of needs, suggesting that excess job complexity has a greater impact on depression than insufficient job complexity.

Insert Figures 5 and 6 About Here

Subsequent studies of the relationship between P-E fit and strain. Numerous studies relevant to P-E fit theory has been conducted since the early 1970s (Assouline & Meir, 1987; Michalos, 1986; Edwards, 1991; Spokane, 1985). Edwards (1991) reviewed studies published from 1960 through 1989 and offered the following general conclusions regarding the relationship between P-E fit and strain. First, the vast majority of P-E fit studies have focused on needs-supplies fit rather than demands-abilities fit. Second, most of these studies have found significant relationships between needs-supplies fit and various indices of strain, including dissatisfaction, tension, fatigue, somatic complaints, and absenteeism. These relationships for were found for algebraic, absolute, and squared differences between needs and supplies, suggesting that strain decreases as supplies increase towards needs (see Figure 2) but providing equivocal evidence regarding the relationship of excess supplies with strain. Third, of the few studies examining

demands-abilities fit, most have reported a U-shaped relationship between misfit and dissatisfaction. However, these studies used analytical techniques that imposed a U-shaped relationship between demands-abilities misfit and strain, making it impossible to detect monotonic or asymptotic relationships. Finally, virtually every study operationalized P-E fit by collapsing person and environment measures into a single score, most often an algebraic, absolute, or squared difference. Operationalizing P-E fit in this manner introduces numerous methodological problems, such as reduced reliability, ambiguous interpretation, and confounding of the effects of person and environment on strain (Cronbach, 1958; Edwards, 1994; Johns, 1981). These problems introduce serious ambiguities in the interpretation of relationships between P-E fit scores and strain. For example, a relationship between a P-E fit score and strain may simply reflect the influence of the person or the environment, not P-E fit. Furthermore, P-E fit scores force the relationship between P-E fit and strain to follow a particular functional form but provide no means of testing whether this functional form is, in fact, supported by the data. Because of these ambiguities, the results of most studies reviewed by Edwards (1991) are inconclusive.

Most P-E fit studies published since 1990 have operationalized fit using methods similar to those used in prior research. Results of these studies are consistent with prior research, suggesting that needs-supplies misfit is related to job dissatisfaction, low self-esteem, anxiety, and depression (Blau, 1994; Chatman, 1991; Conway, Vickers, & French, 1992; Gati, Garty, & Fassa, 1996; Kaldenberg & Becker, 1992; McFarlin & Rice, 1992; O'Reilly, Chatman, & Caldwell, 1991; Tziner & Falbe, 1990), and that demands-abilities misfit is related to dissatisfaction, anxiety, and exhaustion (Chatman, 1991; L. Kahn & Morrow, 1991; Xie & Johns, 1993). However, like previous studies, the results of these studies are inconclusive, given the

aforementioned problems created by collapsing person and environment measures into a single score.

Studies of the joint relationship of the person and environment with strain. Problems created by collapsing person and environment measures into a single score are avoided when person and environment measures and their associated higher-order terms (e.g., their squares and product) are used as joint predictors of stain (Edwards, 1991, 1994). This approach reflects the premise that the person, the environment, and strain are three distinct constructs, and their relationship should therefore be conceived not as a two-dimensional function, but rather as a three-dimensional surface. Studies using this approach (Champoux, 1992; Edwards, 1993, 1994, 1996; Edwards & Harrison, 1993; Elsass & Veiga, 1997; Hesketh & Gardner, 1993; Livingstone et al., 1997; Rice, Phillips, & McFarlin, 1990; Sweeney, McFarlin, & Inderrieden, 1990) have revealed a wide array of three-dimensional surfaces relating the person and environment to strain. Collectively, the findings of these studies suggest several general conclusions. First, person and environment variables often exhibit relationships with strain that differ in form and magnitude. For example, tests of monotonic relationships between needs-supplies fit and dissatisfaction have found that the negative relationship for supplies is often larger in absolute magnitude than the positive relationship for needs (Edwards, 1993, 1994, 1996; Hesketh & Gardner, 1993; Livingstone et al., 1997; Rice et al., 1990). These relationships are presumed to be equal in absolute magnitude when P-E fit is operationalized using an algebraic difference score (Edwards & Cooper, 1990). Second, person and environment variables often exhibit curvilinear relationships with strain that deviate from the basic functional forms shown in Figures 2 and 3. For example, several studies have found that dissatisfaction increases more rapidly for insufficient supplies than for excess supplies, and that dissatisfaction is higher when needs and

supplies are both low than when both are high (Edwards, 1996; Edwards & Harrison, 1993; Hesketh & Gardner, 1993; Livingstone et al., 1997). Third, equations that capture three-dimensional surfaces relating the person and environment to strain usually explain significantly more variance than their two-dimensional counterparts, often doubling or tripling R^2 values (Edwards, 1991, 1993, 1994; Livingstone et al., 1997).

An example of a three-dimensional relationship of the person and environment with strain is shown in Figure 7, based on a reanalysis of the French et al. (1982; Caplan et al., 1980) data by Edwards and Harrison (1993). For comparative purposes, this surface depicts the relationship of needs and supplies for job complexity with depression, corresponding to the two-dimensional relationship shown in Figures 6. Consistent with the two-dimensional relationship, the three-dimensional surface indicates that depression increases as supplies deviate from needs, with a somewhat stronger relationship for excess supplies than for insufficient supplies. However, the surface is also rotated slightly counterclockwise such that, when supplies and values are both low, depression is lowest when supplies exceed values, whereas when supplies and values are both high, depression is lowest when supplies are less than values. This finding suggests that, for simple jobs, a slight excess of job complexity may reduce depression by providing stimulation and challenge, whereas for highly complex jobs, a slight deficiency of job complexity may reduce depression by avoiding overload and conserving adaptive resources. This finding is concealed when the relationship of needs and supplies with depression is viewed in two dimensions, as in Figure 6.

Insert Figure 7 About Here

Summary of empirical findings. Numerous studies have reported evidence relevant to the basic tenets of P-E fit theory. These studies have consistently suggested that P-E misfit, particularly for needs and supplies, is related to strain. However, most of these studies have operationalized P-E fit by collapsing person and environment measures into a single score, such as an algebraic, absolute, or squared difference. This procedure introduces numerous methodological problems and renders results inconclusive. These problems have been avoided by recent studies that examine the three-dimensional relationship of the person and environment with strain. These studies indicate that strain often increases as the environment deviates from the person, as predicted by P-E fit theory. However, these studies also report complexities that are concealed by methods used in previous studies, such as asymmetric relationships between P-E misfit and strain, variation in strain along the line of perfect P-E fit, and minimum levels of strain at points other than perfect P-E fit. By applying three-dimensional procedures to existing data, conclusions of previous P-E fit studies may be clarified, revised, and elaborated (Edwards & Harrison, 1993).

Directions for Future P-E Fit Research

P-E fit theory has contributed to our understanding of the role of the person and environment in the stress process. Specifically, the theory has identified relevant person and environment constructs, described how and when misfit between these constructs signifies stress, generated a set of hypothetical relationships between P-E misfit and strain, and articulated how coping and defense may resolve objective and subjective P-E misfit and thereby reduce strain. However, P-E fit theory has conceptual boundaries that require further conceptual development. Moreover, most studies of P-E fit suffer from important methodological flaws, and many key propositions of P-E fit theory have not been empirically investigated. The needs for conceptual

elaboration, improved methodology, and further tests of propositions constitute the core elements of an agenda for future P-E fit research. In this section, we identify directions for future P-E fit research that we believe are particularly promising.

Relationships Between Objective and Subjective Person and Environment Constructs

P-E fit theory stipulates that objective person and environment constructs affect their subjective counterparts, and that these effects are influenced by perceptual and cognitive distortions and by personal and situational constraints on information access and processing. However, most studies of P-E fit have measured only subjective person and environment constructs (Edwards, 1991). Some studies have collected measures of the environment from sources other than the focal person (Assouline & Meir, 1987; Caldwell & O'Reilly, 1990; Chatman, 1991; Spokane, 1985), but these studies rarely include measures of the environment collected from the focal person. Consequently, these studies provides little evidence regarding the relationship between objective and subjective person and environment constructs or the mediating effects of subjective P-E fit in the relationship between objective P-E fit and outcomes. Moreover, measures of person and environment constructs are often treated as objective if they are obtained from respondents other than the focal person, such as supervisors or job analysts. It is unclear whether these measures should be considered objective, given that they are merely self-reports from another perspective.

The measurement of objective person and environment constructs raises both pragmatic and philosophical issues, and future P-E fit research should address not only how, but also whether objective person and environment measures can be developed (Caplan, 1987a,b; Starbuck & Mezias, 1996). If such measures can be developed and validated, studies should address the nature and magnitude of relationships between objective and subjective person and

environment constructs and the mediating effects of subjective P-E fit postulated by P-E fit theory. These studies may also examine whether objective misfit, accuracy of self-assessment, and contact with reality have implications for mental health, as suggested by early presentations of P-E fit theory (French et al., 1974; Harrison, 1978).

Taxonomies for Person and Environment Content Dimensions

As noted previously, P-E fit theory does not specify content dimensions for the person and environment. Future P-E fit research may obtain content dimensions from theories that provide taxonomies for describing the person or the environment. Taxonomies based on the person may draw from theories of needs or abilities, depending on whether needs-supplies fit or demands-abilities fit is of interest. For example, studies of need satisfaction (e.g., Porter, 1964; Porter & Lawler, 1968) have used Maslow's need hierarchy to derive measures of desired and actual work experiences. Analogously, studies of demands-abilities fit (e.g., Barrett, Forbes, O'Connor, & Alexander, 1980; Carlson, 1969) have adapted measures of skills and aptitudes to measure both abilities and demands.

Conversely, taxonomies that describe work environments (Borman & Brush, 1993; Campion & Thayer, 1985; Fleishman & Mumford, 1991; Hackman & Oldham, 1980; McCormick, 1979) may be used to identify supply and demand dimensions, and needs and abilities may be specified in commensurate terms. This approach was used by Edwards (1996), who measured job supplies and demands in terms of managerial task activities drawn from the Leader Observation System (LOS; Luthans & Lockwood, 1984) and derived corresponding measures of needs and abilities. By using existing person and environment taxonomies, future P-E fit research may avoid the ad hoc selection of content dimensions prevalent in previous studies of P-E fit, and dimensions relevant to the person or environment are less likely to be overlooked.

Moreover, studies may use common taxonomies to determine whether the effects of P-E fit on a particular set of dimensions generalize across settings, occupations, and cultures.

Complexities in Relationships Between P-E Fit and Outcomes

Studies examining three-dimensional relationships between the person, the environment, and outcomes (e.g., Edwards, 1993, 1994, 1996; Edwards & Harrison, 1993; Elsass & Veiga, 1997; Hesketh & Gardner, 1993; Livingstone et al., 1997) have revealed complexities that were undetected in previous studies that focused on two-dimensional relationships between P-E fit and outcomes. Some of these complexities were anticipated during the initial development of P-E fit theory (e.g., Caplan, 1983; French, 1973; Harrison, 1978) but could not be examined using two-dimensional approaches to the study of P-E fit. Other complexities were identified empirically and suggest that P-E fit theory may require further elaboration and refinement. This interplay between theory and empiricism is central to the accumulation of knowledge (Runkel & McGrath, 1972) and is not, as some researchers have admonished, "letting the empirical tail wag the theoretical dog" (Bedeian, Day, Edwards, Tisak, & Smith, 1994, p. 695). Rather, the theory-empiricism interplay represents the use of theory to guide data collection, analysis, and interpretation, and the use of empirical findings to modify and refine theory. The following discussion focuses on complexities that have been replicated across studies and therefore hold promise for future conceptual and empirical P-E fit research.

Different effects for person and environment. As noted previously, several P-E studies have found that the person and environment exhibit relationships with strain that differ in absolute magnitude (Edwards, 1993, 1994, 1996; Hesketh & Gardner, 1993; Livingstone et al., 1997; Rice et al., 1990). One explanation for these differences draws from the distinction between strong and weak situations (Mischel, 1977). Strong situations provide uniform and clear

cues regarding behavioral expectations and associated rewards, whereas in weak situations these cues are varied and ambiguous. Thus, in strong situations, environmental demands and supplies may be highly salient to the person, meaning the person is acutely aware of their amount, frequency, or intensity. If cues from the situation are stronger than those from the person (i.e., needs and abilities), then the effects of the environment may exceed those of the person. Conversely, in weak situations, cues from the person may be more salient than those from the environment and therefore may exert greater effects on strain.

Another explanation for the differential effects of the person and environment entails the variance of person and environment measures. Specifically, measures with greater variance are likely to exhibit stronger relationships with outcomes (Cooper & Richardson, 1986). Some studies of needs-supplies fit examine dimensions that are normatively desirable, meaning that most people would prefer a large amount of the dimension. Examples of such dimensions include pay, control, security, and achievement (Schwartz, 1994). For these dimensions, the variance in needs may be substantially smaller than the variance in supplies, thereby producing stronger effects for supplies than for needs. Conversely, studies of P-E fit occasionally use respondents from within a single job, organization, or occupation (e.g., Aranya, Barak, & Amernic, 1981; Caldwell & O'Reilly, 1990; Doty & Betz, 1979; Wiggins, 1984). For these studies, the variance of environment measures is likely to be smaller than the variance in person measures, thereby producing stronger relationships for the person than for the environment.

Relationships between P-E fit on different dimensions. P-E fit theory posits that the effects of misfit on strain may differ in form and magnitude, depending on whether environmental levels exceed or falls short of personal levels (see Figures 2 and 3). These asymmetries were suggested by studies using censored algebraic difference scores between

person and environment measures (Caplan et al., 1980; French et al., 1982) and have been subsequently demonstrated by studies examining three-dimensional surfaces relating the person and environment to strain (Edwards, 1996; Edwards & Harrison, 1993; Hesketh & Gardner, 1993; Livingstone et al., 1997).

Explanations for these asymmetries are based on the premise that P-E fit on one dimension influences P-E fit on other dimensions through carryover and interference effects. For example, when monetary supplies fall short of needs, needs-supplies misfit is created for dimensions central to the person's welfare and survival, such as clothing, food, and shelter. In contrast, when monetary supplies exceed needs, needs-supplies misfit may occur on less important dimensions, such as feelings of entitlement or pay equity. Due to these differential effects of insufficient and excess pay, strain should be greater when monetary supplies fall short of needs than when they exceed needs (cf. Pritchard, 1969). Alternately, excess work load may create needs-supplies misfit regarding performance and its attendant consequences (e.g., pay, recognition, job security), whereas insufficient work load may create needs-supplies misfit regarding less threatening dimensions, such as skill utilization. In this case, excess work load would have greater effects on strain than insufficient work load. Both of these examples rest on the assumption that needs-supplies misfit on one dimension creates needs-supplies misfit on other dimensions. To date, few studies have directly examined these effects, and explanations for asymmetries in the relationship between P-E fit and outcomes remain speculative.

Relationships between dimensions of P-E fit are also implicated by the hypothesized effects of demands-abilities misfit on strain. As argued by Harrison (1978, 1985), demands-abilities misfit will produce strain only if it induces needs-supplies misfit, as when work rewards are contingent upon meeting job demands. Although studies have found relationships between

demands-abilities misfit and strain (Caplan et al., 1980; French et al., 1982; Edwards, 1996; Livingstone et al., 1997), studies have not examined whether this relationship is mediated by needs-supplies fit. Edwards (1996) reported results indicating that demands-abilities misfit exhibits modest but statistically significant relationships with strain after controlling for needs-supplies misfit, suggesting that the effects of demands-abilities misfit are not fully mediated by needs-supplies misfit. However, this study was intended to compare the effects of demands-abilities fit and needs-supplies fit and therefore measured demands, abilities, needs, and supplies on commensurate dimensions. To explicitly test the mediating effects of needs-supplies fit, demands and abilities should be measured on dimensions that are instrumentally related to needs and supplies dimensions. For example, demands and abilities may refer to performance objectives, and needs and supplies may refer to rewards that are contingent upon meeting performance objectives. To our knowledge, no studies have examined the instrumental effects of demands-abilities fit on needs-supplies fit.

Variation in strain for perfect P-E fit. Relationships between P-E fit on different dimensions may affect the level of strain associated with perfect P-E fit. For example, studies of the three-dimensional relationship between needs, supplies, and strain have found that strain is often lower when needs and supplies are both high than when both are low (Edwards, 1994, 1996; Edwards & Harrison, 1993; Hesketh & Gardner, 1993; Imparato, 1972; Livingstone et al., 1997). These findings were foreshadowed by Harrison (1978) who noted that, although perfect fit exists when a person wants and has a job that is either simple or complex, more complex jobs often bring higher rewards such as pay, status, and recognition. Moreover, people who prefer complex jobs may also prefer high amounts of rewards associated with complex jobs (Edwards, 1996). Thus, high levels of actual and preferred job complexity may act as a surrogate for need

fulfillment regarding pay, status, recognition, and related rewards. Although this explanation focuses on job complexity, its underlying logic generalizes to needs-supplies dimensions examined in recent studies, which include decision-making, authority, power, autonomy, prestige, and creativity (Edwards, 1994, 1996; Edwards & Harrison, 1993; Hesketh & Gardner, 1993; Livingstone et al., 1997).

An alternative explanation for reduced strain when person and environment are both high concerns the sense of competence yielded by achieving high standards (White, 1959). High needs represent stringent standards emanating from the self, and fulfilling such standards may itself constitute a supply for needs regarding self-actualization (Maslow, 1954; Rokeach, 1973; Schwartz, 1994). Analogously, high demands represent challenging standards set by others, and having abilities commensurate with such demands may constitute a supply for self-actualization needs. In either case, strain is reduced not only because fit is achieved, but also because an ambitious standard is met, thereby contributing to needs-supplies fit regarding self-actualization.

P-E misfit leading to minimum strain. Studies of P-E fit are typically based on the assumption that perfect fit reduces strain and enhances well-being. However, this assumption may not hold, for various reasons. First, as illustrated by curve B in Figures 2 and 3, excess supplies or abilities may decrease strain if they promote the fulfillment of needs on other dimensions. Although this possibility is noted in most discussions of P-E fit theory (e.g., French et al., 1974; French et al., 1982), it has received little attention in studies of P-E fit, which often employ methods that assume perfect P-E fit is optimal and provide no means to verify this assumption (Assouline & Meir, 1987; Edwards, 1991; Michalos, 1986; Spokane, 1985). Second, as shown by curve B in Figure 4, strain may be minimized not precisely at perfect P-E fit, but within an interval surrounding perfect P-E fit signifying a range of tolerance. Although few

studies have employed analytical techniques that can detect a range of tolerance around perfect P-E fit (e.g., Locke, 1969; French, 1973), the piecewise linear model described by Edwards (1994) may be adapted for this purpose by specifying two changes in slope of the surface relating the person and environment to strain, each occurring where the environment exceeds or falls short of the person by some amount (e.g., one standard deviation). Third, as indicated by curve C in Figure 4, perfect P-E fit may cause stagnation and produce strain, whereas small amounts of misfit may create challenge and provide opportunities to utilize valued skills, thereby reducing strain (Caplan, 1983; French, 1973; Harrison, 1978; Kulka, 1979). The scoring procedures used in most P-E fit studies prevent the detection of minimum strain at points other than perfect fit, although the three-dimensional procedure described earlier can readily determine whether strain is minimized at perfect P-E fit. Finally, the point at which strain is minimized may depend not only on the proximity of person and environment to one another, but also on the absolute levels of person and environment. This phenomenon is illustrated in Figure 7, which shows that when needs and supplies for job complexity are low, depression is minimized when supplies slightly exceed needs, whereas when needs and supplies are both high, depression is minimized when supplies are somewhat less than needs (for further details and evidence, see Edwards & Harrison, 1993). Future P-E fit research should develop hypotheses regarding which combinations of person and environment minimize strain and employ analytical techniques that can substantiate or refute these hypotheses.

Summary of complexities in relationships between P-E fit and outcomes. As the preceding discussion indicates, relationships between P-E fit and outcomes may take a wide variety of forms. These relationships may depend on the type of P-E fit (i.e., needs-supplies fit vs. demands-abilities fit), the content of person and environment dimensions, and the index of

strain. To date, studies examining alternative relationships between P-E fit and strain (e.g., Edwards & Harrison, 1993; French et al., 1982) have been largely exploratory. Studies hypothesizing specific functional forms relating P-E fit to strain (Edwards, 1996; Livingstone et al., 1997) have focused on a limited set of content dimensions (i.e., managerial tasks, creativity), and only Livingstone et al. (1997) developed separate hypotheses for different indices of strain.

A major undertaking for future P-E fit research is to develop hypotheses regarding functional forms relating needs-supplies fit and demands-abilities fit on specific content dimensions to specific indices of strain. To initiate this undertaking, researchers may apply the principles of carryover, conservation, interference, and depletion to content dimensions obtained from relevant person or environment taxonomies. Researchers should also specify whether relationships are expected to differ across indices of strain that signify major dimensions of mental and physical well-being (Derogatis, 1977; Goldberg, 1978; Russell, 1980; Watson & Tellegen, 1985). Relationships for each combination of person, environment, and strain constructs may also be examined in different contexts (e.g., organizational settings, occupations, cultures) and in different demographic groups. Obviously, a comprehensive treatment of these relationships represents an enormous endeavor for future P-E fit research.

The immense variety of content dimensions, indices of strain, contexts, and populations may prohibit the discovery of relationships between P-E fit and strain that can be generalized. Rather, researchers may have to rely on the principles of carryover, conservation, interference, and depletion to derive hypotheses unique to each study. Although relationships between P-E fit and strain may vary considerably across studies, these relationships may ultimately converge into categories that represent theoretically meaningful prototypes. Moreover, relationships found in a particular context or population provide a knowledge base that may inform hypotheses derived

for other contexts or populations. Thus, although the potential variety of relationships between P-E fit and strain may appear daunting, we believe these relationships will ultimately be placed in meaningful order by programmatic research that systematically varies content dimension, index of strain, context, and popultion.

P-E Fit and Coping

Studies of P-E fit have focused almost exclusively on the relationship of P-E fit with strain. Very few studies have examined the relationship of P-E fit with coping and defense or how coping and defense may influence the objective and subjective person and environment. One reason for this lack of research involves the absence of coping and defense measures relevant to P-E fit theory. Many available measures were derived using an inductive approach, in which respondents generate lists of strategies for dealing with stress and exploratory factor analysis is used to assign these strategies to dimensions (e.g., Amirkhan, 1990; Dewe & Guest, 1990; Folkman & Lazarus, 1988). This approach provides little assurance that the obtained dimensions will be relevant to any a priori theory, including P-E fit theory. Other measures have been derived deductively, with items generated to represent conceptual dimensions specified a priori (e.g., Carver, Scheier, & Weintraub, 1989; Edwards & Baglioni, 1993; Stone & Neale, 1984). However, these measures were not intended to represent coping and defense as defined by P-E fit theory. Perhaps the measure most relevant to P-E fit theory is the Cybernetic Coping Scale (CCS; Edwards & Baglioni, 1993), which includes scales measuring efforts to change the environment, adjust preferences, and decrease perceived importance. However, the CCS does not measures efforts to change demands or abilities, nor does it differentiate efforts to change objective vs. subjective person and environment constructs.

Measures of coping and defense as defined by P-E fit theory are clearly needed. The

availability of such measures would create numerous opportunities for research into the interrelationships among the person, the environment, coping, and defense. Several fruitful directions for such research are suggested by Caplan (1983), who generated various hypotheses regarding the resolution of P-E misfit. For example, Caplan (1983) posits that resolving P-E misfit may yield different effects depending on whether misfit is resolved by changes in the person vs. the environment and whether these changes are initiated by the self vs. others. Caplan (1983) further suggests that the successful resolution of P-E misfit may itself improve well-being by satisfying the person's need for control. These hypotheses set a useful agenda for future research into the specific effects of coping and defense on P-E fit.

P-E fit Over Time

Most studies of P-E fit have relied on cross-sectional data. Consequently, very little evidence is available regarding the effects of P-E fit over time. P-E fit theory suggests two promising avenues for longitudinal P-E fit research.

First, P-E fit theory posits that misfit induces coping and defense, which in turn influence objective and subjective P-E fit, respectively. These relationships imply a cyclical recursive model, in which P-E misfit at time 1 affects coping and defense at time 2, which affect P-E fit at time 3, and so on (Billings & Wroten, 1978; Edwards, 1992). Studies of these sequential relationships would reveal the process by which P-E fit causes and is caused by coping and defense and the time intervals required for the manifestation of these effects.

Second, Caplan's (1983) discussion of past, present, and future P-E fit provides numerous hypotheses regarding the effects of fit on strain over time and how retrospective and anticipated fit may influence current fit and strain. Available evidence indicates that current strain increases as retrospective and anticipated misfit increase (Caplan, Tripathi, & Naidu, 1985; Sen, 1992),

thereby suggesting that misfit from other time perspectives operates through vicarious experience rather than contrast effects (Caplan, 1983). This evidence also indicates that anticipated fit is more relevant than retrospective fit to the prediction of strain, implying that worries about the future have greater effects on strain than ruminations about the past. However, these studies treat P-E fit as a single variable and therefore provide no evidence regarding the relationships between specific person and environment constructs from different time perspectives. By examining these relationships, future research may uncover the underlying mechanisms by which retrospective and anticipated person and environment influence current P-E fit and strain.

P-E fit in Multiple Life Domains

As a process theory, P-E fit theory may be applied not only to different content dimensions, but also to different life domains, such as work, family, and leisure (Harrison, 1978; Rice et al., 1985). Despite the generality of P-E fit theory, most P-E fit research has been conducted in work settings (Assouline & Meir, 1987; Edwards, 1991; Spokane, 1985). Studies in nonwork settings (e.g., A. Campbell, Converse, & Rodgers, 1976; Michalos, 1985) have reported results similar to those found in work settings. However, these studies have collapsed the person and environment into a single P-E fit score, thereby introducing the methodological problems discussed earlier. Thus, future P-E fit research should examine three-dimensional relationships between the person, the environment, and outcomes in multiple life domains. Research on the combined effects of P-E fit in multiple life domains on strain is particularly important, given that strain refers to the overall well-being of the person and therefore depends on the person's total life experience, not just his or her experience in a single life domain (Rice et al., 1985).

Methodological Issues

The preceding discussion has focused on major conceptual themes for future P-E fit research. However, these conceptual themes are intertwined with methodological issues regarding the measurement and analysis of P-E fit. The following discussion highlights measurement and analytical issues that are particularly relevant to P-E fit research.

Sampling the person and the environment. Complete tests of P-E fit relationships require the distribution of data throughout the two-dimensional space defined by the minima and maxima of person and environment measures. Scores must be distributed on either side of the line of perfect P-E fit to detect asymmetries in the relationship between P-E misfit and outcomes. Likewise, scores must be distributed throughout the range of person and environment measures to examine variation in outcomes along the line of perfect P-E fit.

The distribution of data throughout the two-dimensional person-environment space should be verified by plotting data, not by examining univariate statistics (e.g., the means, standard deviations, and ranges of person and environment scores). Focusing solely on univariate statistics can yield erroneous conclusions regarding the distribution of data within the two dimensional P-E space. For example, scores falling along the line of perfect P-E fit may cover the full range of person and environment measures, but because such scores only depict perfect fit, they cannot be used to analyze the effects of misfit on outcomes.

Typically, person and environment measures are positively correlated, given that people tend to select and remain in environments that provide P-E fit (Schneider, Goldstein, & Smith, 1995). Consequently, person and environment measures often yield an elliptical distribution with its primary axis running parallel to the line of perfect P-E fit. Although such distributions often yield reasonable tests of P-E fit relationships, they provide little information regarding the effects of extreme misfit due to the absence of data where person and environment scores are

markedly different. A theory that predicts the conditions under which extreme P-E misfit occurs would help researchers obtain person and environment scores with distributions that permit complete tests of the effects of P-E misfit.

Commensurate measurement. As emphasized earlier, P-E fit theory requires that the person and the environment are commensurate. Accordingly, person and environment measures must refer to the same content dimension and use the same response scale (Caplan, 1987b; French et al., 1974). Commensurate measures may be derived from person and environment taxonomies, as suggested in the preceding discussion. These taxonomies may also be used to supplement person and environment measures with commensurate measures of strain, coping, and defense. For example, needs-supplies misfit regarding quantitative work load should influence satisfaction with work load, as opposed to satisfaction with other job facets (French et al., 1982). Likewise, coping and defense directed toward needs-supplies misfit for quantitative work load should assess efforts to change objective and subjective needs and supplies concerning quantitative work load. Obviously, general indices of strain, such as chronic depression and coronary heart disease, cannot be commensurate with person and environment measures. However, the effects of P-E misfit on general indices of strain may be mediated by specific indices of strain that are commensurate with P-E fit dimensions, as in the relationship between job facet misfit, job facet satisfaction, and overall job satisfaction (Locke, 1976; Rice et al., 1985).

Framing person and environment measures. Previously, we emphasized that studies of needs-supplies fit should measure needs in terms of the desired amount, frequency, or intensity of a dimension rather than the importance of a dimension. However, desires may be framed in various terms, including preferences (“how much would you like?”), needs (“how much must

you have?"), optima ("how much would be ideal?), expectations derived from social norms ("how much should you have?"), or minimal acceptable levels ("how much would be adequate?"). Analogously, demands should refer to the required amount, frequency, or intensity of a dimension rather than its importance. However, like desires, requirements may refer to preferences ("how much would your boss like you to do?"), needs ("how much must you do?"), optima ("how much would your boss consider ideal?), normative expectations ("how much does your boss think you should do?"), or minimal acceptable levels ("how much would your boss consider adequate?"). The consequences of these different framings of needs and demands measures have not been investigated.

Scale contamination. Person and environment measures are often implicitly framed in relative terms. For example, job demands may be measured using a response scale ranging from "very low" to "very high." To assign meaning to the anchors on this scale, respondents may invoke some external or internal standard, such as demands placed on others, demands previously experienced by the respondent, or the ability of the respondent to meet the demands in question. When these standards are invoked, measures of demands will be partially confounded with the standard used by the respondent. Thus, if the respondent evaluates job demands by invoking his or her abilities as a standard, then reported demands will partially reflect demands relative to abilities. As a result, jobs with the same absolute level of demand may be described as highly demanding by a respondent with low abilities but may be considered not at all demanding by a respondent with high abilities. Likewise, measures of abilities may be contaminated if respondents describe their abilities relative to standards such as the abilities of others, the respondent's previous ability level, or demands pertaining to the ability in question. Hence, reported abilities may be biased upwards if the respondent is surrounded by people of lesser

ability, has increased his or her abilities through training or experience, or is not experiencing demands that tax his or her abilities. Measures of needs and supplies may become contaminated in a similar manner.

Scale contamination may be reduced by using concrete response scales for person and environment measures (Caplan, 1983), as when job demands are measured in terms of the number of units the person must produce or the amount of time the person is given to complete a task or meet a performance objective. Concrete response scales are more difficult to develop for abstract dimensions, such as self-actualization. However, abstract dimensions can often be translated into specific dimensions that may be measured in relatively concrete terms. For example, self-actualization may be operationalized as the fulfillment of needs regarding specific, measurable career goals or milestones.

Scale equivalence. To examine P-E fit, person and environment measures must have equivalent scales, meaning they share the same zero point and have the same interval size (Edwards & Cooper, 1990; French et al., 1974). Equivalent scales are required to quantify the direction and degree of misfit between the person and environment. To our knowledge, no P-E fit studies have employed scaling techniques to determine the scale equivalence of person and environment measures (Bass, Cascio, & O'Connor, 1974; Stevens, 1958). However, it may be reasonable to assume that person and environment scales are equivalent when they use the same metric and employ the same verbal anchors (Edwards & Cooper, 1990).

Some investigators suggest that equivalent scales may be created by standardizing person and environment measures (Rice et al., 1985; Wilk & Sackett, 1996). However, standardization discards information regarding the absolute levels of person and environment scores, and this information is necessary to determine the direction and degree of P-E fit. Thus, scale

equivalence must be achieved through the careful construction of person and environment measures, not by standardizing data collected using nonequivalent scales.

Analysis. A final set of methodological issue concerns the analysis of P-E fit relationships. As previously noted, most P-E fit studies have used analytical approaches that reduce the three-dimensional relationship between the person, the environment, and outcomes to two dimensions. Results of these studies are ambiguous and potentially misleading, as demonstrated by studies comparing two-dimensional relationships between P-E fit and outcomes to three-dimensional surfaces relating the person and environment to outcomes (Edwards, 1994, 1996; Edwards & Harrison, 1993). Most three-dimensional relationships relevant to P-E fit theory can be captured by a quadratic equation using measures of the person, the environment, their squares, and their product as predictors. Parameter estimates from these equations may be used to rigorously test features of three-dimensional surfaces that correspond to hypotheses derived from P-E fit theory (Edwards & Parry, 1993). Relationships with abrupt changes in slope, such as the three-dimensional analogs of curves B and C in Figure 4, can be analyzed by adapting the piecewise linear model described by Edwards (1994) to allow curvilinearity and multiple changes in slope.

P-E fit may also be treated as an outcome, as in studies of the effects of coping and defense on P-E fit or longitudinal investigations of relationships between P-E fit at different points in time. Methods for analyzing P-E fit as an outcome require the use of person and environment measures as dependent variables in a multivariate model (Edwards, 1995). These models can depict the joint effects of independent variables on the person and environment and can differentiate effects for cases where the environment exceeds the person from those where the environment falls short of the person. These models can also include quadratic person and

environment terms, thereby permitting test of three-dimensional surfaces relating the person and environment at one point in time to both the person and environment at later points in time.

The foregoing methods for analyzing P-E relationships have been implemented using regression analysis with ordinary least squares estimation (Edwards, 1994, 1995; Edwards & Parry, 1993). However, these methods may also be applied using structural equation modeling with latent variables (Bollen, 1989; Joreskog & Sorbom, 1993). Structural equation modeling typically relies on maximum likelihood estimation, which requires that the distribution of observed variables is multivariate normal. This assumption is almost certainly violated for quadratic structural equations required to depict three-dimensional surfaces relating latent person and environment constructs to outcomes. As an alternative, quadratic structural equations may be estimated using asymptotic distribution free estimation procedures (Browne, 1984). However, these procedures often require very large sample sizes to obtain stable parameter estimates. Further information regarding the specification and estimation of quadratic structural equation models may be obtained from Bollen (1989) and Jaccard and Wan (1996).

Practical Implications

Previous treatments of P-E fit theory have discussed its implications for reducing stress and strain at work (Caplan, 1983; Caplan et al., 1980; French et al., 1982; Harrison, 1978, 1985). These discussions emphasize several important themes, such as the relevance of both demands-abilities fit and needs-supplies fit to recruitment and selection decisions, the need to customize organizational interventions to suit the needs and abilities of the affected individuals, and the viability of resolving P-E misfit by targeting the person, the environment, or both. These general principles provide an overarching framework for stress management interventions. However, it is difficult to translate these principles into more detailed prescriptions, due to the limitations of

available evidence regarding the exact nature of the relationship between P-E fit and strain.

Interventions to resolve P-E misfit require knowledge of the effects of P-E misfit for specific content dimensions. For example, employee involvement programs often change the responsibility, control, rewards, and contact with coworkers experienced by employees (Lawler, Mohrman, & Ledford, 1995). To predict the effects of these changes, we must know the relationship between P-E fit and strain for these particular dimensions. Our current knowledge regarding these relationships is limited, and consequently we have little basis for asserting whether or how changes in P-E fit on specific dimensions will influence strain. Knowledge required to guide interventions might be gained through randomized field experiments that manipulate parameters hypothesized to improve P-E fit and track the effects of these manipulations on strain. These effects should be observed over time, as P-E fit theory views the relationship between the person and environment as dynamic, and changes in the environment may combine with changes in the person to influence P-E fit. In sum, although P-E fit theory identifies relevant person and environment constructs for interventions that may reduce stress and enhance well-being, specific prescriptions based on P-E fit theory await further research.

Summary and Conclusion

P-E fit theory provides a systematic, general framework for understanding how the person and environment combine to produce stress and influence strain. The basic postulates of P-E fit theory are pervasive in theories of stress, and P-E theory has stimulated numerous studies of the relationship between P-E fit and strain. However, available evidence relevant to P-E fit theory has important flaws and limitations, and much remains to be learned regarding the nature, causes, and consequences of P-E fit. Based on this overview of the past 25 years of P-E fit research, we believe the time has come to initiate a second generation of P-E fit research. We hope this

generation of research will address the new and lingering conceptual questions pertaining to P-E fit theory and will avoid the methodological problems associated with much previous P-E fit research. We see important opportunities for identifying taxonomies of content dimensions relevant to P-E fit, for uncovering the mechanisms that generate complex three-dimensional relationships between the person, the environment, and outcomes, and for examining the interplay between P-E fit, strain, coping, and defense over time. By capitalizing on these opportunities, researchers will substantially advance our understanding of the joint effects of the person and environment in the stress process.

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Footnotes

[1.] The relationships shown in Figures 2 and 3 also represent the cumulative difference model, in that they depict gradual variation in strain as a function of needs-supplies fit and demands-abilities fit.

[2.] Left-censored difference scores were created by setting all negative values of the P-E difference to zero, and right-censored difference scores were created by setting all positive values of the P-E difference to zero. Thus, left-censored scores were used to detect relationships between P-E fit and strain where E was greater than P, whereas right-censored scores were used to detect relationships where E was less than P.

[3.] Tests of increments in explained variance were not performed for algebraic difference scores, as they represent linear combinations of E and P and therefore cannot explain variance beyond that accounted for by E and P (Edwards & Cooper, 1990).

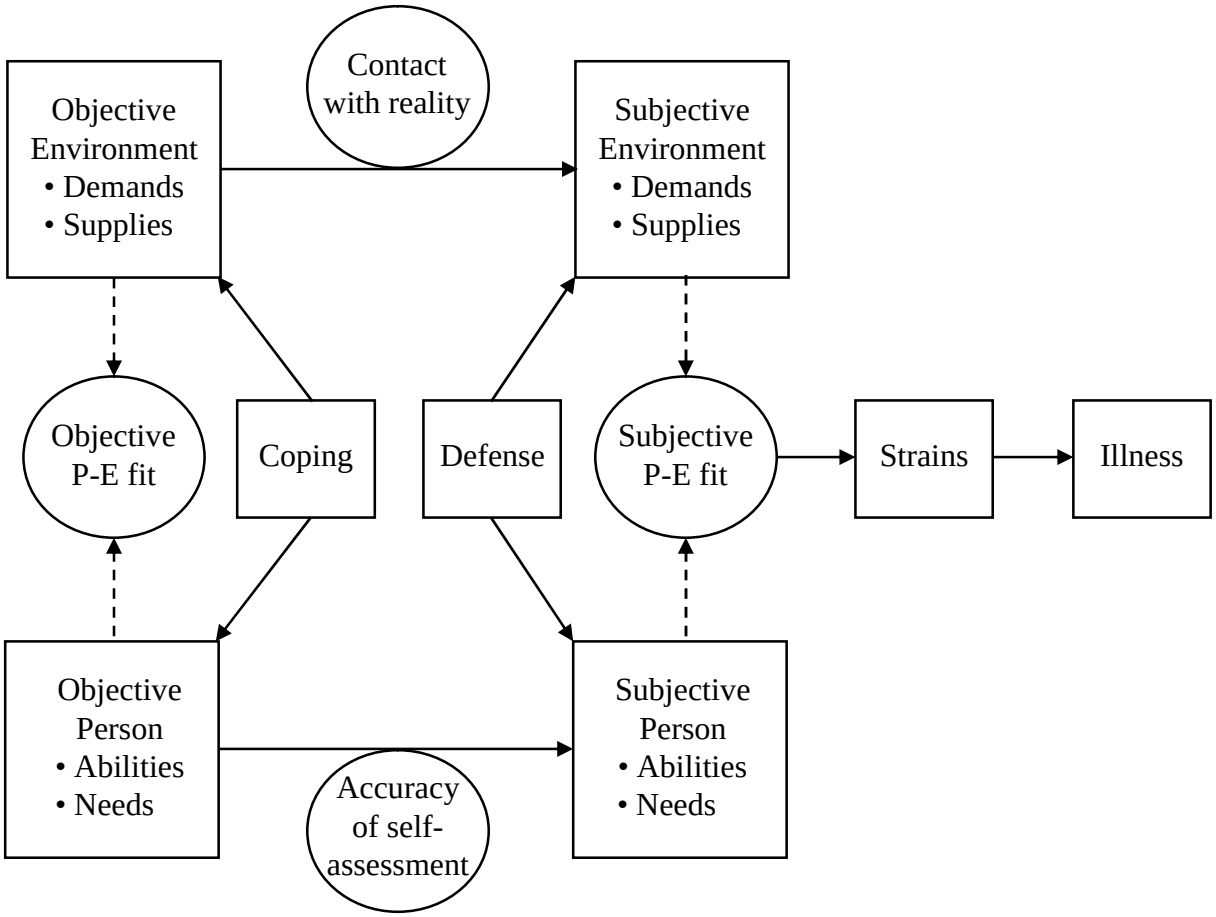

Figure 1. A model of stress as person-environment fit. Concepts within circles are discrepancies between the two adjoining concepts. Solid lines indicate causal effects. Broken lines indicate contributions to person-environment comparisons. Adapted from Harrison (1978).

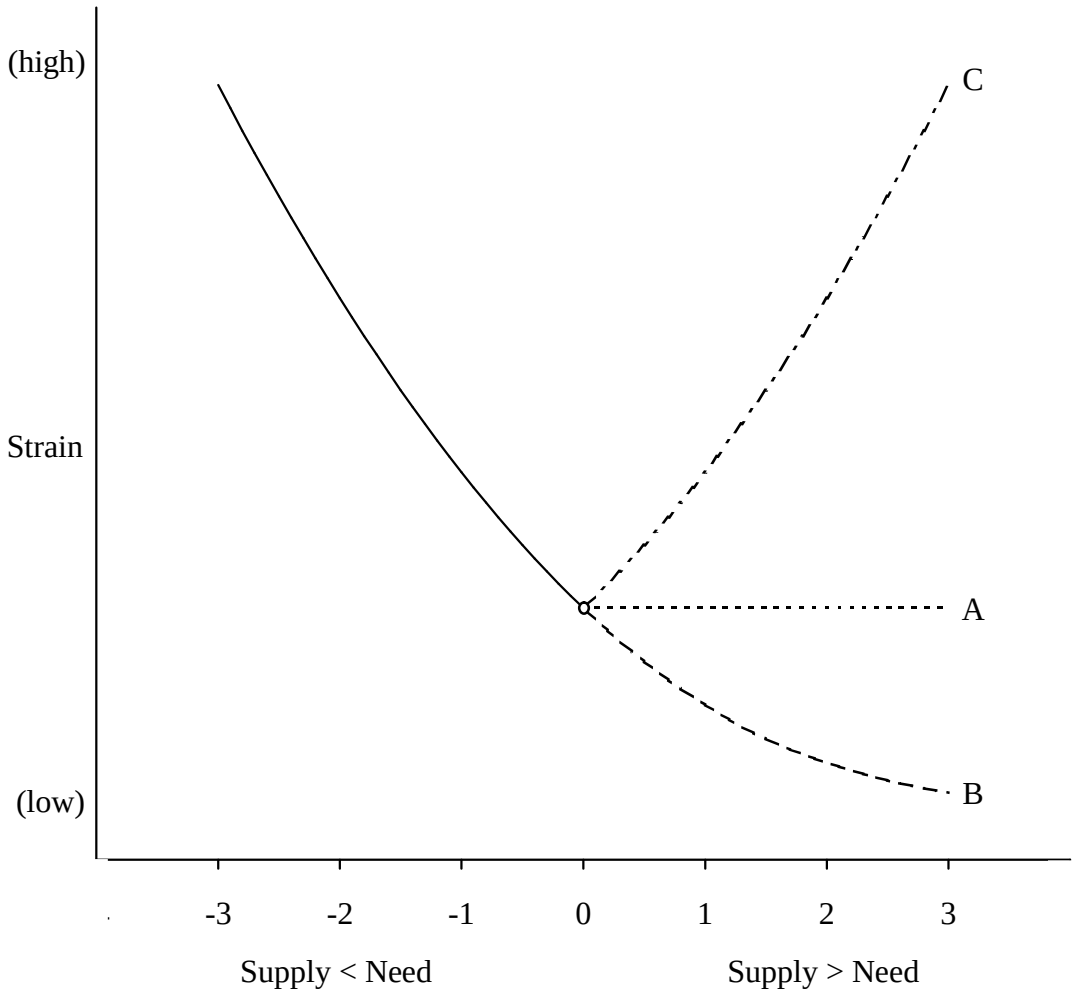

Figure 2. Three hypothetical shapes of the relationship between needs-supplies fit and strain. Adapted from Harrison (1978).

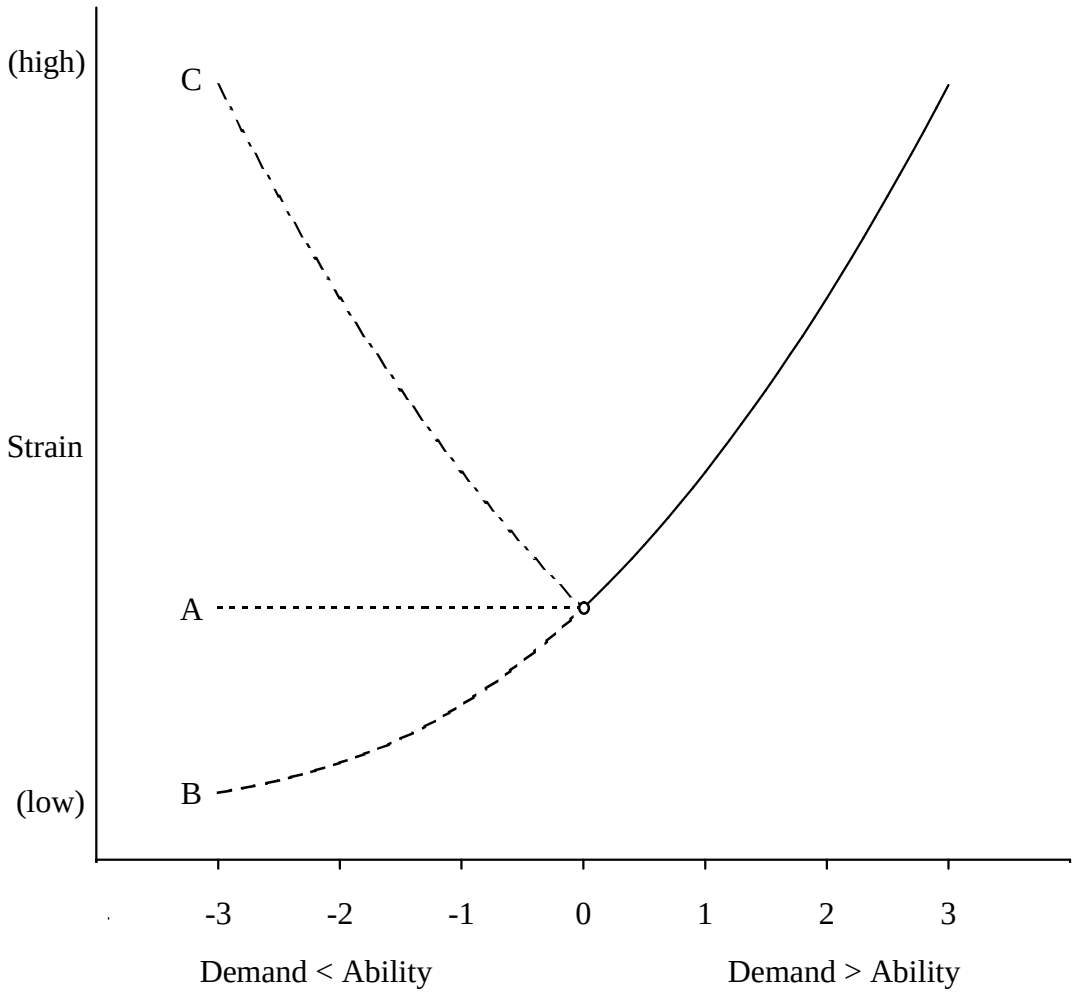

Figure 3. Three hypothetical shapes of the relationship between demands-abilities fit and strain. Adapted from Harrison (1978).

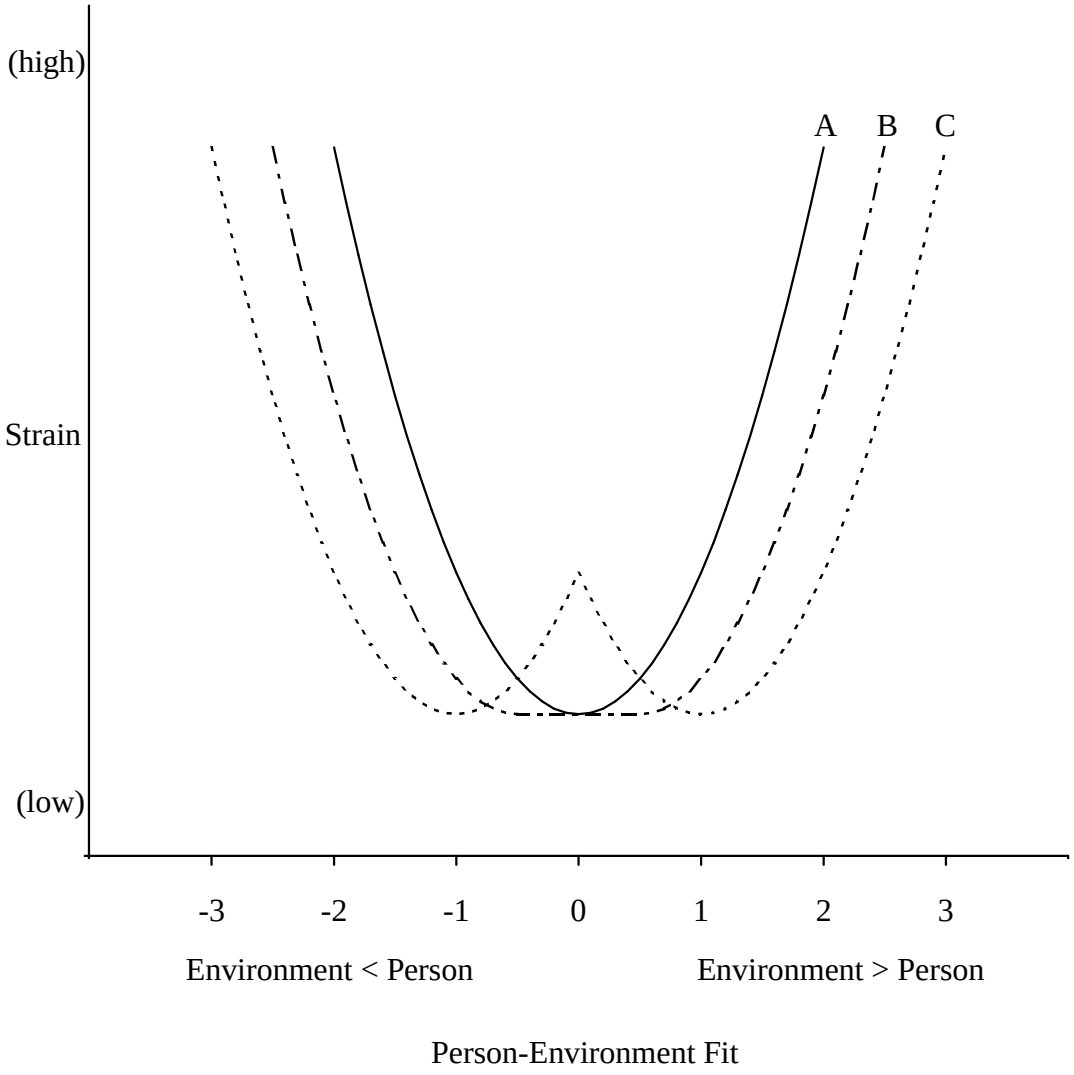

Figure 4. Three hypothetical curves representing the cumulative difference, critical difference, and optimal congruence models. Adapted from Kulka (1979).

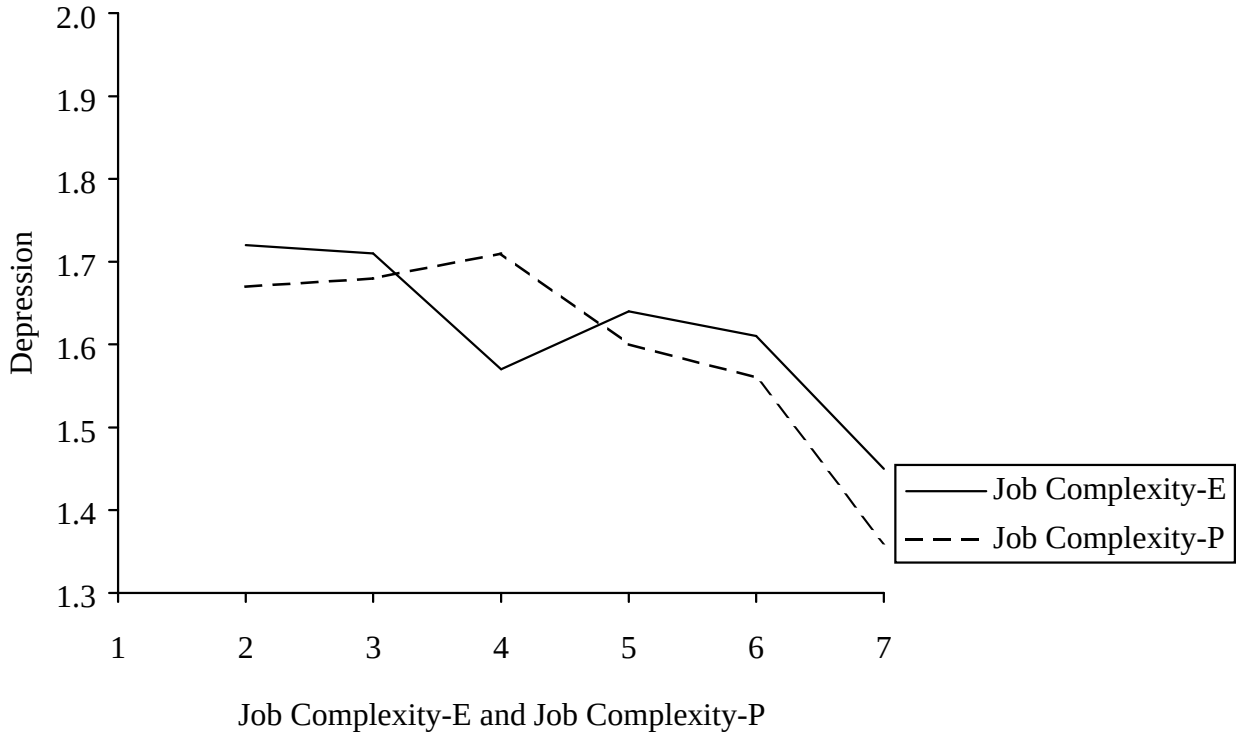

Figure 5. Relationships between depression and job complexity-E and job complexity-P (from Caplan et al., 1980, p. 90).

Figure 6. Relationships between depression and job complexity P-E fit (from Caplan et al., 1980, p. 91).

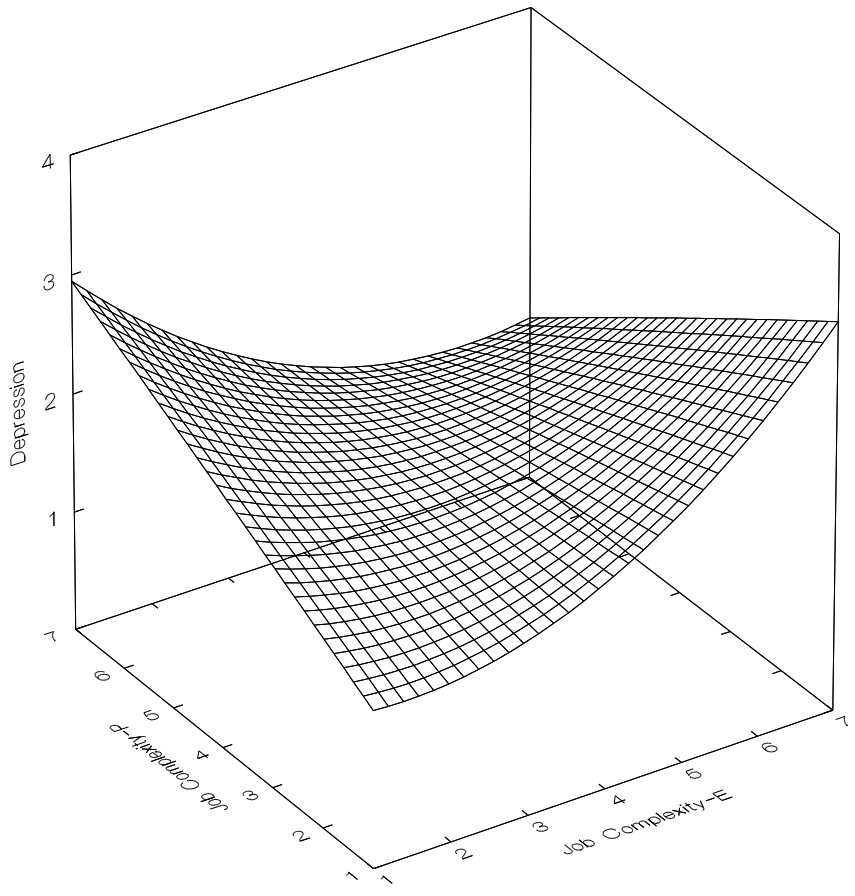

Figure 7. Three-dimensional surface relating job complexity-E and job complexity-P to depression (based on data from Caplan et al., 1980).