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Determinants of functioning and well-being among individuals with schizophrenia: An integrated model

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Abstract

Outcomes for health conditions are typically the result of multiple factors; however, studies tend to focus on a narrow class of variables. Functioning and well-being outcomes for schizophrenia are diverse and have resisted simple explanation; however, prior research has not offered an integrated understanding of the relative contributions of enduring and episodic environmental factors, personal resources and psychiatric factors, and cognitive appraisal and coping, on functioning and well-being outcomes in schizophrenia. The present article sets out an integrated model of the determinants of functioning and well-being among individuals with schizophrenia. To examine evidence that bears on the model, literature on hypothesized relationships is reviewed to identify areas for which there is strong evidence and areas where more research is needed. The article suggests areas for further research, and directs researchers and practitioners toward areas of intervention that can enhance functioning and well-being for persons diagnosed with schizophrenia.

Examinations of the factors that are related to variability in outcome for health conditions usually focus on a narrow class of influences (e.g., environmental variables), but rarely incorporate a broad range of explanatory factors (Wachs, 2000). Such investigations typically find that a class of influences only explains a portion of the variability in a given outcome. As Wachs has discussed, this “fragmentation” reflects a trend of increasing specialization in the sciences and a general lack of communication between disciplines. He has noted that, except in the case of a small number of rare conditions where single influences account for almost all variability (e.g., Huntington's chorea), outcomes for health conditions are typically the result of multiple influences. Wachs has argued that in most cases investigators should consider a range of factors related to outcome, since single classes of influences are usually “necessary, but not sufficient” to explain variability.

Based on existing evidence, schizophrenia and related psychotic disorders are no exception to Wachs' rule. Functioning and well-being outcomes for schizophrenia are diverse (e.g., Harding, Brooks, Ashikaga, Strauss, & Breier, 1987; Harrison et al., 2001), and have resisted simple explanation. Earlier reviews of the factors that influence functioning and well-being outcomes for schizophrenia (Avison & Speechley, 1987; Ciompi, 1988) noted that a variety of psychosocial and biological influences were likely to be important, but there was relatively little research on these variables. Despite progress in many areas suggested by these earlier

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presentations, current investigations of the determinants of functioning and well-being in schizophrenia continue to focus on a narrow range of predictors.

Investigations tend to fall into three major groups with a corresponding set of emphases: (1) traditional psychiatric studies focus on illness variables of presumed biological origin, such as symptom severity, neurocognitive impairment, and “insight”; (2) psychologically oriented studies emphasize psychological and personal resources, such as self-efficacy, coping style, coping skills, and the use of psychosocial services; and (3) sociologically oriented studies emphasize social resources, such as social support, housing, and the impact of episodic stressors such as stigma. Studies typically focus mainly on one set of influences and may include one or two variables from another set, but rarely examine variables from all three sets.

1. Existing models of outcome for schizophrenia

Prior models of the factors influencing outcome from schizophrenia have considered a range of environmental and personal factors and have provided an important platform upon which our model builds. The Vulnerability-Stress Model of schizophrenia (Nuechterlein & Dawson, 1984; Zubin & Spring, 1977) took an important step of linking enduring personal competencies (including coping resources), and environmental factors (social support and social stress) in an interactive model predicting the onset of psychotic episodes among people vulnerable to schizophrenia. This model did not specify how these factors may further influence social functioning and well-being in schizophrenia, which are the focus of the current analysis, but stated that the impact of vulnerability and stress factors on these outcomes deserved “separate evaluation” (Nuechterlein & Dawson, 1984, p. 308).

Liberman (1988) and Liberman et al. (1986) later expanded on the Vulnerability-Stress model by describing factors affecting social competence outcomes for schizophrenia and highlighting the importance of “psychobiological vulnerability,” “socioenvironmental stressors” and “protective factors” (including social support and coping resources). We build on this model here by placing greater emphasis on the distinction between enduring and transitory environmental characteristics (both supportive and stressful ones), considering the distinction between coping style and coping strategies in more detail, and focusing on a broader range of personal and cognitive appraisal factors. In addition, we examine a broader range of functional outcomes beyond social competence.

2. A new integrative model

In response to gaps in the existing literature, we set out a new integrated model of the determinants of functioning and well-being among individuals with schizophrenia. This model is based in part on a general framework of the determinants of functioning and well-being in human development (Moos, 2002), but is tailored specifically to the circumstances of schizophrenia.

Our emphasis on functioning and well-being reflects but differs somewhat from the current interest in “recovery” (Anthony, 1993; Corrigan & Ralph, 2005; Liberman & Kopelowicz, 2005a). Current conceptualizations of recovery tend to emphasize either subjective or functional outcomes. For example, Ralph (2005) has recently emphasized subjective aspects of recovery, defining recovery as a form of personal growth, including a sense of well-being. Liberman and Kopelowicz (2005a), however, have offered a definition of recovery related to clearly delineated functional criteria, including independence, involvement in work or school, and involvement in social and recreational activities. Our emphasis on both functioning and well-being reflects our view that both subjective and objective outcomes need to be considered, allowing for a multidimensional range of outcome possibilities for people with schizophrenia (see also Xie, McHugo, Helmstetter, & Drake, 2005, for findings supporting the

multidimensional nature of recovery-related outcomes), and emphasizing that outcomes in this population need to be considered along a continuum (i.e., many individuals may improve but may not reach specific thresholds). We have avoided using the term “recovery” to clarify the difference between our conceptualization and those described above.

The proposed model is illustrated in Fig. 1. The model is a representation of factors related to functioning and well-being among persons who have already developed schizophrenia, and does not address etiology. The model attempts to represent the manner in which ongoing personal and environmental resources and deficits influence everyday experiences and individuals' responses, and how these responses affect functioning and well-being. While the model acknowledges that existing resources and conditions determined by factors outside of the individual's control are likely to be important, it places the person's appraisal and coping responses at a crucial juncture in determining functioning and well-being outcomes. The positioning of elements in the model reflects a temporal process by which an individual's enduring personal and environmental contexts influence transitory experiences that lead to changes in appraisal and coping, which, in turn, affect functioning and well-being. *Arrows* in Fig. 1 represent the causal direction of hypothesized associations between determinants and outcome indices (for example, community stigma is hypothesized to partially cause stigmatizing interactions). *Bidirectional arrows* represent hypothesized reciprocal relationships. The width of arrows reflects the hypothesized strength of the relationship (thin arrows reflect a small relationship, medium arrows reflect a moderate relationship, and thick arrows reflect a strong relationship).

Five major classes of determinants are included in the model: *Enduring Environmental Conditions*, *the Personal System*, *Transitory/Episodic Experiences*, *Cognitive Appraisal*, and *Coping*. These sets of determinants are presented in relationship to each other and to a broad group of outcomes labeled *Functioning and Well-Being*. Functioning and Well-Being outcomes include three sets of separate but partially related variables: community integration, social functioning, and life satisfaction/psychological distress. In our model, community integration refers to what others have termed the “physical” and “social” aspects of integration (Wong & Solomon, 2002), reflecting participation in community activities and interactions with community members. Social functioning reflects related but distinct dimensions such as independence, employment status, leisure activities, and interpersonal relationships (Birchwood, Smith, Cochrane, Wetton, & Copestake, 1990); life satisfaction/psychological distress reflects the construct that many refer to as “subjective quality of life” (Prince & Prince, 2001), which consists of a person's expression of relative satisfaction with their lives. Although symptoms can be outcomes, we include them as predictors in the Personal System under Psychiatric Factors (except in the case of psychological distress, which overlaps with depressive symptoms and is included as part of Functioning and Well-Being).

Enduring Environmental Conditions include relatively stable characteristics of the environment, such as social climate, resources and ongoing stressors. As shown in Fig. 1, the model hypothesizes 4 types of links between enduring environmental conditions and the other sets of variables: (1) links between enduring conditions and functioning and well-being, (2) links between enduring conditions and the personal system, (3) links between enduring conditions and episodic conditions, and (4) links between enduring conditions and coping.

The *Personal System* includes characteristics that are primarily influenced by biogenetic and early environmental factors, such as general cognitive abilities and personality traits. These characteristics are relatively stable but can be modified over time. Psychiatric factors such as symptom severity and neurocognitive impairment are also included in the personal system; although these variables have unique relationships with other variables in the model, the general pattern is similar to that of other sets of variables in the personal system. Substance abuse/

dependence is included here to reflect situations in which an individual has developed substance abuse habits early in life. As shown in Fig. 1, the model hypothesizes 4 types of links between the personal system and the other variables: (1) links between the personal system and functioning and well-being, (2) links between the personal system and episodic events, (3) links between the personal system and appraisal, and (4) links between the personal system and coping.

Transitory/Episodic Experiences include relatively short-term environmental conditions, such as exposure to stressful life events and abuse/trauma, and mental health interventions. As shown in Fig. 1, the model hypothesizes 4 types of links between transitory/episodic conditions and the other variables: (1) links between transitory/episodic events and functioning and well-being, (2) reciprocal links between transitory/episodic events and the personal system, (3) links between transitory/episodic events and cognitive appraisal, and (4) reciprocal links between transitory/episodic events and coping.

Cognitive Appraisal includes variables that are typically referred to as “insight” and “awareness” in the psychiatric literature, as well as related constructs such as health beliefs and illness models (Lobban, Barrowclough, & Jones, 2003). These variables are included separately in this model to illustrate their crucial hypothesized relationship to coping in schizophrenia. As seen in Fig. 1, the model hypothesizes that cognitive appraisal is directly linked to coping.

Coping is defined to include efforts an individual undertakes to manage his or her experiences, and includes help-seeking and making use of professional treatment services, making use of informal forms of care (e.g., self-help groups), choosing to adhere to prescribed medication regimens, and self-initiated efforts such as using active or avoidant coping strategies (e.g., cognitive self-talk, distraction, etc.). The use of substances as a way of coping is also included here (in contrast to substance use habits that develop earlier in life, which are included in the personal system). Coping efforts that are undertaken to prevent or anticipate problems prior to their occurrence are included as proactive coping and goal striving (Aspinwall & Taylor, 1997). As seen in Fig. 1, the model hypothesizes 3 types of links between coping and the other variables: (1) links between coping and functioning and well-being, (2) reciprocal links between coping and enduring environmental conditions, and (3) reciprocal links between coping and the personal system.

3. Factors not directly included in the model

Although the model is meant to be relatively comprehensive, there are a number of factors that may exert an important influence on functioning and well-being outcomes for schizophrenia that are implied by it but not directly included. Genetic predispositions toward specific personal characteristics (such as temperament) and greater illness severity have an important influence on the personal system. In addition, environmental conditions during early childhood that are no longer present during adulthood may strongly influence the personal system. While these variables may no longer be present as enduring environmental conditions, they may continue to exert an influence on identity, personality traits, and psychiatric factors.

Cultural context and historical factors exert an important influence on enduring environmental conditions. For example, historical changes in mental health policy influence the availability of mental health services and insurance coverage for mental health services (Mechanic, 1998). Historic economic changes also are related to employment opportunities and rates among people with mental illness (Warner, 1994). Similarly, longstanding cultural/historical differences may account for differences in level of community stigma or availability of work opportunities that may explain some of the international differences in outcomes observed in the World Health Organization (WHO) studies (Harrison et al., 2001). While we consider these

genetic and historical/cultural factors to be important, in general we believe that they operate through the domains we have included in the model.

Variables typically subsumed under the category of “demographic characteristics” (usually gender and race/ethnicity) are also not included in the model. This reflects our perspective that these characteristics do not exert independent effects on functioning and well-being, but do so by way of their association with other variables in the model, such as environmental or personal system characteristics. For example, a relationship between race/ethnicity and functioning is likely to be mediated by enduring environmental conditions (such as neighborhood poverty determined by historic discriminatory practices), transitory/episodic experiences (such as stressors related to racial discrimination), and personal system factors (such as attitudes influenced by culturally based beliefs).

4. Review of evidence for the model

In selecting studies for review, we have sought studies that assessed outcomes related to at least one aspect of the functioning and well-being outcomes specified in our model. We draw from studies with a variety of methodological designs in reviewing evidence for the relationships hypothesized in the model. Many of the relevant studies reviewed are cross-sectional and demonstrate an association between the variables but do not offer strong evidence of a causal relationship; these studies are usually reviewed in brief. However, several studies are prospective or experimental, allowing for stronger causal inferences; these studies are discussed in greater detail.

5. Enduring environmental conditions

5.1. Enduring environmental conditions and functioning/well-being

According to the model, social support resources, neighborhood disadvantage, community economic conditions and community-level stigma directly impact functioning and well-being. There is support for this hypothesis from cross-sectional studies that show an association between more social support and better social functioning and life satisfaction (Baker, Jodrey, & Intagliata, 1992; Lam & Rosenheck, 2000; Ritsner et al., 2000; Yanos, Rosenfield, & Horwitz, 2001). There is also evidence from 2 prospective studies for a longitudinal relationship between social support and functioning and well-being. Rosenfield and Wenzel (1997) found that a participant's number of negative (or unsupportive) social relationship at baseline was modestly related to the likelihood of experiencing poorer life satisfaction at 12-month follow-up. Erickson, Beiser, and Iacono (1998) and Erickson, Beiser, Iacono, Fleming, and Lin (1989) found that number of baseline relationships with friends moderately predicted overall social functioning among a sample of young adults with schizophrenia at both 18-month and 5-year follow-up.

Although housing conditions may be less enduring than other environmental conditions, and are related to other enduring factors (such as the availability of funding for housing programs) we include them here due to their relatively long-term nature. There is cross-sectional evidence that greater independence in housing status (e.g., living independently versus in a custodial environment) is related to better life satisfaction (Lehman, Kernan, DeForge, & Dixon, 1995; Lehman, Slaughter, & Myers, 1991). Although some cross-sectional studies have not identified a clear “gradient” in the relationship between all variations in independence in housing and life satisfaction, the findings that individuals living in the community report more life satisfaction than individuals residing in long-term inpatient settings has been consistently replicated (e.g., Brunt & Hansson, 2004). Prospective studies are currently lacking in this area. Cross-sectional evidence has also linked neighborhood characteristics of housing location to community integration (Segal, Baumohl, & Moyles, 1980). This research found that

individuals with mental illness residing in neighborhoods classified (based on census-level socioeconomic and political characteristics) as “liberal, nontraditional” had better community integration than individuals residing in both more conservative and poorer neighborhoods. Whether or not community-level stigma was associated with the census-level characteristics was not directly assessed. The approach used in this study is in need of more recent replication.

5.2. Enduring environmental conditions and the personal system

Although personal system variables are primarily influenced by genetic disposition and environmental conditions during childhood, development continues throughout the lifespan and personality continues to be influenced by social climate and other environmental conditions. Although we know of no empirical evidence for this hypothesis specifically related to schizophrenia, there is evidence from general population studies that contextual environmental conditions are related to personal system variables. For example, using data from the Epidemiological Catchment Area study, Silver, Mulvey, and Swanson (2002) demonstrated that neighborhood structural characteristic, including disadvantage and social mobility, are associated with higher rates of substance abuse, suggesting that residence in disadvantaged areas increases one's likelihood of abusing substances. Similarly, Boardman and Robert (2000), found that residence in neighborhoods with a high prevalence of unemployment is associated with lower levels of general self-efficacy.

5.3. Enduring environmental conditions and transitory/episodic experiences

Enduring stressors and community problems such as neighborhood poverty are hypothesized to strongly influence the likelihood of experiencing transitory stressors such as criminal victimization or domestic abuse. The rationale for this is that residence in impoverished areas with higher rates of crime places individuals at greater risk of being criminally victimized. There is evidence for this hypothesis from cross-sectional studies indicating that residence in poor urban areas is associated with higher rates of criminal victimization among people with mental illness (Hiday, Swartz, Swanson, Borum, & Wagner, 1999; Lam & Rosenheck, 1998). Prospective studies are lacking in this area.

5.4. Enduring environmental conditions and coping

Community resources, such as the availability of mental health services and the existence of social programs to fund them, may exert an important influence on the use of coping strategies such as help-seeking and medication adherence. Cross-sectional studies have demonstrated a positive association between having adequate health insurance coverage and/or medication benefits and the use of services such as antipsychotic medication and outpatient services (McAlpine & Mechanic, 2000; Rabinowitz, Bromet, Lavelle, Hornak, & Rosen, 2001; Rabinowitz et al., 1998; Yanos, Crystal, Kumar, & Walkup, 2001). Particularly compelling evidence for this relationship also comes from a time-series study showing that changes in local mental health policy can have a direct negative impact on psychotropic medication use (Soumerai, McLaughlin, Ross-Degnan, Casteris, & Bollini, 1994). Specifically, Soumerai et al. found that the imposition of a monthly payment cap for the purchase of medication among Medicaid beneficiaries in New Hampshire led to a marked decrease in the use of psychotropic medications among people with schizophrenia; after political action led to withdrawal of the payment cap, medication use rapidly returned to prior levels.

Enduring resources such as availability of social support may also be related to coping. Research in the general population has found that social support can act as a source of “assistance” in coping with stress (Thoits, 1986). However, only one published study has investigated the relationship between social support and coping among people with schizophrenia (MacDonald, Pica, McDonald, Hayes, & Baglioni, 1998). This study found

evidence for a positive relationship between perceived social support and the use of problem-centered coping strategies to deal with stress among persons with psychosis.

6. The personal system

6.1. The personal system and functioning/well-being

Personal system variables, such as cognitive abilities, personality traits, self-efficacy, identity/self-esteem and psychiatric factors, are hypothesized to exert a moderate direct relationship on social functioning and life satisfaction. Although personality traits have been typically ignored in research among people with schizophrenia, several recent cross-sectional studies have shown that personality traits are related to functioning and well-being (Eklund, Backstrom, & Hansson, 2003; Eklund, Hansson, & Bengtsson-Tops, 2004; Hansson, Eklund, & Bengtsson-Tops, 2001; Kentros, Terkelson, Hull, Smith, & Goodman, 1997; Ritsner, Farkas, & Gibel, 2003). Specifically, traits reflecting a more active and engaging personality, such as self-directedness/extraversion, are related to better life satisfaction and social functioning, whereas traits related to less outward engagement, such as neuroticism and harm avoidance, are related to poorer life satisfaction and social functioning. Longitudinal studies are lacking in this area.

Other personal system variables, such as a more problem-focused coping style and more general self-efficacy, have also been found to predict better social functioning and life satisfaction in cross-sectional studies (Bechdolf et al., 2003; Eklund et al., 2003; Ritsner, Ben-Avi et al., 2003; Ritsner et al., 2000; Yanos, Primavera, & Knight, 2001). Two prospective studies support these findings. One study (Fassino et al., 2003) found that baseline characteristics reflecting greater ability to control emotions and impulses (described by the authors as personality characteristics, but more akin to our conceptualization of coping style) predicted social functioning outcomes at 6-month follow-up. Another study (Ritsner, 2003; Ritsner, Kurs et al., 2003) observed that increases in self-efficacy significantly predicted increases in overall life satisfaction at 16-month follow-up in a sample of persons diagnosed with schizophrenia while controlling for a number of other potential predictors.

A small body of research has examined the correlates of self-esteem among persons with schizophrenia (e.g., Bradshaw & Brekke, 1999; Markowitz, 2001; Roe, 2003; Torrey, Mueser, & Drake, 2000); these studies have consistently demonstrated that self-esteem is significantly correlated to life satisfaction. A longitudinal study demonstrated, however, that baseline self-esteem does not predict life satisfaction (Roe, 2003), but rather that changes in self-esteem are associated with changes in life satisfaction. Another longitudinal study found that self-esteem was relatively stable and did not improve with changes in employment status among people with severe mental illness participating in vocational rehabilitation (Torrey et al., 2000). In addition, it is hard to distinguish empirically between self-esteem and depressive symptoms, which share a substantial amount of variance, and findings are difficult to interpret for this reason.

In the past, there was controversy about whether psychiatric symptoms and neurocognitive factors affect functioning and well-being. While early studies observed no relationship, most recent cross-sectional studies have shown that the presence of more severe specific types of psychiatric symptoms (particularly thought disorder/disorganization and negative symptoms), as well as neurocognitive impairment, are associated with impaired social functioning (Dickerson, Boronow, Ringel, & Parente, 1996; Dickerson, Boronow, Ringel, & Parente, 1997; Smith et al., 1999; Addington & Addington, 1999). Recently, Kopelowicz, Liberman, Ventura, Zarate, and Mintz (2005) found evidence that the absence of specific types of neurocognitive impairment distinguished between persons with schizophrenia judged to be "recovered" (i.e., having reached specified criteria for good functioning) and those who were "non-recovered." Prospective studies have also generally confirmed an association between

symptoms, neurocognitive impairment, and social functioning. Dickerson, Boronow, Ringel, and Parente (1999) found that baseline negative symptoms and neurocognitive impairment had a moderate negative effect on ability to improve in social functioning at a 2-year follow-up. Similarly, Angell and Test (2002) found that initial levels of disorganized symptoms predicted poorer 7-year outcomes in social functioning among a group of young adults with schizophrenia.

Overall cognitive function (typically measured by IQ) that predates neurocognitive impairment associated with psychiatric factors is an aspect of the personal system that has been less frequently studied. Correlational studies have found lower IQ among persons diagnosed with schizophrenia to be related to both poorer social functioning and life satisfaction (Dickinson & Coursey, 2002; Hassiotis et al., 1999; Sota & Heinrichs, 2004). However, long-term prospective studies are needed in this area, as it is difficult to disentangle how overall cognitive function predating psychiatric disorder is impacted by neurocognitive impairment related to symptoms.

6.2. The personal system and transitory/episodic experiences

Particular personal system orientations are also hypothesized to make it more likely for individuals to experience certain types of stressors. This hypothesis is supported by cross-sectional evidence that individuals with pre-existing substance abuse problems are more likely to experience interpersonal and family problems (Salyers & Mueser, 2001), criminal victimization (Hiday et al., 1999; Sells, Rowe, Fisk, & Davidson, 2003) and interpersonal trauma (Scheller-Gilkey, Moynes, Cooper, Kant, & Miller, 2004). Although both substance abuse and the experience of stressors such as interpersonal trauma are likely to be influenced by the same enduring environmental conditions, abusing substances is likely to place already vulnerable individuals at higher risk of experiencing subsequent trauma (Mueser, Rosenberg, Goodman, & Trambetta, 2002).

Personality characteristics may also make it more likely for individuals to experience transitory stressors. A recent longitudinal study revealed that specific personality characteristics (neuroticism and psychoticism) were prospectively associated with more frequent exposure to “dependent” life events (i.e., events judged to be influenced by the person's behavior), but not “independent” life events (i.e., events judged to be beyond the person's control) (Horan, Subotnick, Reise, Ventura, & Nuechterlein, 2005).

6.3. The personal system and appraisal

Personal system factors, such as psychiatric symptoms and neurocognitive impairment, are hypothesized to influence cognitive appraisal. Although we define appraisal more broadly than do most psychiatric studies, which have focused primarily on “insight” (defined largely as degree of acceptance of the mental illness label), we focus on this aspect of appraisal since few studies have used a broad definition. Several cross-sectional studies have found that greater symptom severity and neurocognitive impairment are related to impaired insight (Keshavan, Rabinowitz, DeSmedt, Harvey, & Schooler, 2004; Lysaker, Bell, Bryson, & Kaplan, 1999; Smith et al., 1999). There is also evidence from a large cross-sectional study that co-occurring substance abuse is related to poorer insight (Kavanagh et al., 2004). A longitudinal study (Smith et al., 2004) specifically found that individuals with formal thought disorder (a symptom that has been associated with poor social functioning) were less likely to improve their insight 6 months after hospital discharge.

There is also prospective evidence that personality traits are related to the ability to modify insight. Lysaker et al. (1999) found that psychoticism and extraversion (characteristics associated with more rigidity) were associated with less change in level of insight at 1 year

follow-up. Another longitudinal study examined the impact of dependency on others, self-criticism (a characteristic related to introspectiveness), and sense of efficacy (related to self-efficacy) on insight at 12, 16 and 20 month follow-up (Shahar et al., 2004). An interaction between the traits of dependency and efficacy predicted insight at 20 month follow-up: when a person had lower dependency, high efficacy predicted better insight; conversely, when dependency was higher, lower efficacy predicted better insight. These two studies suggest that personality characteristics impact ability to improve insight, but the relationship is likely to be complex and moderated by a variety of personal system factors.

Identity is a potentially important aspect of the personal system that has been relatively unstudied with regard to schizophrenia. Identity relates to the ways in which individuals see themselves, and the roles that they carry in relation to others. Some researchers speculate that a major way in which schizophrenia can impact functioning is by transforming a person's identity (Estroff, 1989). In this regard, an aspect of identity that has been studied in this population is "engulfment," or the extent to which a person has taken on the identity of being a "mental patient" (Lally, 1989). Although one cross-sectional study found that greater engulfment was associated with poorer social functioning (McCay & Seeman, 1998), another study found that it was strongly associated with better insight (Williams & Collins, 2002). Thus, adopting a patient identity may lead to greater acceptance of the mental illness label, but may restrict one's ability to improve social functioning. There is some support for this conclusion from a prospective study of "internalized stigma" (Ritsher & Phelan, 2004), that assessed the degree to which individuals felt alienated from others due to having mental illness. This study found that greater alienation and stereotype endorsement at baseline were significantly related to greater depressed mood at 4-month follow-up. Similarly, a longitudinal qualitative study assessing the process of recovery from schizophrenia has supported this conclusion, finding that individuals who improved functioning over a 1-year period showed a progression from the identity of "patient" to "person" in their narratives, suggesting that maintaining a patient identity can be detrimental to recovery (Roe, 2001). Although more research is needed, existing findings support our view that a broader view of the construct of insight that emphasizes aspects of appraisal beyond just acceptance of the mental illness label (Roe & Kravetz, 2003) is needed in order to fully understand the complex interplay between self-concept, functioning and awareness.

6.4. The personal system and coping

Personal system variables, such as personality characteristics, coping style (which reflects a general tendency toward using certain types of coping responses [Moos & Holahan, 2003]), and psychiatric factors, are hypothesized to exert a moderate influence on coping responses. Support for this hypothesis is mixed. While there has been no investigation to our knowledge of the influence of coping style on the direct use of coping responses among individuals with schizophrenia, investigations in the general population suggest that coping style and coping responses are minimally related to each other (Carver, Schreier, & Weintraub, 1989). Cross-sectional studies among people with schizophrenia and related mental disorders have also found little or no relationship between general self-efficacy and the use of coping strategies (Yanos, Knight, & Bremer, 2003; Yanos, Primavera et al., 2001).

However, there is cross-sectional evidence that individuals with more extroverted personalities are more likely to use active coping strategies such as seeking social support (Lysaker, Wilt, Plascak-Hallberg, Brenner, & Clements, 2003), and that individuals with a greater degree of neurocognitive impairment are more likely to use avoidant strategies (Lysaker, Bryson, Lancaster, Evans, & Bell, 2002; Lysaker, Bryson, Marks, Greig, & Bell, 2004; Lysaker, Lancaster, Davis, & Clements, 2003; Pallanti, Quercioli, & Pazzagli, 1997; Ventura, Nuechterlein, Subotnick, Green, & Gitlin, 2004). One study found that neuroticism and

neurocognitive impairment both predicted the use of avoidant strategies, while extroversion predicted a higher likelihood of seeking social support (Lysaker et al., 2004). A body of research has also found support for a relationship between substance abuse and poor medication adherence (a form of coping) among persons with schizophrenia (Hunt, Bergen, & Bashir, 2002; Kamali et al., 2001; Olfson et al., 2000).

7. Transitory/episodic experiences

7.1. Transitory/episodic experiences and functioning/well-being

Transitory and episodic environmental conditions, such as social stressors and mental health interventions, are hypothesized to exert a moderate direct relationship on functioning and well-being outcomes. In this regard, cross-sectional studies have linked the experience of stigma and other negative social interactions to worse outcomes, such as poorer life satisfaction (Dickerson, Sommerville, Origoni, Ringel, & Parente, 2002; Yanos, Rosenfield et al., 2001). Familial stressors (such as criticism and emotional overinvolvement) are also related to poorer concurrent subjective well-being (Lopez et al., 2004; Sullivan, Wells, & Lake, 1992). In addition, the experience of criminal victimization exerts a small prospective influence on worse quality of life outcomes among persons with severe mental illness. Specifically, in a multisite sample of over nearly 2000 homeless persons with severe mental illness, Lam and Rosenheck (1998) found that more self-reported criminal victimization experiences at baseline were associated with poorer life satisfaction at 3- and 12-month follow-ups.

Mental health interventions, including both psychopharmacology and psychotherapy, have shown positive impacts on several aspects of functional outcomes among people with schizophrenia. In many cases, however, the impact of interventions is “domain-specific,” and no single intervention has been found to broadly effect functioning and well-being. For example, there is relatively good evidence that prescribing atypical antipsychotic medications leads to improved subjective well-being (see reviews by Awad & Voruganti, 2004; Karow & Naber, 2002); however, evidence regarding an impact on social functioning has been much more mixed (see Corrigan, Reinke, Landsberber, Charate, & Toombs, 2003). With regard to psychosocial interventions, the supported employment treatment model has repeatedly shown success in improving rates of competitive employment, but there is little evidence for an impact on other aspects of social functioning (see Bond, 2004). While case management services have displayed a definite advantage in reducing psychiatric rehospitalization rates, most studies have not found there to be an impact on social functioning (Bustillo, Lauriello, Horan, & Keith, 2001). Similarly, most studies of cognitive-behavioral and “illness management” services have found little evidence for an impact on social functioning (see Bustillo et al., 2001); however, a long-term randomized study of an individual treatment approach called “personal therapy” showed a considerable improvement in social functioning (Bustillo et al., 2001). Overall, findings suggest that a constellation of mental health interventions (combining access to atypical antipsychotic medication with supported employment, case management and long-term psychotherapy services) may need to be offered to maximize impact on functioning and well-being.

7.2. Transitory/episodic experiences and the personal system

The model also hypothesizes that transitory experiences can influence changes in relatively stable characteristics in the personal system, such as psychiatric symptom severity and general self-efficacy. This is supported by a large body of evidence indicating that transitory and episodic environmental stressors (especially in a family context) are related to symptom exacerbation in schizophrenia (see Barrowclough & Hooley, 2003 for a review). In addition, two recent laboratory-based studies found that stable personal system variables, such as maladaptive coping style, trait negative affect, and neurocognitive impairment can magnify

the impact of psychosocial stress (through a simulated task) on the experience of psychiatric symptoms (a less stable aspect of the personal system) (Horan & Blanchard, 2003; Rosenfarb, Nuechterlein, Goldstein, & Subotnik, 2000). Accordingly, at least for a subset of persons with schizophrenia, personal system characteristics can moderate the impact of transitory experiences on symptoms.

There is also some evidence that the experience of stigmatizing interactions can influence stable characteristics of the personal system such as self-efficacy. Wright, Gronfein, and Owens (2000) found cross-sectional evidence that self-reported experiences of stigmatizing interactions were modestly but significantly associated with poorer self-efficacy in a sample of persons with mental illness recently discharged from a long-stay psychiatric hospital. However, it is possible that individuals with lower self-efficacy were more likely to perceive interactions with others as stigmatizing.

7.3. Transitory/episodic experiences and appraisal

Transitory experiences also can impact aspects of cognitive appraisal, such as changes in awareness of mental health symptoms and health beliefs. Although insight and illness beliefs frequently fluctuate over time among people with schizophrenia (Estroff, Lachicotte, Illingworth, & Johnston, 1991; Lysaker et al., 1999), surprisingly little is known about the impact of transitory experiences on degree of insight and beliefs about mental illness. Regarding the influence of mental health interventions, a recent review found only two studies of psychoeducational interventions and one study of medication which supported a positive impact of treatment upon insight (Henry & Ghaemi, 2004). In addition, a more recent study demonstrated the success of a psychotherapeutic intervention in improving insight (Rathod, Kingdon, Smith, & Turkington, 2005). This study found that, compared with treatment as usual, participation in an insight-focused cognitive-behavioral intervention was associated with modest but significant improvements in insight at a 1-year follow-up. There is also tentative evidence for a possible impact of treatment on insight from naturalistic studies (Mintz, Addington, & Addington, 2004; Sajatovic et al., 2002; Smith et al., 2004; Weiler, Fleisher, & McArthur-Campbell, 2000), which found that insight improved over the course of a brief hospitalization and up to 12 months after an initial psychiatric hospitalization.

7.4. Transitory/episodic experiences and coping

Transitory environmental conditions can exert a moderate direct relationship on coping. Regarding the impact of social stressors specifically, increased substance use among trauma victims suggests that such individuals are more likely to use alcohol and other drugs as a coping strategy (Mueser et al., 2002). Although little research has been conducted on this topic, a cross-sectional study comparing persons diagnosed with schizophrenia with and without substance abuse problems found that recent substance use was related to the experience of current emotional abuse (Gearon, Bellack, Rachbeisel, & Dixon, 2001). Prospective research needs to be conducted on this issue, however, to disentangle whether emotional abuse was the result of recent substance use.

There is more specific evidence for the impact of transitory environmental conditions on coping from two longitudinal studies demonstrating that participating in certain types of mental health interventions can increase the use of problem-centered coping strategies. One longitudinal study (Moggi, Ouimette, Moos, & Finney, 1999) found that participants with substance abuse problems and mental illness modestly improved on general and substance-specific coping skills over a 1-year follow-up period. Individuals who participated in more dual diagnosis services and 12-Step self-help groups showed slightly more gains in their use of problem-centered coping skills. A cross-sectional study also supported that the degree of participation in dual-focus (mental illness and addiction) self-help groups was significantly associated with degree

of medication adherence (Magura, Laudet, Mahmood, Rosenblum, & Knight, 2002). Another prospective study (Lecomte et al., 1999) found that persons with severe mental illness participating in a 12-week treatment program geared toward improving self-esteem improved in active coping skills, in contrast with participants receiving treatment as usual.

8. Cognitive appraisal

8.1. Cognitive appraisal and coping

The model posits that cognitive appraisal can exert a strong influence on coping, reflecting the view that individuals' understanding of their symptoms and problems affects their selection of coping strategies. Evidence for this hypothesis comes primarily from studies that have examined the construct of "insight," which reflects one aspect of cognitive appraisal. Cross-sectional studies have found that greater insight is related to more service use and medication adherence (Cuffel, Alford, Fischer, & Owen, 1996; Smith et al., 1999), and that lack of insight is related to more reliance on avoidant coping strategies (Lysaker et al., 2002; Lysaker, Wilt et al., 2003).

Despite such findings, insight, as traditionally defined, has not always been related to either medication adherence (Tauer & Sacks, 2000), engagement in treatment (Tait, Birchwood, & Trower, 2003), or other beliefs about mental illness. In a cross-sectional study, Tait et al. (2003) found that "recovery style,"¹ a construct that included the person's beliefs about the personal relevance of experiencing psychotic symptoms and whether the causes of symptoms are internal or external, predicted treatment engagement. Individuals who took on a more "integrative" recovery style were more engaged in treatment; however, insight as traditionally defined was not associated with either recovery style or service engagement. The literature on medication adherence has also consistently found that attitudes and beliefs about medication, rather than insight, are the most important predictors of adherence (Lacro, Dunn, & Dolder, 2002). In addition, while insight, traditionally defined, may be responsive to the interventions offered in an inpatient treatment setting, attitudes and beliefs about medication may not be (see Sajatovic et al., 2002).

A recent cross-sectional study on the relationship between hopefulness, awareness and coping among individuals with schizophrenia further suggests that awareness by itself may not be a sufficient predictor of coping; this study found that individuals with greater insight and hope were more likely to use problem-centered and less likely to use avoidant coping strategies than both individuals with high insight but low hope and individuals with high hope and low insight (Lysaker, Campbell, & Johannesen, 2005). A consideration of this research may shed some light on the finding that greater insight is modestly associated with psychological distress and depression among people with schizophrenia (see Mintz, Dobson, & Romney, 2003, for a review and meta-analysis). The realization of the severity of one's mental illness may be associated with more distress if it is not combined with hope for improved future functioning and well-being.

The findings discussed above support our contention (see also Lobban et al., 2003; Roe & Kravetz, 2003) that awareness is a much more multidimensional construct than what is usually called insight, and includes narrative aspects of illness representation, as well as specific beliefs about relevance, cause, duration, and severity of symptoms, and the utility of treatment. A recent literature review and empirical study found that several aspects of the health belief model

¹The construct of "recovery style" was originated by McGlashan (1987), who distinguished between "integration" and "sealing over," and characterized them as "coping styles." Nevertheless, an examination of McGlashan's criteria for these styles indicates that they are primarily concerned with aspects of awareness, rather than coping. McGlashan (1987) found that recovery style was an important predictor of "global outcome," which included symptoms and functioning.

(Leventhal, Nerenz, & Steele, 1984) such as beliefs about the degree to which one has a problem, the consequences of having a mental illness, and degree of personal control, were relevant to understanding how people with schizophrenia make sense of their experience and choose to cope (Lobban et al., 2003; Lobban, Barrowclough, & Jones, 2004). Specifically, the authors found that individuals who believed that they had greater personal control over symptoms tended to use more “positive” coping strategies.

9. Coping

9.1. Coping and functioning/well-being

The model hypothesizes that coping exerts a strong, direct relationship on functioning and well-being. Coping includes all efforts that an individual undertakes to manage his or her experiences, such as help-seeking, medication adherence, more specific coping strategies (e.g., cognitive self-talk, distraction, etc.), and substance use as a way of coping. Proactive coping and goal striving, which are used as preventive measures, are also included in this category (Aspinwall & Taylor, 1997).

Evidence from cross-sectional research supports the view that the use of active, problem-oriented coping strategies is related to better social functioning (Andres, Pfammatter, Fries, & Brenner, 2003; Lee, Lieh-Mak, Yu, & Spinks, 1993; Yanos et al., 2003; Yanos, Primavera et al., 2001). A longitudinal study (Boschi et al., 2000) found that individuals who reported that problem-centered coping strategies were most helpful to them at baseline had moderately better social functioning at 24 month follow-up than individuals who reported another type of strategy as most helpful. However, these studies do not support our contention about the magnitude of the relationship between coping and functioning, which was small to moderate.

Although a substantial body of evidence has demonstrated that medication adherence is related to reduced risk of rehospitalization, surprisingly few studies have investigated the relationship between medication adherence and functioning and well-being outcomes. Nevertheless, the studies that have been conducted suggest that medication adherence has a positive relationship with these outcomes. In a cross-sectional study, Coldham, Addington, and Addington (2002) found that medication adherence was associated with better life satisfaction among young adults with psychotic disorders. Similarly, a systematic review of the literature (Nose, Barbui, & Tansella, 2003) found evidence that medication adherence was related to better social functioning.

Although substance use problems among people with mental illness are associated with a variety of compromised outcomes (Drake, Wallach, Alverson, & Mueser, 2002), relatively little research has examined the effect of substance use as a coping strategy on functioning and well-being. Though many researchers assume that coping is the primary aim of substance use (i.e., the self-medication hypothesis), this perspective is contradicted by evidence that the majority of persons with schizophrenia who use substances began doing so before the onset of their psychiatric disorder (Drake et al., 2002). One cross-sectional study (Blanchard et al., 1999) found that persons with schizophrenia who reported using substances to cope with negative affect were more likely to report adverse functional consequences associated with substance use than were those who did not use substances to cope.

Little research has examined the impact of “proactive coping” and goal striving. Only one cross-sectional study (Yanos, 2001) explored the use of proactive coping strategies among persons with severe mental illness; this study found that the number of proactive strategies reported was related to better social functioning. Qualitative studies also suggest that proactive coping and goal striving may be crucial aspects of the process of coping with schizophrenia. Davidson and Strauss (1992) and others (Sells, Stayner, & Davidson, 2004) described how

persons with severe mental illness who expressed themes of the discovery of themselves as active agents in their qualitative narratives displayed significant improvement in global functioning in a longitudinal study. This process, which Davidson and Strauss termed the construction of “sense of self,” frequently involved the discovery of ways of recapturing a sense of purpose through daily activities. For many individuals, this involved pursuing goals they had before they developed psychiatric problems. It is also likely that the use of proactive coping strategies and the pursuit of goals described in this work relates closely to the progression in identity discussed earlier; finding ways to engage in regular activities may not only prevent symptoms but may also help persons to construct an identity that is independent of being a “patient” (Roe, 2001). This research suggests that proactive coping and goal striving may play a central role in facilitating positive outcomes for many individuals with schizophrenia.

9.2. Coping and enduring environmental characteristics and the personal system

The model also hypothesizes a relationship between coping and the two most stable factors in the model: enduring environmental conditions and the personal system. These links are hypothesized based on the perspective that people ultimately, by way of their coping efforts, alter their environments and enduring personality characteristics in small but meaningful ways. Despite suggestions from the qualitative research described in the preceding section that proactive coping efforts can play a role in transforming the identity of people with severe mental illness (Davidson & Strauss, 1992), these hypotheses are largely conjectural and have yet to be tested in research.

10. Implications for future research and intervention

10.1. Empirical support for the model and recommendations for future research

There is good empirical evidence for many of the causal connections predicted by the model; there are several areas where the number and/or quality of studies provide particularly strong support. Table 1 summarizes evidence for different connections hypothesized for the model, based on our review. Evidence is judged to be strong if there have been several prospective studies providing evidence of a causal connection; evidence is judged to be moderate if there are a large number of cross-sectional and/or only 1–2 prospective studies providing evidence for the hypothesized relationship; evidence is judged to be weak if there are few or no studies or studies that have been conducted do not support the relationship.

With regard to enduring environmental conditions, there is strong evidence that social support positively impacts social functioning and quality of life. There is moderate evidence that neighborhood poverty increases risk of criminal victimization, and that local mental health policies affecting ability to obtain services can impact coping (specifically in the area of medication adherence). There is little existing evidence that enduring environmental conditions impact the personal system.

For the personal system, there is strong evidence that thought disorder and neurocognitive impairment are related to poorer functioning; there is moderate evidence that they diminish ability to improve insight (an aspect of appraisal). There is moderate evidence that more rigid personality traits are associated with more avoidant coping. There is also moderate evidence that more outwardly oriented personality characteristics and greater self-efficacy positively influence functioning, appraisal and coping. There is moderate evidence for a link between the preexisting substance abuse problems and criminal victimization/trauma.

Transitory/episodic experiences have been found to impact other variables in the model in two main ways: there is moderate evidence that social stressors such as stigmatizing interactions and victimization can negatively exacerbate symptoms (personal system) and impact social

functioning, and moderate evidence that mental health interventions such as atypical antipsychotic medication and illness management can improve insight and coping skills. There is also moderate evidence that mental health interventions such as supported employment and atypical antipsychotic medication can impact quality of life and social functioning.

With regard to appraisal, there is moderate evidence that insight and other aspects of appraisal impact coping (especially for medication adherence and help-seeking). Finally, there is moderate support for the hypothesis that coping strategies such as the adherence to prescribed medication regimens, active coping responses, and engagement in treatment improve social functioning. There is very little support for the hypothesized connection between coping and the personal system.

11. Implications for future research

Despite the findings described above, research has not always been adequate to fully test the relationships predicted in the model. In some areas, research has been mainly exploratory or cross-sectional, and, in other areas, major contentions of the model remain largely untested. For example, we still know relatively little about the impact of community stigma and neighborhood poverty on personal variables such as self-efficacy, identity, and coping style. Additionally, enduring environmental conditions such as community level of stigma have not been examined in relation to the experience of transitory stressors, such as stigmatizing interactions. Similarly, the connection between community poverty and the experience of stressors and victimization has been relatively unstudied.

Although mental health interventions and stressful life events influence functioning and well-being, it is not fully clear if they do so partly by impacting appraisal and coping. Research has not established a definitive connection between mental health interventions and changes in appraisal or coping among individual with schizophrenia.

Little research has explored the impact of personality, self-efficacy and psychiatric symptom severity on the likelihood of experiencing transitory stressors. In addition, with the exception of engulfment, almost no research has examined the influence of identity as a personal resource on outcomes and other variables. In another area, the manner in which cognitive appraisal affects coping is still minimally understood, since most research has focused narrowly on one aspect of appraisal (awareness of mental illness).

The strength of the relationships predicted by the model has not always been supported in the literature. Notably, although there is evidence that coping plays an important role in determining functioning and well-being, present literature does not support our contention that coping is the single most important predictor of variability in functioning and well-being among people with schizophrenia. However, we believe that the impact of coping on functional outcomes has only begun to be understood, as important variables such as proactive coping, goal striving and help-seeking have barely been studied.

Clearly, future research is needed to address many of the areas we have discussed above. In addition, there is a need for research to test multiple facets of the model in an integrated fashion. This would allow for better estimates of the magnitude of the relationships between the various domains in the model, since most prior studies of connections between two of the domains in the model have not controlled for many of the other domains. It would also allow for consideration of the extent to which the “effects” of specific sets of factors, especially enduring and transitory conditions, are “direct” versus the extent to which they are mediated or moderated by personal and, more importantly, appraisal and coping factors. In this manner, for example, we can come to understand how personality traits moderate the impact of stressful life events on appraisal, and how, in turn, appraisal leads to changes in coping and functioning.

Similarly, we can examine how variables such as community level stigma influence the likelihood of experiencing stigmatizing interactions, and how these interactions impact appraisal, coping, and functional outcomes. Although integrative studies are complex, Wachs (2000) has argued that such research is necessary. He has suggested that theory and existing knowledge should be used to identify the most salient influences for a given outcome, and that these influences should then be examined in integrated studies. In the case of the determinants of functioning and well-being for schizophrenia, our model and review could be used as a guide to selecting some of the more salient variables within each domain (e.g., social support and community-level poverty from the enduring environmental conditions domain, personality characteristics, neurocognitive impairment, and substance abuse from the personal system, etc.).

Integrative studies will ultimately help investigators both refine existing interventions and develop priorities for intervention. As Liberman and Kopelowicz (2005b) have cogently argued, variables linked to recovery can be directly targeted for intervention in the effort to increase the proportion of individuals with schizophrenia who can achieve recovery. For example, finding evidence for a causal chain connecting poor housing conditions, exposure to victimization, use of substances to cope and subsequent impaired social functioning would provide further support for the need to develop interventions to improve housing conditions for people with schizophrenia to reduce exposure to victimization.

12. Implications for intervention

A major implication of the findings from the current review is that a person's appraisal and coping responses reflect a crucial juncture in determining functioning and well-being outcomes. Although the magnitude of the impact of appraisal and coping remains to be clarified, there is good evidence that how individuals interpret their experience and how they choose to respond to this appraisal can have an impact on their functioning. Therefore, it is clear that interventions directed toward persons with schizophrenia should attempt to engage individuals' understanding of their experience and provide them with adequate information to make an informed judgment about the benefits of taking medication, engaging in treatment, and using other coping strategies to deal with their experience. Mental health interventions may not be able to have a life-changing impact on awareness (such as a "turning-point" event described in some models of recovery [e.g., Ralph, 2005]); however, interventions can strive to support positive changes in awareness resulting from transitory experiences that occur outside of the treatment context, and help to connect them to changes in coping activity. At the same time that interventions work to enhance awareness through education, they should also strive to facilitate hope in the potential for coping to have a positive impact on functioning.

In addition to emphasizing the role of personal agency, our findings suggest that clinicians should remain attuned to the personal resources and social contexts of persons with schizophrenia. Personal resources, such as more flexible personality characteristics, can partially determine the degree to which a person remains open to considering recommendations for treatment and other lifestyle changes advocated by the mental health system. Persons with less flexible personality characteristics probably need to be worked with in a way that construes their tendency to resist change as an asset. Neurocognitive impairment needs to be addressed in psychosocial interventions by using strategies to compensate for memory and concentration difficulties (e.g., by providing calendars and other materials to structure information.) Social characteristics, such as residence in areas that expose persons to a greater likelihood of experiencing social stress and victimization, need to also be considered. Family interventions and case management interventions that can help to modify the immediate social contexts of persons with schizophrenia need to be emphasized as well.

Ultimately, we believe that all five domains discussed in the model should be considered as possible points for intervention in order to improve the functioning and well-being of persons with schizophrenia. Social policy interventions can improve access to treatment and remove enduring structural barriers to coping resources (such as medication). Public education interventions can work to reduce endorsement of stigmatizing views in order to reduce the incidence of stigmatizing experiences. Interventions addressing housing and substance abuse can work to bring people with mental illness out of high-risk neighborhood and living environments to reduce risk of exposure to criminal victimization and domestic violence. Psychosocial interventions can work to improve general self-efficacy and reduce identity engulfment, at the same time as they strive to improve awareness and help people develop problem-centered coping skills. Although interventions would take a variety of forms, all interventions can be linked by an overriding vision of improving functioning and well-being for people with schizophrenia, one of the most socially disabling of health conditions.

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Fig. 1.
Environmental, personal, and coping factors and their relationship to functioning and well-being in schizophrenia.

Table 1Estimated strength of evidence for hypothesized model relationships^a

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- (A) Enduring environmental conditions to:
 Functioning and well-being +++
 Personal system +
 Transitory/episodic experiences ++
 Coping ++
- (B) Personal system to
 Functioning and well-being +++
 Transitory/episodic experiences ++
 Cognitive appraisal ++
 Coping ++
- (C) Transitory/episodic experiences to
 Functioning and well-being ++
 Personal system +++
 Cognitive appraisal ++
 Coping ++
- (D) Cognitive appraisal to
 Coping ++
- (E) Coping to
 Functioning and well-being ++
 Personal system +
-

^a + denotes weak evidence; ++ denotes moderate evidence; +++ denotes strong evidence.