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Using Dyadic Analysis in Health Psychology

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Health psychology aims to understand how psychological mechanisms influence health, both physical and mental. Accordingly, much of the research in this field has been dedicated to clarifying the association between psychological and biological processes (e.g., demonstrating that increased levels of stress are related to reduced immune responses; Marsland, Bachen, Cohen, Rabin, & Manuck, 2002) and better understanding the etiology of health-promoting (e.g., exercise; Corwyn & Benda, 1999) and health-compromising behaviors (e.g., smoking; Shiffman et al., 2000). Although the field has benefited greatly from these areas, there is also much to be gained from focusing on the social context.

Towards this end, researchers have provided evidence that individuals' immune systems and levels of arousal are connected with particular qualities of their marital relationships (e.g., Kiecolt-Glaser, Fisher, Ogrocki, Stout, Speicher, & Glaser, 1987; Levenson & Gottman, 1983). There is also evidence to suggest that family involvement in treatment may be linked to rates of compliance (see Campbell, 1986, for a review) and that general levels of social support are associated with functioning of the immune, cardiovascular, and endocrine systems (see Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Unfortunately, the study of social processes cannot usually be accomplished by using methods for the analysis of individual processes. Given the importance of social relationships for health outcomes, we present important dyadic models that can aid health researchers in their attempts to better understand the relation between physical health and the social environment.

Dyadic Designs and Analytic Techniques

We believe that two dyadic designs may be of particular utility to health psychologists – the standard dyadic design and the one-with-many design (Kenny, Kashy, & Cook, 2006). In the *standard dyadic design*, data are collected from dyads in which the two individuals interact with only each other. Such designs are useful for researchers interested in investigating health-related processes within close relationships such as the parent-child dyad and the romantic dyad. In the *one-with-many design*, one person (i.e., the focal person) is

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linked to many others, but these others (i.e., the partners) are not linked with each other. This design would likely be useful for the investigation of doctor-patient relations and of patients with members of their social network.

The most widely used dyadic model for the analysis of the standard dyadic design is the Actor-Partner Interdependence Model (APIM; Kenny et al., 2006). Aside from being able to address whether individuals' scores on a predictor variable are related to their own outcome (i.e., actor effect), the APIM also permits researchers to answer whether individuals' scores on a predictor variable are related to their partners' outcome (i.e., partner effect). Thus, such an analysis is ideal for capturing basic interpersonal processes.

Longitudinal extensions of the APIM have also been developed (see Kenny et al., 2006; Kenny & Kashy, in press; Kashy & Donnellan, in press). The cross-lagged APIM, for instance, uses longitudinal data on the same variable from both members of a dyad to assess questions regarding stability and reciprocity. Moreover, the growth-curve APIM assesses whether individuals' trajectories of change on some variable can be predicted by their own and/or their partners' scores on a predictor variable. All in all, such longitudinal variations of the APIM are especially well-suited to investigating the

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intrapersonal and interpersonal factors related to the stability and development of health-related outcomes.

The one-with-many dyadic model (Kenny et al., 2006) uses data from a one-with-many design to answer a different set of questions concerning the sources of behavior (or perceptions) in dyadic interactions. It can take three forms altogether. In the first, measurements on the partners come from the focal person. For the second type of one-with-many model, measurements on the focal person come from the partners. Finally, in the third type of one-with-many model, the focal person and partners both provide measurements on each other. Depending upon the type of design that is implemented, the one-with-many model helps to reveal whether there is consistency in focal persons' behavior towards (or ratings of) their partners, consistency in partners' behavior towards (or ratings of) their focal person, or both. It also permits researchers to evaluate whether these effects are moderated by focal person or partner characteristics.

Applications of Dyadic Techniques within Health Psychology

Relative to other dyadic analytic methods, the APIM has been extensively used by health researchers to study a wide variety of topics. Several investigators have studied dyads in which one member has a chronic disease and the other member does not (e.g., Badr & Taylor, 2008; Kim, Wellisch, & Spillers, 2008; Mellon, Kershaw, Northouse, & Freeman-Gibb, 2007). Some topics explored in these works include the influence of psychological stress on life quality among mothers with cancer and their adult caregiving daughters (Kim et al., 2008), the association between the provision and receipt of social support in cardiac patients and their spouses (Hong, Franks, Gonzalez, Franklin, Artinian, & Keteyian, 2005), and factors associated with the fear of cancer-recurrence in cancer survivors and their caregivers (Mellon et al., 2007). Other investigators using the APIM have studied dyads wherein one, both, or neither member has a given disease. For instance, Hoff, Chakravarty, Beougher, Darbes, Dadasovich, and Neilands (2009) and Eaton, West, Kenny, and Kalichman (2009) conducted studies of gay men in which one, both, or neither member was HIV positive. McMahon, Pouget, and Tortu (2007) also studied gay men where one member, both members, or neither member was diagnosed with hepatitis C.

Less frequently used is the one-with-many design. Recall that in this design, a given person (i.e., the one) interacts with many others. As mentioned previously, such a design is particularly useful in the study of doctor-patient interactions. Consider the study by

Kenny et al. (2009) who studied 91 doctors and 1749 patients. Whereas doctors' ratings of their own communication skills with patients were found to be rather consistent across patients, patients' ratings of the same doctor were not very consistent with one another. Additionally, they found little or no agreement between doctor and patient whether the communication between them was good or poor.

Future Work and Conclusions

Whether it be the progression of a disease, the cessation of some risky behavior, or the accumulation of stress, there is likely to be some connected interpersonal component that merits empirical investigation. We believe that the dyadic models that we have described offer much promise for a more complete understanding of the cross-level connections between physical health, psychological health, and the social context. Indeed, their use should help to foster a more contextualized understanding of health behavior.

At the most basic level, future research may benefit from using the APIM to explore how individuals' health outcomes are related to characteristics of their partners. Indeed, romantic partners and family members may impact individuals' health directly by inducing stress and thereby increasing cortisol levels (see, e.g., Dickerson & Kemeny, 2004), or even indirectly by enhancing the motivation to engage in a health-promoting behavior. Longitudinal extensions of the APIM would also benefit future research (for more information on these designs, see Kenny et al., 2006; Kenny & Kashy, in press; Kashy & Donnellan, in press). We believe such designs will be especially useful for investigating the relations between the social context and the progression of disease and health-related behaviors. Finally, future research within health psychology would benefit from using the one-with-many design more frequently given its capabilities of illuminating the sources of behaviors or perceptions within dyadic relationships.

Gaining a more comprehensive picture of physical health by understanding its connection with the broader social context will be a challenging and complex task for health psychologists. As researchers move from an individual-oriented to a dyadic-oriented focus, they will need to think critically about the types of data that are needed, from whom they need to collect data, and what types of designs are most amenable to the kinds of questions that they hope to answer. We hope that our article encourages researchers to learn more about dyadic models such as the APIM and one-with-many design, and how to apply them within their own areas of research. ■

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