

# Self-Reported Coping Behavior in Health and Disease: Assessment With a Card Sort Game

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*The authors tested the hypothesis that individuals with a variety of severe chronic illnesses and the healthy elderly exhibit a loss of flexibility in their response to a variety of stressors, compared with healthy adults. A card sort game designed to assess self-reported coping behavior under different stressful life situations was used to compare healthy adults with individuals with multiple sclerosis, rheumatoid arthritis, systemic lupus erythematosus, and the elderly. The healthy adults were found to exhibit more variability than any of the illness groups or the elderly. Healthy function is marked by a complex type of variability.*

**Index Terms:** aging, arthritis, chronic illness, coping, healthy adults, lupus, multiple sclerosis

A major unresolved problem in behavioral medicine is defining the relationship between coping ability and health in the individual. Coping refers to behavioral or cognitive strategies used to accommodate physical or emotional stressors.<sup>1</sup> The variable nature of coping makes it difficult to measure with standard techniques based on single "snapshots" of behavior.<sup>2</sup> Traditional methods assess coping typologies (eg, the "denier," the "stoic acceptor") or strategies (eg, problem-focused, emotion-focused) at one time in response to a particular stressor.

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One way to quantify the inherently variable nature of coping behavior would be to measure it frequently over a sustained period. However, this approach is costly and unfeasible. An alternative strategy, which we adopted for this study, is to develop a simple test to evaluate the plasticity of self-reported coping behavior in different contexts.

The notion that certain types of behavioral variability indicate healthy functioning is consistent with recent applications of nonlinear dynamics to physiology and medicine. Many disease states, as well as physiologic aging, are marked by less complex dynamics than those seen under healthy conditions.<sup>3</sup> We sought to test the hypothesis that individuals with a variety of severe chronic illnesses and the elderly exhibit less variability in the way they cope with stressful life situations when compared with healthy adults.

## METHOD

### Participants

In this secondary analysis, we used data pooled from three sources. The first study included participants with rheumatoid arthritis (RA;  $n = 45$ ; age range = 35–70 years; mean age = 53.7 years,  $SD = 9.0$ ; 51% women, 49% men), systemic lupus erythematosus (SLE;  $n = 44$ ; age range =

25–73 years; mean age = 43.7 years,  $SD = 10.9$ ; 83% women, 17% men), and the elderly ( $n = 38$ ; age range = 75–88 years; mean age = 79.7 years,  $SD = 5.1$ ; 47% women, 53% men).

Approximately one third of the elderly participants reported no health problems, and 55.5% reported one or two health problems, with the most prevalent condition being high blood pressure. The second study included participants with multiple sclerosis (MS;  $n = 131$ ; age range 21–64 years; mean age 43.1 years,  $SD = 8.9$ ; 73% women, 27% men).

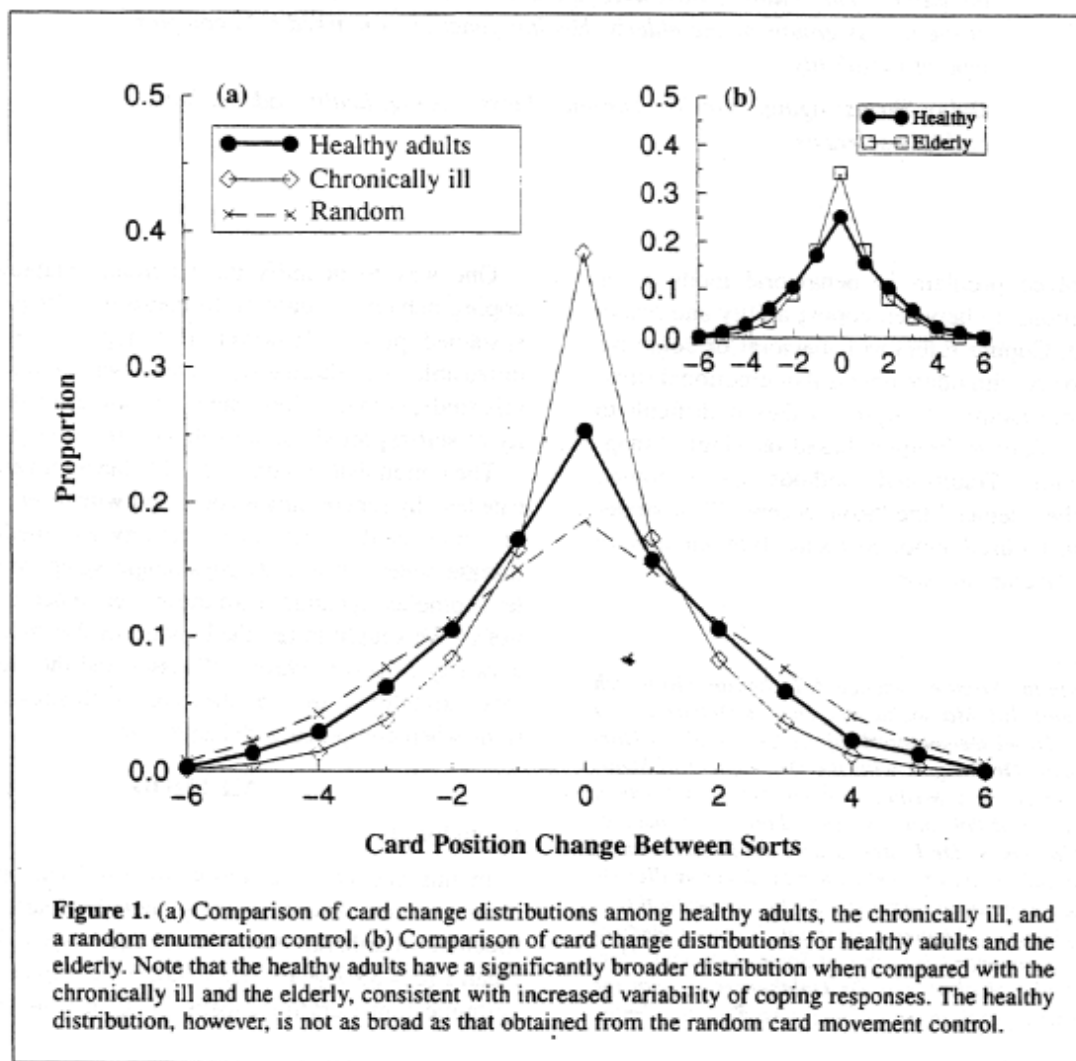
The third study included healthy adults ( $n = 66$ ; age range 18–66 years; mean age, 40.6 years,  $SD = 14.7$ ; 53% female, 47% male). Potential participants for the third study were screened for psychological and physical health and were excluded if they smoked cigarettes, did not drive (ie, logistical difficulty impeding participation in the original study),

were on antidepressants, or had a history of hypertension. We obtained informed consent from all participants.

### Procedure and Measures

We employed a new method to quantify self-reported coping flexibility based on a card sort game. This protocol, the Flex,<sup>4</sup> requires participants to place 20 response cards (Appendix A) on a sorting sheet (Fig 1) to describe how they would cope with a specific stressful situation chosen from six life domains (Appendix B).

Each separate card sort measured the response to one of the six stressful situations. Each coping response card lists one of 20 different commonly used coping strategies that can be categorized as acceptance (eg, “I try to accept my limits”), problem-solving (eg, “I figure out ways to manage so that I can still do the things I like to do”), social support



(eg, "I call a friend"), and negative approaches (eg, "I take it out on others"). The column placement (range -3 to +3) describes how like or unlike the participant that particular coping response would be in the specific situation.

Each participant performed at least three card sorts. Two sorts were then randomly selected for each participant to assess *variability* in coping response in different contexts. This selection ensures that each domain has an equal chance of being selected within subjects between groups. For example, a person might place the coping response card "I try to accept my limits" in the most-like-me column (score = +3) for a work stressor. This same card might be placed in the a-little-unlike-me column (score = -1) for a family/social stressor. The movement of this card across four columns in the two different card sorts can be used as an index of variability, quantified as the absolute difference between the column scores (eg, +3 to -1 = 4).

The method of assigning sort situations differed slightly in the three studies. In the first, participants performed a card sort for all six life domains. In the second, participants selected the three life domains that were most relevant to them. In the third, participants performed card sorts for each of four life domains.<sup>5</sup>

### Statistical Analysis

We computed the histograms for all participants for card change movement between the two life stressor domains for each of the 20 coping response cards. Next, we obtained a cumulative probability distribution for each group by pooling the card sort data from each individual. We calculated an exact enumeration to generate control histograms of random card movement.

We then compared these distributions by using the Kolmogorov-Smirnov *D* two-sample statistic to test the null hypothesis that the distributions are drawn from the same populations. The Kolmogorov-Smirnov *D* statistic is defined as the maximal deviation between two cumulative probability distributions. A large value supports rejecting the null hypothesis that the two distributions are the same.<sup>7</sup> We also calculated the variance of the card change distributions for the different groups as a quantitative measurement of coping variability.

### RESULTS

The healthy adults exhibited a significantly different card change distribution from each of the illness groups: healthy adults,  $D = 0.079$ ; RA,  $D = 0.094$ ; SLE,  $D = 0.069$ ; and MS,  $D = 0.077$ ,  $p < .0001$  in all cases, (Fig 1a); the elderly,  $D = 0.069$ ,  $p < .0001$ , (Fig 1b); and the random card movement control,  $D = 0.052$ ,  $p < .0001$  (Fig 1a).

We found that the card change distributions for healthy participants showed more variability,  $\sigma^2 = 3.99$ , than the individuals with rheumatoid arthritis,  $\sigma^2 = 2.23$ ; systemic lupus erythematosus,  $\sigma^2 = 2.60$ ; and multiple sclerosis,  $\sigma^2 = 2.41$ ; or the elderly,  $\sigma^2 = 2.53$ ; but less variability than the random card movement control,  $\sigma^2 = 5.52$ .

To investigate whether the differences in variability were a function of the situations assigned to each participant, we examined histograms of card movement across all pairs of domains and calculated the variability of each histogram. We found that the chronically ill patients had a histogram that was independent of the domain change and was less variable than the healthy group ( $\sigma^2$  ranged from 2.7 to 2.61, compared with 3.06 to 4.37, respectively).

The elderly group had slightly more variable histograms,  $\sigma^2$  ranged from 2.27 to 2.96, but we found no overlap between the healthy and elderly groups. We also examined whether differences between the healthy and other participants could be attributed to age. We stratified the healthy (control) group into two subsets by ages: younger than 40 years and equal to or older than 40 years. The age distribution of the older healthy group was similar to that of the chronically ill patient groups.

We compared the card change histograms between the two healthy subgroups and found no difference: The older healthy group had the same card change distribution as the younger healthy group,  $\sigma^2 = 3.99$  and 3.76, respectively. Thus, the differences in card change distributions could not be attributed to specific domains or to age-related factors.

### DISCUSSION

This study is, to our knowledge, the first attempt to use a protocol that incorporates *variability of response* to quantify coping behavior. The card sort game was designed to assess differences in reported coping behavior between stressful life contexts, rather than obtaining a single, static index. Our findings are notable because they provide a statistically robust demonstration that healthy adults exhibit higher levels of self-reported coping variability than do chronically ill individuals or the elderly.

This increased variability is consistent with recent findings that used analyses based on nonlinear dynamics, which suggest that healthy function is marked by a complex type of variability and that various pathologies may be characterized by a loss of variability.<sup>3</sup> However, the variability figures may not necessarily reflect healthy flexibility, which is underscored by the maximum variability observed in the random sort (Fig 1).

Future studies should help clarify the mechanism of the decrease in self-reported coping variability, its correlation

with other measures of coping, and whether it is associated with psychological factors. Researchers should also address the similarity between self-reported and behavioral assessments of real-life coping variability, as well as which components of observed variability reflect adaptive flexibility and which reflect maladaptive "random" responses. The use of a dynamic test may make it more feasible to quantify interventions designed to enhance coping plasticity.

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#### NOTES

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#### APPENDIX A

##### Coping Response Cards Used in the Flex

The 20 coping response cards were grouped into four categories:

*Acceptance:* "I try to accept my limits"; "I tell myself tomorrow will be different, this too shall pass"; "I balance work and rest"; "I laugh and joke about my physical limits"; "I let myself feel frustrated"; "I try to appreciate life more, everything becomes more special"; and "I ask God to help me get through the day."

*Problem-Solving:* "I keep busy"; "I've decided that it's not going to get me down"; "I figure out ways to manage so that I can still do the things I like to do"; "I have cut out some of my activities so that I only do what is necessary"; "When I am physically unable to do something, I shift to a different kind of activity."

*Social Support:* "I call a friend"; "I ask others for help, eg, to take a bath, open a can"; "I talk to my doctor."

*Negative:* "I take it out on others"; "I try not to talk about my own problems"; "I think about what others have done to cause my problems"; "I say there is nothing wrong when friends ask"; "I would like to be left alone."

#### APPENDIX B

##### Card Sort Situations Used

We used the following six-card sort situations:

*Work:* "I am no longer able to do the job level or quality of work that I used to."

*Self-Image/Confidence:* "I have lost confidence in myself. I am no longer sure I can do things I used to do easily."

*Family/Social:* "I feel less able to be a good husband/wife/parent/friend."

*Recreation/Sports:* "I am no longer able to do my favorite leisure activities."

*Pain/Fatigue:* "Pain or tiredness makes it harder for me to plan or finish activities I used to do easily."

*Activities of Daily Living:* "I can no longer take care of my home or work around the yard as I would like."