

## **Macroergonomics in the wild: research challenges in community settings**

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### **1. Introduction**

The majority of macroergonomic field studies are conducted within formal institutions such as manufacturing companies, call centers, or hospitals. These settings tend to (but do not always) have some level of orderliness, defined schedules, reliable communication systems, safe and hygienic physical locations, and resources. Agents in these settings tend to be literate and language competent, cognitively intact, and protected by the organization to which they belong. Macroergonomics research is also applied in community settings characterized by variable levels of disorder, hardship, and vulnerability. For example, macroergonomics research on health and healthcare is increasingly carried out with patients in their homes and communities. Research with patients—especially with those who are older, sicker, disabled, poor, rural, or underrepresented minorities—presents unique challenges. This study considers challenges related to the design and implementation of macroergonomic research with workers, paid and unpaid, in less structured or more “chaotic” community settings. We draw insights from two recent studies of chronically ill patients in urban and rural US communities.

### **2. Methods**

The first study recruited 90 cardiovascular disease patients in urban and rural settings in a ~200km<sup>2</sup> region of the Southern US. A proportion of these patients could be considered vulnerable as a result of advanced age, low income, lack of health insurance, number of diseases, illness severity, low literacy, disability, minority status, lack of resources, or often some combination of these. Over a third were recently hospitalized and another third came to the emergency department with acute cardiovascular symptoms. About half (n=44) were interviewed and observed in their homes by one or two researchers.

The second study was on health information technology-supported care management among patients with chronic lung and cardiovascular diseases living in a rural region of an Eastern US state. Data were collected by telephone and face-to-face interviews and focus groups with nineteen patients participating.

Our examination of the challenges of macroergonomic research in community settings was guided by two existing frameworks for implementing field research: the first a framework for macroergonomic field research in organizations (Holden et al., 2008) and the second for community-based public health research (Israel et al., 1998).

### 3. Results

Identifying eligible individuals was difficult when formal records were missing or hard to access. Eligibility criteria can also pose challenges as they pose significant constraints on who can participate in the research. Access to participants was an issue due to gatekeepers such as healthcare professionals and family members, difficulty contacting eligible individuals (e.g., no phone number available), and ethical considerations such as need for confidentiality and regulations about access to protected health information. Once accessed, patients canceled for a variety of reasons including emergency events, disinterest, forgetting, or misunderstandings about the research. Follow-up and home visits were difficult when patients lived far away, were hard to contact in advance of a visit, were (re)admitted to the hospital, or passed away.

There were multiple logistical issues, including limits on time that could be spent by researchers and participants on data collection activities. Travel and timing were challenging, especially when patients lived far away or had daytime obligations. Communication was sometimes difficult because of hearing and cognitive impairments, heavy accents, lack of electronic mail, and literacy issues. Personal safety for researchers because of hazards in the home or community was an important concern in a few cases.

We also encountered issues related to data quality. Reliability and validity of some data were relatively low, for example because many patients had limited memories of the past, were unsure about certain aspects of their health and healthcare, or were asked to articulate complex concepts. Further, we encountered challenges eliciting truthful information on dietary habits and other socially desirable behaviors, which appeared to vary with the amount of trust established between researchers and participants.

### 4. Conclusion

Doing research in less structured and more chaotic settings certainly has challenges. However, doing such research can be very rewarding. The needs of and potential benefits to vulnerable groups such as patients with chronic conditions are potentially great. Patients bear the ultimate consequences of poorly designed systems of health and healthcare delivery system, but receive relatively little attention from researchers and system designers. Orienting research and design toward patients and other vulnerable groups begins to address some of the potential disparities in *who* benefits from human factors/ergonomics (Hancock & Drury, 2011).

In sum, challenges of “macroergonomics in the wild,” while balanced by many mutual benefits to researchers and community members, must be further identified and addressed.

### References

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