

Applying a Behavioral Epidemiology Framework to Research Phases in Child Health Psychology

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Published online: 11 February 2006

The purpose of this study was to apply a behavioral epidemiology framework reported in J. F. Sallis, N. Owen, and M. J. Fotheringham (2000) to the field of child health psychology and describe the resulting distribution of research phases. Recent volumes of the *Journal of Pediatric Psychology* were analyzed and their articles classified as belonging to one of five sequentially-ordered phases of behavioral epidemiology research: Phase 1—relationship between behavior and health; Phase 2—measurement and method; Phase 3—factors influencing behavior; Phase 4—intervention; Phase 5—translation. The results indicate that Phase 3 studies (46%) were the most well-represented in the field, followed by Phase 2 (11%), Phase 1 (9%), Phase 4 (8%), and Phase 5 studies (2%). Compared to the journal *Health Psychology*, the shape of the research phase distribution of articles published in the *Journal of Pediatric Psychology* was similar. Overall, an encouraging amount of data in the field of child health psychology is being amassed in preparation for behavioral intervention. As research in the field matures, it will likely have a greater impact on public health via chronic disease prevention and control and health promotion interventions.

KEY WORDS: chronic disease; epidemiologic studies; health behavior; health promotion; children.

Cardiovascular disease, cancer, and diabetes affect adults in record numbers and are leading causes of death nationwide (Mokdad, Marks, Stroup, & Gerberding, 2004). Tobacco use, poor diet and physical inactivity, and alcohol use are behaviors

underlying these diseases and consistently shown to be actual causes of death in the United States (Mokdad et al., 2004). All of these behaviors have origins in childhood, when lifelong habits of smoking, eating, exercising, and drinking are first formed and track into adulthood (Baranowski et al., 1997). In light of the importance of childhood in chronic disease prevention and control, health promotion activities directed toward improving the public's health are incorporating developmental and lifespan perspectives to better achieve their goals (Centers for Disease Control and Prevention, 2004; Neumark-Sztainer, Blum, Brindis, Anglin, & Irwin, 1997).

Two public health disciplines—epidemiology and behavioral science—play significant and complementary roles in reducing the burden of chronic disease; behavioral risk factors impact disease etiology and distribution and can be reduced through behavior change. To Sallis, Owen, and Fotheringham (2000) and others (Kaplan, 1985), the

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convergence of these two disciplines results in a new approach termed “behavioral epidemiology.” Defined, behavioral epidemiology is the study of behaviors and health and their interrelationships (Sallis et al., 2000). Behavioral epidemiology spans nonintervention research (e.g., investigations of behavior–health relationships, behavioral measurement, factors influencing behavior) as well as intervention research (e.g., randomized controlled trials of behavior change interventions, translations from research to practice) and does so with the intention of using empirically supported interventions to improve population health (Sallis et al., 2000). These interventions share a common focus on behavior and health, though may originate from a number of content-specific (e.g., tobacco, nutrition, exercise, alcohol) and discipline-specific (e.g., psychology, medicine, nursing) fields addressing health behavior.

In 2000, Sallis et al. described a behavioral epidemiology framework for classifying research according to sequentially-ordered phases. Ultimately, latter-phase research may lead to better public health interventions. The purpose of the framework was to both operationalize and refine the term behavioral epidemiology, as well as to guide and inform researchers, clinicians, and policymakers in their discussions and actions toward improving the public’s health. The framework was applied to the fields of behavioral medicine and health psychology through its published research in four peer-reviewed journals. The data suggested a richness and diversity with respect to the distribution of studies across the phases of the framework. For example, while some research in the interdisciplinary field of behavioral medicine focuses on intervention research, the majority does not. Likewise, in the discipline-specific field of health psychology, more nonintervention than intervention research is conducted. By contrast, intervention research on specific behaviors such as eating and smoking have flourished. Examining research phases may be descriptive, prescriptive, and proscriptive—gauging the level of maturity a field has reached (as represented by the distribution of latter-phase studies), identifying existing strengths and weaknesses (as represented by the relative percentage of studies in each phase), setting new priorities and directions, and fostering change, progress, and discovery (by calling attention to under- and overrepresented phases).

Child health psychology is a relatively new field, dating back to the 1960s (Routh, 1975). In the United States, the Society of Pediatric Psychology

(Division 54 of the American Psychological Association) is the professional organization to which many individuals who affiliate with this field claim membership. The Society’s mission includes conducting research on and addressing the relationship between children’s behavior and health (broadly defined), including a focus on health promotion and chronic disease (American Psychological Association, 2005). Child health psychology is closely aligned with health psychology, though primarily distinguishes itself through its focus on children. Child health psychology also makes significant contributions to behavioral medicine, again through its unique focus on children. Behavioral epidemiology may draw upon the knowledge and resources of the field of child health psychology (much as it does health psychology, behavioral medicine, and others) when the focus of concern is the prevention and control of child chronic diseases, the developmental origins of behavioral risk factors of adult chronic diseases, and health promotion activities early in the lifespan.

At question are: (a) the extent to which child health psychology research can be examined from the standpoint of behavioral epidemiology research phases, and (b) the relative maturity of the field and its potential contributions to public health? This paper addresses these questions by analyzing a representative sample of articles recently published in the field of child health psychology, classifying them according to Sallis et al. (2000) framework, and describing, comparing, and interpreting the resulting data. Similar studies of the field and its publications have been carried out by Routh and Mesibov (1979), Elkins and Roberts (1988), Roberts (1992), Roberts, McNeal, Randall, and Roberts (1996), La Greca (1997), and Kazak (2002). Their conclusions suggest a preponderance of nonintervention research with difficulty forecasting its applications. At the outset, it was expected that research in this field could be classified in the manner intended, and that the majority of research would fall within nonintervention phases. The present study distinguishes itself from those carried out previously by its focus on children and application of a public health research classification framework.

METHODS

The *Journal of Pediatric Psychology* was selected to represent the field of child health

psychology in general and child health behavior research in particular. Although other content field and disciplinary journals publish child health behavior research, the *Journal of Pediatric Psychology* is the flagship journal of the Society of Pediatric Psychology and devoted solely to this discipline.

Three years/volumes of the journal were analyzed, spanning 2002 through 2004. In 2002 (Vol. 27), 72 articles were classified, 62 articles were classified in 2003 (Vol. 28), and 62 articles were classified in 2004 (Vol. 29). This yielded a combined total of 196 classified articles.

All possible articles (empirical studies, scholarly reviews, case reports, commentaries) were classified as belonging to one of five phases of research based upon the criteria set forth in Sallis et al. (2000). Briefly, these criteria are as follows. Phase 1: Articles establishing relationships between behaviors and health, including social, psychological, and behavioral independent variables and physical and mental health dependent variables. Phase 2: Articles detailing measurements and methodologies pertinent to describing or evaluating variables studied in Phase 1-like articles. Phase 3: Articles identifying factors that influence behavior, including correlates, mediators, and moderators of social, psychological, and behavioral independent and dependent variables. Phase 4: Articles of behavior change interventions, including studies of intervention efficacy and effectiveness. Phase 5: Articles translating research into practice, such as descriptive research on diffusion, dissemination, implementation, and sustainability of behavior change interventions in different settings.

In addition to these five phases, Sallis et al. (2000) developed two additional classifications: "other behavioral" articles and "nonbehavioral" articles. Articles classified as "other" were those that focused on health-related behaviors but could not be classified as belonging to Phases 1 through 5. Examples include literature reviews, meta-analyses, and articles of a predominantly methodological or statistical nature only. Articles classified as "nonbehavioral" focused on topics or contents other than social, psychological, or behavioral variables. Examples included book reviews, addresses, obituaries, and training and professional issues.

According to Sallis et al. (2000), editorials and commentaries without extensive references were not classified. Further, when more than one research phase applied to an article, the article was classified

into the highest possible phase. Articles on measurements of potential determinants of behavior were classified as belonging to Phase 3 and articles on measurements of factors related to dissemination were classified as belonging to Phase 5. Articles stemming from the Society of Pediatric Psychology's series on empirically supported treatments (Spirito, 1999) were classified as belonging to Phase 5.

All research team members were extensively trained on Sallis et al. (2000) research phases. This included didactic presentations, as well as open group discussions about and classification of unused, illustrative articles published in the *Journal of Pediatric Psychology* in 2001 (Vol. 26). Team members were required to achieve 80% reliability or higher on classifying a representative sample of these illustrative articles prior to proceeding. Next, the 196 articles of interest were evenly distributed across seven team members for independent classification. Once classified, 92 (47%) articles were selected at random and subjected to reclassification by a different team member masked to the article's initial classification. Cohen's κ was chosen as the statistic of classification concordance. Concordance between initial classification and reclassification was adequate ($\kappa = .85$); classification discrepancies were resolved by consensus.

The percentage of articles classified as belonging to each phase of research was computed, along with the percentage classified as other and nonbehavioral. These percentages were then qualitatively compared to percentages reported by Sallis et al. (2000) for the field of health behavior research overall, as represented by articles within the journal *Health Psychology*.

RESULTS

Figure 1 displays the percentage of articles classified as belonging to one of five phases of research in the *Journal of Pediatric Psychology* (black horizontal bars). There were relatively low numbers of articles belonging to Phases 1, 2, and 4 and virtually no articles belonging to Phase 5. With respect to Phases 1 and 2, this suggests less of an emphasis on relations between behavior and health and on measurement. With respect to Phases 4 and 5, this suggests less of an emphasis on intervention and in moving from research to practice. The majority of articles were classified as belonging to Phase 3, suggesting more of an emphasis on the etiology of behavior.

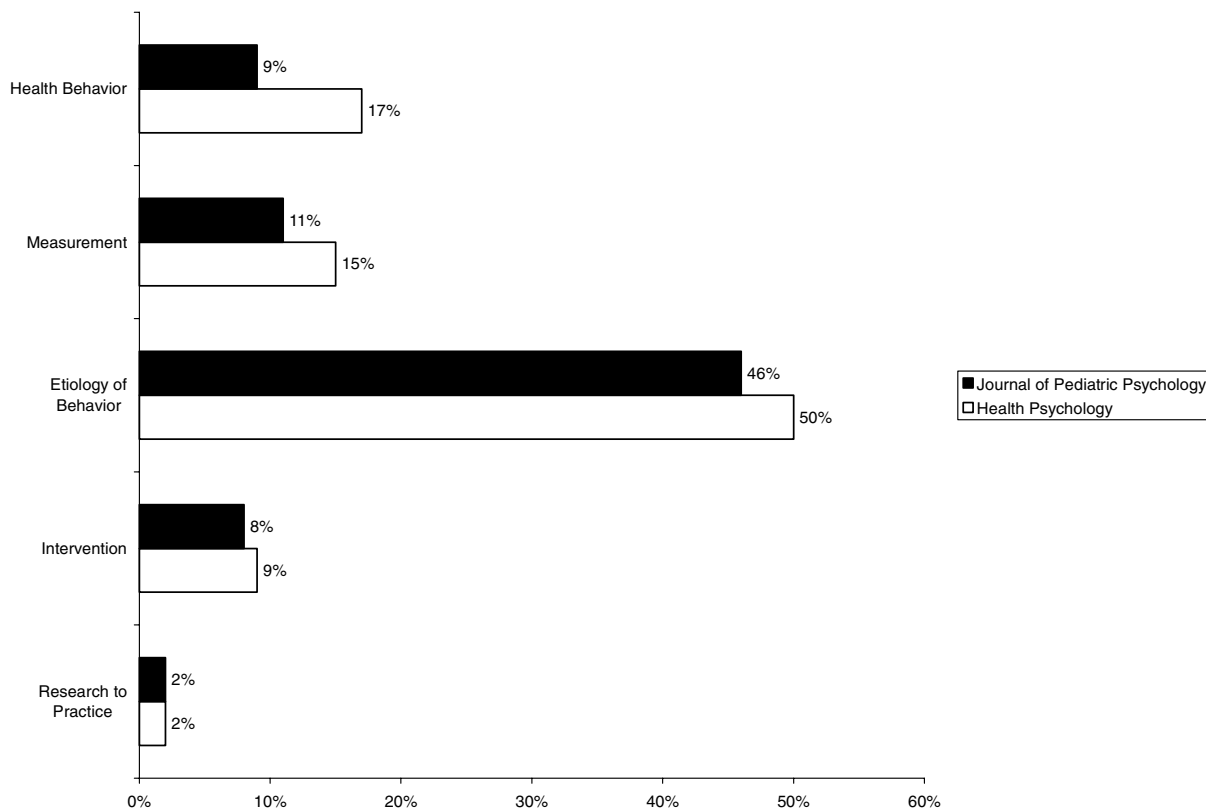


Fig. 1. Percentage of articles in child health behavior and health behavior by behavioral epidemiology research phase.

In comparison to *Health Psychology* (see Fig. 1, white horizontal bars; Sallis et al., 2000), the shape of the behavioral epidemiology research phase distribution of articles published in the *Journal of Pediatric Psychology* was highly similar, though some differences were evident. Articles published in both journals emphasized nonintervention over intervention research and nonintervention research by both journals was dominated by behavioral etiology research. Of note is that the total percentage of articles classified as belonging to one of five research phases in the *Journal of Pediatric Psychology* was 73% and 93% in *Health Psychology*. This suggests more of an emphasis on “other behavioral” articles (14%) and “nonbehavioral” articles (10%) in the *Journal of Pediatric Psychology* relative to *Health Psychology*. Two special issues of the *Journal of Pediatric Psychology* focused on research methodology and design (Vol. 27, issue 1) and training (Vol. 28, issue 2) contributed to this discrepancy. Finally, a key research phase difference between these two journals was in health behavior studies, with the *Journal of Pediatric Psychology*

containing fewer articles classified as belonging to Phase 1.

DISCUSSION

This study analyzed research articles published in several recent volumes of the *Journal of Pediatric Psychology* in an effort to classify them as belonging to phases of behavioral epidemiology research. The results suggest that the behavioral epidemiology framework described in Sallis et al. (2000) was applicable to the majority of research published in the field of child health psychology, with the exception of about one-quarter of articles published. As expected, nonintervention research dominated in publications (66%) and intervention research comprised about 10% of the articles published. Both the relatively young age of the field of pediatric psychology and the consistency of this finding with respect to prior reports (Kazak, 2002; La Greca 1997; Roberts, 1992) and to the field of health psychology must be taken into account when interpreting it. Nevertheless, this does suggest a lack of maturity within the field with

respect to behavioral interventions and in translating research findings into practice. Across the entire distribution of child health behavior research, Phase 3 studies were the most well-represented. Given that findings from studies of this phase are poised to develop into interventions, it is encouraging that more interventions may be forthcoming.

In many areas of public health, empirically supported interventions are sorely needed. Interdisciplinary and transdisciplinary approaches to understanding and solving complex behavior-health relationships are being encouraged at the local, state, and national levels to combat cardiovascular disease, cancer, diabetes, and other chronic diseases. Public-private research partnerships are being encouraged to better address behavioral risk factors throughout the lifespan. These approaches and partnerships may need to rely upon child health behavior research across all epidemiological phases to bring about discovery (Fuemmeler, 2004). However, change and progress may be most affected by intervention research.

The approach taken herein is not without some limitations and biases. Chief among these is that the whole of child health behavior research was represented by three volumes of a single, discipline-specific field journal. No one journal can accommodate all of a field's research activities and recently published articles represent only a portion of research conducted. Second, a host of factors are taken into consideration by authors, reviewers, editors, and publishers that were not taken into consideration here. These include journal impact, research and article quality, issue and volume consistency and novelty, and readership and circulation. It is possible, for example, that the apparent overrepresentation of Phase 3 studies in child health behavior research reflects these unmeasured factors. Finally, the Sallis et al. (2000) phase classification framework suggested articles be classified according to their highest possible phase. Thus, articles establishing relationships between behaviors and health (Phase 1) that also described new measures (Phase 2) and went on to identify factors that influence behavior (Phase 3) were classified as Phase 3 and not Phases 1 or 2 and no articles were dually classified.

Despite these limitations, this report represents a step toward examining research conducted within the field of child health psychology through the lens of behavioral epidemiology. The results suggest an encouraging amount of data is being amassed in preparation for behavioral intervention. Whether or

not these data will actually be used to develop and evaluate behavior change interventions and translate research findings into practice remains to be seen. Given the recursive impact of chronic disease and children's behaviors on one another, and the developmental etiology of tobacco use, poor diet and physical inactivity, alcohol use, and other behavioral risk factors, child health psychology is in position to have a larger impact on public health. This impact may be realized through more aggressive chronic disease prevention and control and health promotion research agendas, including interventions.

ACKNOWLEDGMENTS

This work was co-supported by National Institutes of Health research career development awards to the first (CA091831) and last (DK062161) authors.

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