Hutchinson Smoking Prevention Project: a New Gold Standard in Prevention Science Requires New Transdisciplinary Thinking

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In this issue of the Journal is a classic study of health behavioral change intervention. The Hutchinson Smoking Prevention Project (HSPP) (1) is destined to become the gold standard in prevention science, the definitive study on the social-influences approach to prevention. Whenever such an impressive intervention study finds no effect on the outcomes, there is a search for what could possibly have gone wrong (2,3). Before commenting on more plausible explanations for the findings, we will review the usual list of suspects.

First, the research design was elegant. Forty school districts were matched, randomly ordered, and randomly assigned to either the experimental (i.e., intervention) or the control condition. The integrity of the research design was sustained for 15 years. No findings were released before the final results were compiled. Moreover, there was impressive initial equivalence in the pairs of randomly assigned districts. Thus, in terms of randomized trials, the design of this study is outstanding.

The intervention was an enhanced social-influences (i.e., theory-based) curriculum containing all 15 “essential elements” of school-based and curriculum-driven smoking prevention programs developed by the National Cancer Institute (4) and endorsed as best practices guidelines by the Centers for Disease Control and Prevention (5). These elements were infused into a curriculum that was developmentally specific for each year from grade 3 through grade 10 and that was intended to address multiple putative stages of smoking acquisition. Consequently, the intervention started early enough (3rd grade) to be considered primary prevention. The number of hours of intervention to which students were exposed was 46.75, much more than the 30 hours for Life Skills Training (6), the curriculum touted as the most effective social-influences program. Furthermore, HSPP started earlier and covered grades 3–12 instead of grades 6–8, as in Life Skills Training. Thus, this intervention met and exceeded the number of exposure units and contained all of the recommended components of a school-based, curriculum-driven program.

Implementation fidelity is a critical feature of a science-based evaluation of efficacy and effectiveness. Far too often, implementation fidelity is simply not measured or is not measured adequately. Generally, the larger the study, the bigger the problem. However, Peterson et al. (1) were able to obtain self-reports on implementation and to observe delivery of the curriculum. On the basis of those observations, the authors conclude that the teachers effectively communicated the lessons’ key concepts in 80% of the lessons—a new standard for prevention science. Moreover, the teaching styles and methods utilized to deliver the curriculum were state of the art and largely interactive.

Subject attrition is often one of the most problematic elements of evaluations of field experimental studies. For example, in the evaluation of Life Skills Training, Botvin et al. (6) had a 39% attrition rate at 6 years. The HSPP study followed subjects from grade 3 through grade 12 and to 2 years beyond high school. At grade 12 and 2 years beyond high school, the attrition rate was remarkably low, only about 7%.

The measures of the outcome variables reflect a consensus group convened by the National Cancer Institute, so they are not suspect. The principal outcome measure is self-reported daily smoking. Furthermore, the investigators validated their outcome measure by testing saliva cotinine on a 12.6% sample of 12th graders; they found minimal dissimulation. Finally, by restricting the districts randomly assigned to those with a feeder pattern to only one high school, the investigators were able to avoid the confounds generated by having students from experimental and control conditions mixed at the high school level. Although restricting the study to such districts limits somewhat the generalizability of the results, it avoids a major domain of confounds.

This elegantly designed and impeccably implemented study evaluating the social-influences approach to smoking prevention reaches a clear and indisputable conclusion—the social-influences approach did not work. Furthermore, the investigators anticipated essentially all of the potential methodological and design confounds. This being so, what should we conclude?

First, the theory that has dominated thinking about prevention interventions over the past 25 or so years may be seriously flawed. The effect sizes found in this study are close to zero. This finding suggests that the social cognitive learning approach most often associated with the work of Bandura (7) may be virtually useless in explaining what causes some people to smoke and others not to smoke and some to progress toward daily smoking and other possible indicators of tobacco dependence and others not to progress. The failure to find an effect may reflect a major limitation of the social-influences approach. Most social-influences prevention programming utilizes a “cold” cognition approach to decision making, in which decisions are assumed to be rational, completely ignoring the influence of affect (i.e., “hot” cognitive decision making) on smoking and other health-compromising behaviors among youth (8).

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Second, the social-influences approach, which typically locates the causes of smoking almost exclusively within the individual, may be far too narrow. Data from the HSPP study reveal substantial heterogeneity across the districts in terms of the behavior targeted (i.e., daily smoking). For example, the range of reported daily smoking among girls in grade 12 ranged from 0% to 41.9% in the control districts and from 15.5% to 34.2% in the experimental districts. Daily smoking prevalence among boys was similarly heterogeneous. This heterogeneity raises the likelihood that there are potent factors at contextual levels that may interact with factors at the individual level to predict smoking among youth. In future analyses of this valuable dataset, it is thus critical that individual-level pathways and trajectories of tobacco use be examined with contextual factors in the equation (9).

Third, the usual periodicity of data collection in longitudinal studies (once a year) may miss much relevant information. For example, almost nothing is known about early episodes of tobacco use (10) or turning points in tobacco use (from no use to trying, from trying to experimentation, or from experimentation to regular use) (11). To understand these turning points, strategies are needed in which data are collected more frequently. One such strategy, ecological momentary assessment (12), uses a personal digital assistant (PDA) that is triggered multiple times daily on a random basis (i.e., sampling of time) for a week. The subject responds to the message to turn on the PDA and answers a series of questions concerning the immediate situation with regard to smoking and other factors (e.g., negative affect). Such data and data collection strategies may reveal the behaviors and situations that are most critical to target in prevention interventions.

Fourth, although the HSPP study makes an important contribution by focusing on daily smoking as the principal outcome, it also illustrates that little is known about the critical features of dependence and how to measure their emergence among youth (13–15).

Finally, what are the implications of these dramatic findings for prevention science and practice? The results provide compelling evidence of the need for a better understanding of the etiology of tobacco use and dependence. This understanding must come from a transdisciplinary perspective (16) because, as shown in the HSPP evaluation, existing discipline-specific theories about the causes of smoking among youth are not adequate. A transdisciplinary perspective entails a thorough integration of individual-level factors (i.e., biologic and psychologic) with contextual factors measured at the social and cultural levels. Continuing to rely on current theoretical models of behavior change is unlikely to result in credible positive findings; it is time to re-examine the theoretical underpinnings of health behavior to identify new and more robust theoretical models.

This study and its findings provide both a challenge and an opportunity for the next generation of science on prevention and the search for a comprehensive understanding of the etiology of tobacco use and other health-related behaviors. It is clear that we must move beyond simple models of main effects (i.e., increase knowledge of influences from media and peers to smoke and skills to resist these influences to prevent smoking) to more complex, robust causal models. This would entail reorienting the prevention field from the main effects question (what works?) to the moderated model question (what works, for whom, under what conditions, how, and why?). It would also entail consider-

erably more research on mechanisms that might explain how changes in knowledge of influences and skills could affect outcome behaviors, that is, a focus on the mediating variables. Moderated and mediated models will more accurately reflect the nexus of dynamic and malleable risk and protective factors at the individual and contextual levels. Research on the epidemiology, etiology, treatment, and prevention of smoking among adolescents and young adults must thoroughly examine the most salient factors, from cells to society, to provide a realistic basis for the next generation of prevention interventions.

REFERENCES


NOTE

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