Controlling for “confounders” in psychosocial pain research

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Controlling for “confounding” variables is commonplace in epidemiological research. A confounder is a variable that has the potential for biasing the relation between an exposure variable and an outcome variable. By reducing the “noise” in outcome variation due to confounding variables, greater clarity can be brought to the interpretation of the effects of exposure on an outcome variable.

Controlling for confounders permits the researcher to explore alternate explanations of an observed relation between an exposure variable and an outcome. For example, a researcher might be interested in examining the effects of occupational chemical exposure on the risk of developing lung cancer. In such a study, the researcher would test for the possible confounding influence of smoking since smoking is a known risk factor for developing lung cancer. If the relation between occupational chemical exposure and the risk of lung cancer is no longer significant when controlling for smoking, the researcher might conclude that occupational chemical exposure is not causally related to the risk of developing lung cancer and that the observed relation is due to the confounding effects of smoking.

In this issue, Lee et al. (2016) examine the mediating role of changes in catastrophizing the relation between changes in pain knowledge (ie, the exposure variable) and subsequent changes in pain severity (ie, the outcome variable) in individuals with chronic pain. All participants attended 2 or 3 group sessions of pain education and completed measures of catastrophizing and pain severity at 4 different test points over a 12-month period. Initial analyses revealed that reductions in catastrophizing mediated the effects of increased pain knowledge on subsequent pain reduction. After controlling for the effects of a variable that the authors refer to as “clinician attributes,” the contribution of reductions in catastrophizing was no longer significant.

On the basis of their findings, Lee et al. (2016) conclude that the effect of pain education on pain reduction is not mediated by catastrophizing. They note the inconsistency between their findings and previous research supporting the role of catastrophizing as a mediator of pain outcomes but suggest that previous findings might be biased because of failure to control for confounders. As highlighted by the findings of Lee et al., researchers’ choice of potential confounders can be critical to the conclusions that will be drawn.

Statistical control of confounders is intended to address the possibility that observed influences on an outcome variable might be due to the influence of other known risk factors. It follows that the inclusion of variables as potential confounders should be based either on theory or on research, clearly supporting the risk-factor status of the potential confounder variables on the outcome of interest. Although the concept of “risk factor” is well established in epidemiology, its application to health psychology is not straightforward. The bidirectional influence of psychological factors on pain experience and the unknown etiology of many pain-related psychosocial variables render problematic the designation of psychological variables as risk factors in the traditional epidemiological sense.

In the findings of Lee et al., “clinician attributes” is included in predictive analyses as a potential confounder. The clinician attribute variable was derived from participants’ ratings of their educator’s empathy, attentiveness, and expertise. To consider a composite of perceived empathy, attentiveness, and expertise as a potential confounder, there should be a theory or research to suggest that this variable is associated with pain outcomes. The authors justify their selection of clinician attributes as a potential confounder by referencing review articles that address the role of psychological variables on clinical outcomes. Perusal of the content of the review articles reveals no study showing that participants’ perceptions of their educators’ empathy, attentiveness, and expertise is associated with pain outcomes. Even in the authors’ previous work, no data are reported suggesting a link between scores on the clinician attributes scale and the effectiveness of a pain education intervention.

Because the inclusion of a variable as a potential confounder is intended to bring greater clarity to relationships among exposure, mediator, and outcome variables, it is paramount that the confounder be a known construct, assessed with a reliable and valid instrument, with established links to the outcome variable. The clinician attributes scale used by the authors is referenced to 2 previous publications. In one article, it is described as a measure of satisfaction with one’s clinician; in another article, it is described as a measure of therapist equivalence. When the referent construct of a scale differs from one publication to another, confusion arises as to what the scale actually measures. More importantly, no data can be found in any article, providing information about the reliability or validity of the scale. To a greater extent than is perhaps the case in epidemiology, issues of construct and operational definition, and measurement reliability and validity...
are critical in research addressing psychological influences on health outcomes.

It is also important to note that there is no accepted conceptual framework that addresses the processes by which clinician attributes (operationalized as a composite of perceived educator empathy, attentiveness, and expertise) would lead to a reduction in pain. If the mechanisms linking the potential confounder to an outcome variable are less well understood than the processes linking the hypothesized mediator to the outcome variable, controlling for the confounder does little to clarify the nature of relationships among study variables.

It is difficult to know what to conclude from the findings of the Lee et al. study. Given the absence of previous research showing that a composite measure of participants’ ratings of educators’ empathy, attentiveness, and expertise are associated with pain outcomes, it is necessary to consider the possibility that the observed relation between scores on the clinician attributes scale and pain reduction is spurious. Another possibility is that the clinician attributes scale might capture processes linked to fundamental characteristics of catastrophizing. In the latter case, covarying scale scores would understandably attenuate the contribution of catastrophizing. Contrary to the suggestions of Lee et al., it is likely premature to discount the vast literature supporting the contributions of catastrophizing to pain outcomes on the basis of one study suggesting the confounding influence of an inadequately defined construct, measured with a scale of unknown reliability and validity.

**Conflict of interest statement**

The author has no conflicts of interest to declare.

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**References**


