

REVIEW

What are the Origins of Chronic Back Pain of “Obscure Origins”? Turning Toward Family and Workplace Social Contexts

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Chronic back pain (CBP) is a common symptom throughout the world, and those undergoing it often experience a profound degradation of life. Despite extensive research, it remains an elusive symptom. In most cases, CBP is “non-specific,” since bio-mechanisms examined in the clinic do not account for it; another way of saying this is that it is “of obscure origins.” This paper re-directs attention towards origins that are distal and usually out of sight from the vantage point of the clinic. CBP as considered here is non-specific, persists ≥ 3 months, and, additionally, interferes with activities of daily life, such as family interaction or work. A theory proposed in the paper draws upon Durkheim’s *Suicide* to explain *why* exposures in the distal social contexts of family and workplace are fundamentally implicated in CBP. The theory is formed out of previously published studies on family and workplace social contexts of CBP and, in effect, provides a theoretical framework with which to review them. After treatment of CBP in the clinic, patients return to family and workplace contexts. Unless exposures in these contexts are addressed, they serve as continually renewing sources of CBP that remain unabated regardless of mechanism-based treatment in the clinic.

INTRODUCTION: THE QUESTION TO BE INVESTIGATED

Back pain is a highly prevalent symptom throughout the world, and, according to the Global Burden of Disease Study, it imposes more disability than any other disease or injury [1,2]. Back pain also remains a poorly understood and elusive clinical entity, an aggregation of subtypes. The rule-of-thumb in the literature is to clas-

sify pain as chronic on the basis of its duration, ie, pain, regardless of type, is “chronic” if it persists 3 or more months [3]. Back pain, however, ordinarily persists longer than this, although it may do so at a mild level or else recurrently subside and then flare up [4-6]. If the 3 months rule-of-thumb were applied, most people who have back pain would thus have *chronic* back pain. As such, back pain even if experienced over the long-term would be, in Hadler’s words, a common “intermittent and

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remittent predicament of life [7].”

Of those with back pain, however, a minority (7%-28%) accrue a disproportionate amount of Years Lived with Disability as well as wage and medical compensation costs (77%-86%) [1,8]. In order to distinguish the troubling subtype from more commonly occurring back pain, chronic back pain (CBP) here implies not only persistence but also corresponding adverse effects on physical functioning. In other words, over the long-term, it is also disabling and interferes with activities of daily life, such as family interaction and work.

Discernible bio-mechanisms seldom account for back pain (an often-cited estimate is that bio-mechanisms account for it in only about 10% of all cases [9]), and CBP as considered here is, additionally, mechanistically and hence medically unexplained, excluding diagnoses such as trauma, cancer, infection, and stenosis. This leaves its ontological reality open to question, which has further implications. Qualitative studies have consistently found that those undergoing CBP feel isolated and alienated, set apart from others in society by the medical uncertainty of their symptom and the constraint this imposes on expressing what for them may be the central experience of their lives, the persistence of disabling pain [10-12]. As a patient told a clinician, “What are you giving me antidepressants for? I’m not depressed, my back hurts—that’s why I’m depressed and you people are depressing me because you’re not listening [6].”

The experience in its intense form has been compared to a nightmare: terrible things are happening to those undergoing it, worse are threatened; an inexplicable force is causing those things to happen, against which the will is helpless; and the experience goes on seemingly without end [13]. CBP of this nature may represent a more general vulnerability [14]. A longitudinal study with 10 years of follow-up found that, after adjusting for socio-demographic variables as well as other pre-existing diseases, the all-cause mortality rate was 50% higher among those with severe chronic pain than it was among those with no or only mild chronic pain [15].

The problem of CBP has increasingly drawn the attention of researchers. Thousands of articles on CBP have been published, and they have been reviewed and re-reviewed [1,16-24]. Despite this research, several studies show that prevalence rates of CBP are rising [25-28]. Of hundreds of treatments for CBP, few have proven to be better than any other treatment or placebo [29-32]. CBP as considered here is most frequently referred to in the medical literature as “non-specific,” which refers to the non-specificity of its bio-mechanisms. Another term with essentially the same meaning, once common but now outmoded, is chronic back pain “of obscure origins” [33].

The purpose of this paper is to re-direct attention toward origins of CBP situated in the social contexts of

family and work. The distinction between back pain and CBP establishes the central question to be investigated: *Why* is pre-existing back pain, the common predicament of life, transformed into more troubling, persistently disabling back pain, or what here is referred to as CBP? In contending with that question, we propose a theory to explain the role of family and workplace exposures in the transformation.

THE BIO-PSYCHO-SOCIAL MODEL OF CBP

It is necessary to consider the “bio-psycho-social model,” because for decades it has been influential in the field of pain medicine, including studies of CBP [34,35]. The model is a notable advance, because it sensitizes researchers to each of the three components that compose it as well as interactions among components. For instance (as is discussed later), exposures in family and workplace social contexts such as divorce and job loss trigger psychological stress and corresponding bio-mechanisms conducive to CBP. The model, however, is not a theory. It does not provide a conceptual framework with which to derive variables nor does it specify determinate relationships among those variables. For example, according to the model, what particular variables within family or workplace, ie, its social component, account for CBP? In a sense, the model delineates broad contours of components but does not fill them in with adequate detail to provide an underlying rationale for *why* variables within its components are implicated in CBP.

There is a widespread norm in society to reduce symptoms to bio-mechanisms [36,37], and, given an apparent lack of a persuasive rationale otherwise, the bio-component takes precedence in the bio-psycho-social model. The ordering of the model’s components reflects the norm, with the bio-component conventionally listed first. As Rosenberg has noted [37], the norm also supports an “assumption of hierarchy” that gives biomedicine the “right to ultimately define the true and the efficacious in the profession’s own terms.”

The hierarchical arrangement, more specifically, influences how CBP is defined in the clinic and ensuing treatment of it. Surveys conducted in various clinical settings in the US and other high-income countries indicate that CBP for the most part elicits mechanism-based treatment (even though bio-mechanisms remain largely unspecified). Most CBP patients receive prescriptions for pain medications and, according to a recent review of surveys, 42% of them receive opioid prescriptions in particular [38]. These patients, however, are relatively infrequently counseled about other than the mechanistic component of their pain [39,40].

Research on the bio-component has attained a momentum that may be self-perpetuating. The US National

Institutes of Health (NIH), for example, tends to allocate funds for research in accordance with its *past* allocation of funds [41]. Specifically with regard to chronic pain, the NIH has recently solicited proposals on “acute to chronic pain signatures” to track “biomarkers” of patients who have had arthroplasty and thoracic surgery as well as proposals on “a new generation of powerful, nonaddicting opioid analgesics” [42-44]. Research of this nature further elucidates pain bio-mechanisms and treatment of them. On the other hand, less research in the field of pain medicine is devoted to the social component of the bio-psycho-social model, and it remains the least developed of its components [45-47].

The social component is central to this paper, particularly the “social contexts” of the family and workplace. These social contexts are distal and usually out of sight from the vantage point of the clinic, although according to the theory proposed in the paper, they are fundamentally implicated in CBP. After treatment in the clinic, patients return to their family and workplace social contexts and are enmeshed in them. Pain medications and other mechanism-based treatments that patients receive in the clinic do not address contextual exposures to which they return. Thus, unless exposures in distal family and workplace social contexts are brought within the realm of treatment and are also addressed, they serve as continually renewing sources of CBP that remain unabated regardless of mechanism-based treatment [48].

WHY CONSTRUCT A THEORY BASED ON EXPOSURES IN SOCIAL CONTEXTS?

“Science is built up with facts, as a house is with stones. But a collection of facts is no more a science than a heap of stones is a house.”—Henri Poincaré [49]

The theory proposed here entails a shift in points of view. In contrast with micro-level analysis of bio-mechanisms and the effects of those bio-mechanisms traced outward toward the individual’s experience of CBP, individuals are here viewed insofar as they are suspended in larger webs of family and workplace social contexts. Effects of exposures in these macro-social contexts are then traced *inward* toward the individual’s experience of CBP.

Although the social component of the bio-psycho-social model (or what here constitutes family and workplace “social contexts”) is less developed than other components of model, pain researchers have increasingly considered it [50-52]. They have produced a multitude of findings that relate diverse contextual exposures to CBP. For instance, within family context, the solicitous response of one spouse toward the other spouse’s pain places the other spouse at risk of chronic pain, and also a parent with chronic pain may have served as a role model

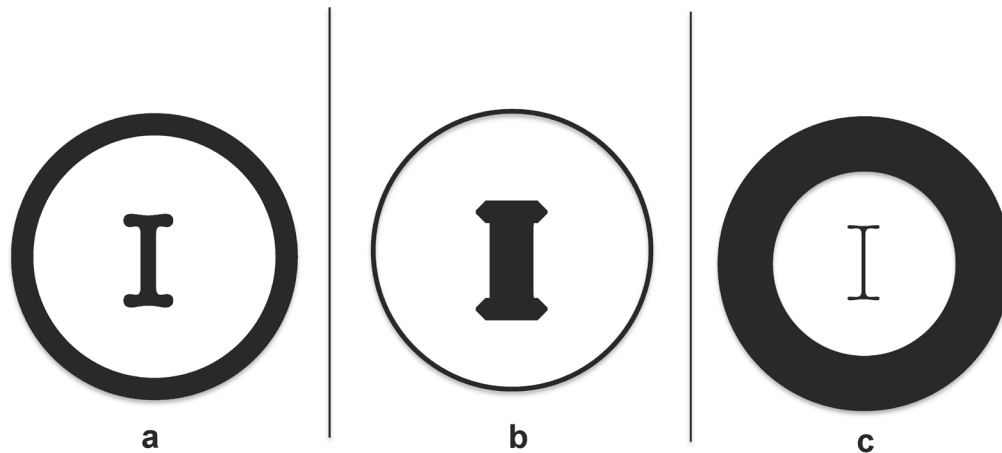
for an individual with CBP; within workplace context, a short time on the job and job dissatisfaction are both related to CBP (particular studies on these exposures are cited later in the paper). Other than the effect on CBP, how do spousal solicitousness, parental role model, short time on the job, and job dissatisfaction fit together? A causal model that diagrams such exposures would be densely packed with a multitude of boxes and crisscrossing arrows. Its complexity may obscure rather than clarify why contextual exposures are implicated in CBP.

In order to organize diverse exposures and bring coherence to them, it is necessary to subsume them under an overarching theory. As Freud is reputed to have said, “All that matters is to love and to work [53],” and the theory proposed here accommodates social contexts of *both* types, ie, family and workplace. This raises the matter of whether the proposed theory is applicable to exposures in other social contexts besides family and workplace, and, additionally, whether it is applicable to chronic pain at other sites besides the back as well as to other symptoms not explained by bio-mechanisms. The theory as proposed here, however, is “middle-ranged [54].” As such, it is circumscribed by the studies out of which it is formed, stays close to them, and is restricted in scope to CBP and exposures in family and workplace contexts.

A THEORY BASED ON FAMILY AND WORKPLACE CONTEXTUAL EXPOSURES

The proposed theory draws from Durkheim’s *Suicide: A Study in Sociology* [55], a work that, although published more than a century ago, still informs social scientific investigations of health and illness [56]. In the section that follows, the theory is laid out in way that reflects, more generally, elements that compose a “theory” [54,57]. The relationship of the individual to the larger social contexts of family and workplace is at the core of the proposed theory. Equilibrium in the individual’s social ties to larger contexts represents health (depicted in Figure 1, Panel a). Conversely, disequilibrium in the individual’s ties to larger social contexts represents ill health and weakened ties as well as excessive ties may both result in disequilibrium. From these conceptualizations, two less abstract propositions may be derived. Studies are cited to bring empirical data to bear on the propositions, and, in turn, operationalization of the propositions is embedded in the studies.

Proposition I. Insufficient Integration into Social Contexts and its Effect on CBP: *The individual’s ties to the larger family and workplace social contexts are weakened, and, correspondingly, contextual influences are attenuated (depicted in Figure 1, Panel b).*



In the figure, “I” represents the individual experiencing commonly occurring back pain that has not yet become persistently disabling chronic back pain (CBP), and “O” represents larger family and workplace social contexts.

a. Equilibrium in the individual’s ties to the larger social contexts of work and family

b. Disequilibrium Produced by Insufficient Integration into Social Contexts
The individual’s ties to social contexts are weakened, and, correspondingly, contextual influences are attenuated. Examples include divorce/separation and poor relations with co-workers, both of which increase the risk of CBP (see studies cited under Proposition 1 of the explanation).

c. Disequilibrium Produced by Excessive Integration into Social Contexts
The individual’s ties to social context of the family serve to accentuate contextual influences and, correspondingly, to refract pain. Examples include one spouse’s solicitousness of the other’s pain (especially when spouses are satisfied with their marriage) and the modeling of pain by other family members, both of which increase the risk of CBP (see studies cited under Proposition 2 of the explanation).

Figure 1. A Theory of Why Exposures in Family and Workplace Social Contexts are Implicated in Transforming Commonly Occurring Back Pain into Chronic Back Pain (CBP).

An engineering analogy is useful in representing the consequence of weakened ties to larger social contexts: impact in relation to supporting surface [58]. In this analogy, supporting surface would be the social context composed of family and workplace, and impact would be the common predicament of back pain that has not become CBP, which includes flares-ups that subside as well as persistence at a mild level. To draw out the analogy, the influence of the larger social contexts under usual circumstances is strong enough to sustain the impact of commonly occurring back pain; however, if the individual’s ties to social contexts are weakened, contextual influences are correspondingly weakened and give way under the

impact of the pain, which may result in more persistently disabling CBP.

The concept of “weakened ties to family and workplace contexts” is operationalized in studies in various, more particular ways.

A. Regarding *weakened ties to family context that occur in adulthood*, studies indicate that the following increase the risk of CBP:

1. Marital dissatisfaction [21,59,60]
2. Divorce/Separation [61-65]
3. Women in an abusive spousal relationship [66-70]
4. Punitive responses of one spouse toward the other’s

pain [21,71,72]

B. Regarding *weakened ties to family social context that occurred in childhood*, studies indicate that the following increase the risk of CBP:

1. Major episode of childhood hospitalization [73-76]
2. Most studies that consider child abuse (but not all [77]) find that it is related to chronic pain decades afterward [17,69,78-80]
3. Miscellaneous operationalization of weakened ties in childhood, including death of parent, other long-term absence of parent, divorce of parents, and childhood institutionalization [73,81,82]

C. Regarding *weakened ties to the social context of the workplace*, studies indicate that the following increase the risk of CBP:

1. Job loss (also called unemployment) [63,83-86]
2. Major episode of time lost from work (eg, > 1 mo.) due to current/prior illness/injury [87,88]
3. Short duration on the job prior to CBP (also called short job tenure) [23]
4. Poor relations with co-workers (also called lack of co-worker support) [18-20,23,89,90]
5. Job Dissatisfaction [1,19,20,22]

How, more specifically, do weakened ties to larger family and workplace contexts designated in the theory impinge upon the individual's consciousness and affect the experience of CBP? A number of "pathways" may be proposed. According to one pathway, interaction with family and workplace contexts under usual circumstances turns the individual outward, but the individual insufficiently caught up in these larger social contexts turns inward instead to dwell on the interior sensation of pain. In McCracken's words, "attention magnifies the perceived intensity of pain [91]." In cases of child or spouse abuse, post-traumatic stress may be a mediating factor in the pathway between weakened family ties and chronic pain [69,70,78]. Still another pathway is placed under the rubric of "social context" because of its precipitants, notably weakened ties to the family or workplace contexts, although they in turn produce psychological stress and attendant stress-related bio-mechanisms conducive to chronic pain. There are large bodies of literature on the bio-medical and psychological repercussions of weakened ties to family and work [92,93]. A rapidly expanding body of literature, furthermore, concerns major separation from the family in *childhood* and its effects on bio-mechanisms conducive to chronic pain in adulthood; as is well documented, molecular bio-mechanisms produced in childhood (eg, changes in telomere length) may be sustained over long expanses of time [81,94,95].

Proposition 2. Excessive Integration into the Social Context and Its Effect on CBP: *The*

individual's ties to the larger social context of the family function to accentuate contextual influences and, correspondingly, to refract pain (depicted in Figure 1, Panel c).

When the first of the above propositions is juxtaposed with the second, they appear to be opposed to each other, ie, the first concerns weakened integration and the second concerns excessive integration. As conceptualized here, however, both represent disequilibrium in the individual's ties with larger social contexts resulting in adverse effects on the experience of pain.

In tracing the pathway of accentuated contextual influence (Proposition 2), family interaction may be analogized to a "looking glass," ie, a mirror. As Charles Cooley (alluding to Lewis Carroll's *Alice Through the Looking-Glass*) wrote, "Each to each a looking glass/Reflects the other that doth pass [96]." In other words, the individual's pain is refracted among family members and in this way its effects are amplified, which again may result in more persistently disabling CBP. Regarding *accentuated influence of family context*, studies indicate that the following increase the risk of CBP:

1. Spouse's solicitousness of the individual's pain [16,21]. Predictably in view of the refraction of pain among family members, the effect of one spouse's solicitousness of the other's pain is greatest among spouses who are closest to each other and satisfied with their marriage [97,98].
2. One or more other members of the family who are in pain themselves and serve as a role model for the individual in pain [24,99,100].

To step back from the above theory and examine it as a whole, it draws together exposures in family as well as workplace social contexts. Once the diverse contextual exposures are together in one place, they may be comprehensively tested in subsequent analyses. Additionally, the simultaneous inspection of exposures brings into view the possibility that *particular* exposures, although outwardly dissimilar in form, are similar in adverse consequences for the individual in pain; they may be, in short, "dysfunctional equivalents [54]." Among particular forms of exposures leading to weakened ties, for example, are divorce and marital dissatisfaction as well as job loss and job dissatisfaction. The diversity of particular forms suggests that the underlying, abstract property consisting of "weakened ties" to social contexts, in contrast with particular forms themselves, may be operative in producing adverse effects on the individual in pain. The unexplored research question is the extent to which particular forms of exposures in the theory are dysfunctional equivalents, ie, one may be a surrogate for others. Alternatively, particular forms of exposures may exert independent effects,

and, instead of equivalent, these effects to some extent may be additive.

CONCLUSIONS: PRACTICAL APPLICATIONS

The presentation of a theory on why contextual exposures are implicated in CBP raises still another issue. Aside from implications for research, does the theory have practical utility? Otherwise stated, may it be applied to the design of interventions intended to reduce the effects of contextual exposures? Predictably, less is known about interventions related to the social component of the bio-psycho-social model than interventions related to other components of the model. The framing of questions, however, may be useful in itself, because doing so entails specification of what needs to be known in order to improve the design of interventions. As Agnes Arber famously remarked, “the difficulty in most scientific work lies in framing the questions rather than in finding the answers.” Four questions on the practical application of the theory are framed here, with rationales for why research on them is warranted.

1. How may exposures in the patient's social context be assessed in the first place?

The North American Spine Society recently conducted a systematic review of the literature on guidelines for the treatment of back pain. It contains the startling finding that there are no studies to “adequately address” the question of whether assessment tools or questionnaires in the literature “can help identify the cause of acute, subacute or chronic low back pain [31].” To expand upon this finding, a standardized physical examination is well tested and routinely administered to back pain patients [101], and, as discussed earlier, bio-mechanisms that produce back pain are seldom detectable. Given the finding from the review conducted by the North American Spine Society, clinicians are otherwise left on their own in assessing why patients present with CBP. Exposures in distal social contexts are not directly observable in the clinic—eg, multiple studies cited in the explanation above indicate that CBP is related to “poor relations with co-workers,” an exposure situated in workplace context. The patient's clinic visit typically is brief, about 15 minutes [102], and, aside from the physical examination, the clinician is left with little time to uncover such contextual exposures. The lack of assessment tools or questionnaires has elicited little comment in the literature. Distal and out of sight from the vantage point of the clinic, contextual exposures may simply be overlooked in accounting for why patients present with CBP.

2. Supposing exposures in the patient's social

contexts are detected and plausibly account for the patient's CBP, how is this to be communicated to the patient?

Consistent with the norm of reducing disease to bio-mechanisms, what most patients want when they seek medical care for CBP is a mechanism-based diagnosis. Another common theme in qualitative studies of chronic pain patients is their continuing but largely unproductive quest for such a diagnosis [10-12,103]. A crucial but still unresolved problem in medical care is how to communicate a non-mechanistic diagnosis to patients in a way that does not impair the relationship with the clinician and also prepares them to accept an intervention intended to address contextual exposures that, although not reducible to bio-mechanisms, have been substantiated in studies of CBP [48,104].

3. What interventions are effective in addressing contextual exposures?

Provided that exposures in the patient's social contexts are assessed, contextual exposures may be matched with suitable interventions. For example, marital dissatisfaction and job dissatisfaction may be matched, respectively, with couples therapy and workplace interventions. Whether these are effective interventions for CBP has not been definitively ascertained [105,106], but they show initial promise. Studies suggest that couples therapy may reduce depression, improve marital functioning, self-efficacy, and pain coping skills, and, in so doing, reduce health care costs [107-109]. Further studies suggest that workplace interventions, including employee assistance programs (EAPs), may increase worker satisfaction and, additionally, they may lessen symptoms of workers who remain present at work as well as enable those absent from work to return to work sooner than mechanism-based treatment [110-115]. Despite the initial promise, however, couples therapy and workplace interventions are often omitted from prominent guidelines on the treatment of CBP [29,31].

The inattentiveness to these interventions may be due to the re-orientation and complexity required to implement them. “Despair” at the root of the current upsurge in the prevalence of chronic pain in the US, for example, is produced by macro-economic change that leads to diminished economic prospects, including job loss as well as a labor market disproportionately composed of jobs with low wages and unsatisfactory working conditions. The underlying cause of the upsurge in the prevalence of chronic pain, macro-economic change leading to diminished economic prospects, is beyond the purview of the clinic, and the discussion of how to lessen its impact is as yet ongoing [48,56]. Additionally, some exposures designated in the above theory, such as child or spouse

abuse, exert complex effects that require sustained and intense care. Is care of this nature available, and are resources available to cover it? The purpose here is not to resolve such issues, but, rather, to bring them to the surface, which is necessary to prepare the way for the design and implementation of suitable interventions.

4. What is the aim of intervention?

The aim of interventions intended for CBP patients may be subdivided into more distinct treatment outcomes. Researchers have long noted that, at follow-ups, changes in these outcomes to a large extent vary independently of each other [116,117]. Pain intensity (patients' reports of how much they hurt, often measured with a 0 to 10 numerical rating scale) is one such outcome, and change in it is obviously desirable, but it resists modification [118,119]. Other, conceivably more modifiable outcomes, however, matter to patients as well, such as enhanced emotional and physical functioning, better sleep, and the retention of work [46,120-122]. Interventions that address exposures in family and workplace social contexts may be particularly well suited to attain these outcomes.

In sum, as stated at the outset of this paper, back pain for most people who undergo it remains ineradicable, a common "intermittent and remittent predicament of life." It becomes especially troublesome when it is transformed into disabling CBP that over the long-term interferes with what people want to do. Interventions that address contextual exposures are based on the premise that they have the potential to moderate the experience of CBP and dial it back. Otherwise put, if the common predicament of back pain may be transformed into CBP in the first place, CBP may be transformed back into more common but less disabling back pain.

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