Research report

Is low mood an adaptation? Evidence for subtypes with symptoms that match precipitants

Matthew C. Keller[a],*, Randolph M. Nesse[b]

[a]Center for Society and Genetics (UCLA), Box 951405, 1339 Murphy Hall, Los Angeles, CA, 90095, United States
[b]Departments of Psychology and Psychiatry, University of Michigan, Ann Arbor, United States

Abstract

Background: Although severe depression is dysfunctional, the capacity to experience normal low mood may be useful in certain fitness-threatening situations. Moreover, if specific kinds of situations recurred often enough in the course of evolution, natural selection may have shaped partially differentiated subtypes of low mood that are parallel to the subtypes of anxiety that protect against different kinds of danger. To test this hypothesis, we examined how symptoms of low mood differ depending upon the precipitating situation, and whether these differences match expectations of symptoms useful in each kind of situation.
Method: 337 subjects who experienced a period of low mood within the last year wrote accounts describing perceived causes of their low mood and they filled out the CES-D depression inventory. Seven symptom scales were derived from analysis of CES-D data. Independent judges blindly coded the accounts into one of six precipitant categories.
Results: Different untoward situations were associated with different symptoms that were predicted to be useful in those situations. Social losses (death of a loved one, romantic breakups, and social isolation) were associated with greater crying and arousal. Failure to reach a goal, stress, and winter seasons were associated with more fatigue and pessimism.
Discussion: These results suggest that natural selection shaped not only a generic state of low mood but also partially differentiated subtypes shaped to cope with specific situations that were associated with fitness losses among our ancestors.
© 2005 Elsevier B.V. All rights reserved.

Keywords: Depression subtypes; Evolution; Natural selection; Evolutionary psychology; Mood

There has been much debate about whether low mood is an evolved adaptation, what functions it might serve, and what kinds of evidence would test hypotheses about these functions. Most researchers who think low mood may be adaptive argue for a global function of low mood, such as a signal of submissiveness following a loss of status (Price et al., 1994), a strategy to conserve energy and resources (Engel, 1980; Beck, 1996), a way to reassess failing plans (Gut, 1989; Watson and Andrews, 2002), or as a means of social communication (Klerman, 1974; Watson and Andrews, 2002). We and others have

* Corresponding author. Tel.: +1 734 678 2389; fax: +1 310 825 1435.

E-mail address: matthew.c.keller@gmail.com (M.C. Keller).

suggested that natural selection may have shaped capacities for low mood to cope with fitness-relevant situations that have been recurred over evolutionary history-specifically, those that involve losses or efforts that are not paying off (Klinger, 1975; Carver and Scheier, 2001; Nesse, 2000). Less often, researchers have sought specific functions of subtypes of low mood that follow specific precipitants, such as depression following childbirth (Hagen, 1999) and depression following social versus material losses (Gilbert, 1992).

These differing hypothesized functions of low mood are not mutually exclusive. Low mood may be both a global response to a wide variety of situations that represented potential fitness threats in ancestral environments, and a set of more specific responses shaped by natural selection to cope with the particular adaptive challenges posed by different types of situations. If depression symptoms differ depending on the precipitating circumstances in ways that match functional expectations, this would support the more general thesis that low mood is an adaptation. It would also provide a new way to view subtypes of depression based on precipitants and context.

1. Low mood versus depression

An evolutionary view of psychopathology suggests the core importance of distinguishing defects from symptoms that are normal and useful (even if aversive). Fever, nausea, and somatic pain, for example, are aversive states that nonetheless serve important adaptive functions (Nesse and Williams, 1994), while chronic pain syndromes arise from defective neural mechanisms. Because the word depression usually refers to pathology, we use the more neutral phrase "low mood" to describe the cluster of symptoms usually associated with depression—depressed mood, anhedonia, crying, self-reproach, fatigue, pessimism, psychomotor retardation, somatic disturbances, and shifts in cognitive style (Diagnostic Statistical Manual of Mental Disorders, 1994, Fourth Edition). Normal low mood is precipitated by cues associated with fitness losses in ancestral environments, it subsides once the situation is dealt with, and its severity is proportional to the seriousness of the precipitant. As with fever or

somatic pain, we hypothesize that normal low mood evolved as a response that is protective in certain kinds of fitness-threatening situations.

Depression, as typically used in the literature, refers to what we would term "extreme low mood". Depending upon the context, extreme low mood could be normal and adaptive or it could be pathological (Wakefield, 1997). For instance, in a hypothetical example (Licinio et al., 2002), a young woman catches her fiancé cheating on her and breaks up with him. For 2 weeks she cries, feels horribly sad, pessimistic, guilty, and has difficulty eating and sleeping, then her behavior returns to normal. Although this woman would receive a diagnosis of major depressive disorder by DSM-IV criteria, such behaviors are probably normal and (as argued below) adaptive given her situation. If, on the other hand, the woman experienced the same symptoms without a precipitant, her behavior would be pathological. Instead of an arbitrary cutoff between normal and pathological low mood based on severity and duration alone, this approach takes context into account in the same way that general medicine uses the context to determine when pain or immune responses are normal and when they are pathological.

The utility of low mood is more apparent when considering the normal human reaction to ordinary events rather than extreme reactions. Nevertheless, because most research is on depression instead of ordinary low mood, we briefly review relevant depression findings.

2. Causes and subtypes of depression

It is increasingly clear that situational factors play a large role in depression etiology. Brown and Harris (1978) estimated that 83% of depressive episodes were preceded by one or more severe negative life events. Relevant to the present research, depressive symptom patterns show little within-person stability across time (Coryell et al., 1994; Oquendo et al., 2004), implying that mood symptom patterns are more governed by situational than interpersonal differences. Consistent with this, some evidence suggests that negative events perceived as being global and stable are associated with specific kind of symptoms: lack of motivation, fatigue, psychomotor