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## Invited essay: Cognitive influences on the psychological immune system



S.J. Rachman

Department of Psychology, University of British Columbia, Canada

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### ABSTRACT

The construct of the psychological immune system is described and analysed. The direct and indirect cognitive influences on the system are discussed, and the implications of adding a cognitive construal to the influential model of a behavioural immune system are considered.

The psychological immune system has two main properties: defensive and healing. It encompasses a good amount of health-related phenomena that is outside the scope of the behavioural model or the biological immune system. Evidence pertaining to the psychological immune system includes meta-analyses of the associations between psychological variables such as positive affect/wellbeing and diseases and mortality, and associations between wellbeing and positive health. The results of long-term prospective studies are consistent with the conclusions drawn from the meta-analyses.

Laboratory investigations of the effects of psychological variables on the biological immune system show that negative affect can slow wound-healing, and positive affect can enhance resistance to infections, for example in experiments involving the introduction of the rhinovirus and the influenza A virus. A number of problems concerning the assessment of the functioning of the psychological immune system are considered, and the need to develop techniques for determining when the system is active or not, is emphasized. This problem is particularly challenging when trying to assess the effects of the psychological immune system during a prolonged psychological intervention, such as a course of resilience training.

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As far as I know Marcel van den Hout has not tackled the construct of the psychological immune system ... yet. He is an international expert on psychopathology and his extraordinary productivity is unmatched. Marcel has covered a remarkably wide range of topics: emotional reasoning, a brilliant article on ex-

consequentia reasoning (with Arnoud Arntz and M. Raumer), OCD, compulsive checking, grief, selective attention, pain, a deep analysis of safety behaviour (with Iris Engelhard). Their work showing the effects of taxing the working memory on emotional reactivity has relevance for the psychological immune system. His work is original and brilliant. Marcel is an enthusiastic collaborator and inspiring teacher. In all, one of these days he may even earn tenure.

E-mail address: [rachman@mail.ubc.ca](mailto:rachman@mail.ubc.ca).

The primary purpose of this review is to consider the direct and indirect cognitive influences on the psychological immune system. A secondary aim is to consider the relevance of some well-established phenomena for the construct of the psychological immune system, including emotional processing, habituation, extinction, and psychological resilience.

The psychological immune system (PIMS) operates in parallel with the biological immune system and also interacts with that system. Both systems are defensively protective and promote healing. The similarities between them, and their distinctive properties, are set out below. From a psychological perspective the cognitive influences on the psychological immune system are particularly significant.

The biological immune system (BIS) is a defensive system that protects people against pathogens within cells and/or within blood or other bodily fluids. It is automatic, adaptive, silent, self-correcting, self-healing, outside of awareness, and never 'sleeps'. Pathogens can be 'recognised' on second or subsequent contacts and the immune system tends to react strongly and effectively (adaptive immunity). Immune system responses are commonly assessed by venipuncture or salivary tests (Miller & Cohen, 2001; Wahbeh, Haywood, Kaufman, & Zwickey, 2009). In addition to its defensive properties the immune system promotes healing. In some instances the system 'turns on itself'. The autoimmune negative reactions include lupus, rheumatoid arthritis.

The system can be primed. Inoculations are a clear example of how cognitions directly affect the immune system. The person appraises the information about the value of an inoculation, makes a decision that instigates behaviour, obtains the injection, and makes a postinjection appraisal of their action ('safer'). If the information is mis-appraised ('it can cause autism') the recommended behaviour is rejected, leading to an erroneous sense of safety.

Psychological immune system (PIMS): There are two overlapping processes in the psychological immune system. The first resembles the BIS in protecting against harmful intrusions and in repairing damage. It is automatic, prevailing, adaptive, silent, outside of awareness, can be primed, and the effects can be observed and measured. Implicit processes such as emotional processing, habituation, extinction, taxing working memory, are automatically set off and can be interrupted but not easily prevented.

The second activity of the psychological immune system is proactive. Purposeful, intentional interventions are undertaken in order to enhance and/or boost the immune system and to promote healing. There is evidence that psychological well-being, and positive affect, are associated with sound health, e.g. a reduced likelihood of experiencing a heart attack, and remarkably, associated with enhanced longevity (Chida & Steptoe, 2005). In January 2014 the UK Dept. of Health stated that "It is estimated that high levels of subjective wellbeing can add 4–10 years to life".

Positive emotional style predicts resistance to illness after experimental exposure to rhinovirus and influenza A virus (Cohen, Alper, & Doyle, 2006). Short term interventions such as relaxation, stress management, have little or no effect on the immune system (Miller & Cohen, 2001), but prolonged interventions, such as resilience training, can be health-enhancing (Seligman, 2011). Healing interventions of psychological disorders, such as depression and anxiety disorders, are carried out by cognitive therapy and/or cognitive behaviour therapy (Barlow, 2004; Beck, 1976; Clark & Beck, 2010).

The influential model of a behavioural immune system developed by Schaller and Park (2011) provides a basis for considering cognitive influences. The behavioural immune system consists of mechanisms that "(a) detect cues connoting the presence of

infectious pathogens in the immediate environment, (b) trigger disease-relevant emotional and cognitive responses, and thus (c) facilitate behavioural avoidance of pathogen infections" (Schaller & Park, p. 99).

The Schaller-Park model can be elaborated by the addition of cognitive influences consisting of the person's appraisal of the significance of the cues (bodily dysfunctions, pain, mental distress), the selection and execution of appropriate avoidance behaviour, and evaluations of the effects of the behaviour. The cognitive elaboration expands the Schaller-Park model from local pathogens to include a variety of health problems. Among other examples, the psychological immune system model is relevant to mental ill-health as well as physical illnesses. In 2013 the U.S. National Institute of Mental Health reported a prevalence rate of 18.5% for adult mental illnesses. In the field of psychopathology the infusion of cognitive concepts advanced our understanding and treatment of emotional and behavioural disorders such as anxiety, panic disorders, phobias, obsessive compulsive disorders, and eating disorders (Barlow, 2004; Beck, 1976; Clark, 1986; Clark & Beck, 2010; Rachman, 2015).

In 1996 Salkovskis (p.xiii) observed that a paradigm shift had taken place in the field of psychopathology. The long-term dominance of behaviourism (Boring, 1950) was diluted and replaced by the growth of cognitive psychology. There is no non-cognitive psychology. In psychological therapy the shift was from Behaviour Therapy to Cognitive-Behaviour Therapy (Beck, 1976; Clark, 1986; Rachman, 2015; Salkovskis, 1985).

The proposed cognitive-behavioural model of the psychological immune system goes beyond the facilitation of the "behavioural avoidance of pathogen infections". Cognitive appraisals of difficulty/danger promote behaviour that is intended to give relief from pain, distress and disturbing thoughts; it can provide feelings of safety. Positive, realistic, constructive cognitive appraisals can enhance the protective and healing functions of the psychological immune system. On an everyday basis cognitions are involved in decisions to seek medical attention, take medications, undertake psychotherapy, agree/disagree to undergo surgery, and so forth. Cognitive appraisals can instigate life-long changes in health behaviour.

In contrast misappraisals or negative appraisals can be harmful. In panic disorders, episodes of intense uncontrollable fear are caused by catastrophic misappraisals in which bodily sensations such as breathlessness, sweating and a pounding heart are erroneously interpreted to be signs of an imminent heart attack (Clark, 1986). Disturbing intrusive unwanted images tend to be unchanging, extremely persistent and open to catastrophic misappraisals, especially about one's mental stability (Rachman, Coughtrey, Shafran, & Radomsky, 2014). Faulty, negative, alarming, pessimistic appraisals impair the protective and healing functions of the psychological immune system.

In many instances the operation of indirect cognitive influences is inferred, not observed. An example of the inferred operation of the system is the spontaneous fading of the effects of a trauma. The majority of people who experience a trauma do not develop PTSD (Ehlers & Clark, 2000; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). The short-term effects fade without deliberate interventions, and it is inferred that the psychological immune system was operative. Spontaneous fading occurs in grief, some forms of anxiety, and other emotions. This fading resembles the changes that occur during and after emotional processing (see below).

Interactions take place between the psychological immune system and the biological immune system (Glaser & Kiecolt-Glaser, 2005). Planned interventions can modify the automatic immune system, as in the example of immunizations. Detecting and appraising signs of ill-health usually provokes deliberate actions

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