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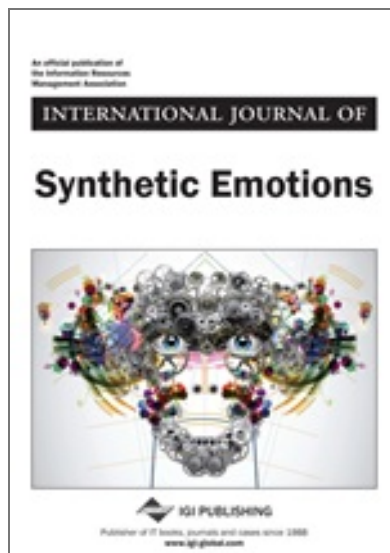


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## Tracing Emotion: An Overview

Roddy Cowie (Queen's University Belfast, UK), Gary McKeown (Queen's University Belfast, UK) and Ellen Douglas-Cowie (Queen's University Belfast, UK)

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## Abstract

Computational research with continuous representations depends on obtaining continuous representations from human labellers. The main method used for that purpose is tracing. Tracing raises a range of challenging issues, both psychological and statistical. Naive assumptions about these issues are easy to make, and can lead to inappropriate requirements and uses. The natural function of traces is to capture perceived affect, and as such they belong in long traditions of research on both perception and emotion. Experiments on several types of material provide information about their characteristics, particularly the ratings on which people tend to agree. Disagreement is not necessarily a problem in the technique. It may correctly show that people's impressions of emotion diverge more than commonly thought. A new system, Gtrace, is designed to let rating studies capitalise on a decade of experience and address the research questions that are opened up by the data now available.

## Article Preview

## Background Research

Tracing techniques emerged from a substantial body of research in psychology. Some features that people find strange at first sight are in fact grounded in long-established findings.

First and simplest, traces almost always describe apparent emotion (or affect). It is naive to assume, as people sometimes seem to, that they ought to describe actual emotion (whatever that is). In the terms used by Cowie et al. (2001) they provide effect-type rather than cause-type descriptions – that is, they describe the expected effect of generating particular set of signs (facial, vocal, gestural, etc). That is a different task from describing either the signs themselves (as, for instance, FACS coding does); or the inner state that caused them to be emitted (which various self-report questionnaires are designed to do).

There is nothing new or unsound about distinguishing between objective reality and subjective

representations of it, and recognising that both can be important. It was established by 17<sup>th</sup> century philosophers (notably Locke). From the early 19<sup>th</sup> century, research addressed topics like colour and the mathematical relationship between objective and perceived brightness, weight, etc. It in turn made a major contribution to the emergence of psychology on one side, and technologies dealing with sound and light on the other (giving rise to tools such as the mel and sone scales, colour spaces, etc.). Given the size and sophistication of that research tradition, it is disconcerting that people still talk as if traces should be understood as more or less accurate measures of an objective  $\hat{\epsilon}$ -ground truth $\hat{\epsilon}^{\text{TM}}$  (presumably the person $\hat{\epsilon}^{\text{TM}}$ 's true emotion). The natural view is that their primary function is to capture the way observers perceive things. That is a different task, with its own challenges and uses. In the terms used by Rosenthal (2005), the topic is a BC link  $\hat{\epsilon}$ “ the relationship between encoder behaviour and decoder judgment.

Historically, there is a strong association between tracing and a representation that contrasts with everyday language. Day to day descriptions use categories that involve rather complex combinations of attributes (for instance,  $\hat{\epsilon}$ œanger $\hat{\epsilon}$ , which Aristotle (1941, p. 1380) described elegantly as  $\hat{\epsilon}$ œa belief that we, or our friends, have been unfairly slighted, which causes in us both painful feelings and a desire or impulse for revenge $\hat{\epsilon}$ ). It is tempting to assume that the proper way to describe emotion is in terms of categories like that: anything else is a poor substitute. However, when we study emotion in naturalistic situations, the general rule is that no one description quite fits (Cowie & Cornelius, 2003). Categories are like landmarks: most of emotional life is not exactly at any one landmark, but rather, at varying distances from several.

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