

# Multiple Identities, Uncertain Social Interactions and Mixed Emotions: Using Bayesian Probability to Model the Dynamics of Identity, Action and Emotion

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## Extended Abstract

This paper will use new tools for computational modeling of identity, behavior and emotion to test how uncertainty about identity labels or the meanings associated with them can produce mixed emotions about how events have unfolded. We will compare classic versions of affect control theory, which assumes a concrete, labelled definition of a situation (implemented in a new R-based version that allows batch runs of large numbers of simulations) to new Bayesian versions of the theory (implemented in a simulation called BayesACT, with an R wrapper that allows for the easy input of data and parameters). We will use simulations to test the hypothesis that multiple identities and uncertain meanings can lead to mixed (multi-modal) or ranging (widely dispersed) emotions after social events, when compared with the well-defined situations with highly consensual meanings that are typically simulated in affect control theory. Our simulations are intended to generate hypotheses that are appropriate for empirical investigation.

Affect control theory is a cybernetic model of how people use social action to maintain their own and others' identities [3, 6]. It has a formal, mathematical structure, which is enabled by the fact that the theory places all elements of a social event (identities, behaviors, emotions, and social settings) into a single three-dimensional meaning space. The three dimensions are evaluation (good-bad), potency (powerful-powerless) and activity (lively-quiet) (EPA). Locations in this meaning space determine what kinds of events are seen as normal (or strange) and so are probable (or improbable). Events—particularly strange events—can change how the identities and behaviors involved are understood by shifting their meanings away from their original locations in EPA space. The theory predicts that such shifts are generally undesirable for actors, who will then behave in such a way as to bring meanings back to their original locations.

In this work, we focus on emotions generated by events. Emotions are defined by the location of the new meanings in the EPA space and the direction from which they have moved from their original value. They act to signal disruptions in cultural meanings, and in the case of negative emotions, perhaps motivate actions to restore identities.

From its inception in the 1970s until 2016, identities, behaviors, emotions and settings were viewed as highly consensual points in the three-dimensional space that could be measured by averaging ratings on the three dimensions across a relatively small number of culture experts (often college students, but quasi-representative on-line samples in more recent years) [4]. In 2016, Jesse Hoey, a computer scientist at the University of Waterloo, developed an extension of affect control theory using Bayesian probability theory [7]. In BayesACT, as this extension was called, he allowed the identity that a person occupied to be uncertain by operationalizing the meaning associated with that identity as a distribution rather than a point in three-dimensional space. BayesACT more accurately represents a number of interesting social situations in which there is uncertainty about either meaning or identity. Schroder, Hoey and Rogers (2016) show

the sociological potential of this extension, illustrating how (1) meanings for self and other can dynamically update during interactions under uncertainty, (2) how people can learn from their interactional environment to refine their understanding of both their own and others' roles during interaction, and (3) how even very uncertain and undefined situations can evolve into a stable social order through situational learning.

With this paper, we intend to investigate an idea suggested by Smith-Lovin [8]: that mixed emotions result when people occupy multiple identities within the same situation and so are processing events in more than one cognitive framing. Smith-Lovin suggested this idea before BayesACT was developed, but the new treatment of uncertainty in the Bayesian treatment has clear implications for this insight. BayesACT allows us to formalize the conditions under which mixed emotions might occur. Through modeling, we will generate predictions about mixed emotions that result from multiple identity situations and from situations where identity meanings remain uncertain/dispersed. This work will generate theoretically based hypotheses that could be tested empirically with vignettes or in emotion measurements in actual interactions.

We plan to use a suite of newly-released R packages for ACT modeling: *actdata* [1], a public repository of standardized ACT data sets; *inteRact* [5], an R implementation of the classic, point-estimate version of the theory; and *bayesactR* [2], an R-based wrapper that significantly streamlines the process of running BayesACT simulations. These packages are new and as-of-yet relatively untested resources for ACT research, and through this work we hope to demonstrate how they may be used to further our understanding of identity processes in interaction.

## References

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