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Intrinsic dynamics of state self-esteem: The role of self-concept clarity☆

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ABSTRACT

Change in self-esteem is commonly viewed as random variation or a response to external influence. The present research investigated whether changes in self-esteem are produced instead by the structure of the self-system and thus reflect intrinsic as opposed to extrinsic dynamics. In this view, temporal variability in self-esteem reflects the landscape of attractors and repellers in a person's self-concept. Using a computer mouse procedure (Vallacher, Van Geert, & Nowak, 2015), we recorded 3-min time series of participants' self-esteem and examined whether the temporal patterns stabilized on evaluative states (attractors) or converged on but departed from such states (repellers). We hypothesized and found that participants with higher self-concept clarity (signaling a well-integrated system) had positive self-esteem attractors and weaker self-esteem repellers, whereas those with lower clarity demonstrated less positive self-esteem attractors and stronger self-esteem repellers. Discussion centers on individual variation in self-esteem dynamics and the interplay of exogenous and endogenous sources of self-esteem.

1. Introduction

How a person evaluates him or herself has a pervasive influence on his or her feelings and overt actions in a variety of social contexts. Because of this connection, considerable research has examined the sources of changes in self-esteem. For the most part, this line of investigation has focused on the role of external factors, from the fulfillment of social and other needs (Baumeister & Leary, 1995; Heppner et al., 2008) to conformity with societal and cultural norms (Markus & Kitayama, 1991). Although the influence of external factors cannot be denied, this explanatory mode overlooks the potential role of endogenous factors in promoting temporal variability in self-esteem. The aim of the present study is to investigate this unexplored source of variation in self-esteem. In line with principles of dynamical systems, we investigated the extent changes in self-esteem reflect internal (intrinsic) dynamics of the self-system that can be observed on a short (moment-to-moment) timescale. In this view, a person's temporal pattern of self-esteem may say more about the structure of the self-concept than about the forces and circumstances he or she experiences.

That self-esteem shows temporal variability in the absence of external influence should come as no surprise. William James (1890) coined "stream of consciousness" to capture the spontaneous changes in mental content that occur moment-to-moment, noting that although such changes might seem random, they are constrained by the structure of the mental system—in the same way water in a stream is constrained by the stream's banks. Simple intuition makes clear that thoughts and feelings unfold spontaneously, often when we are least attentive to external forces. "Mind wandering" is a well-documented phenomenon, for example, that is difficult to suppress when there are lapses in attention to external circumstances (Smallwood & Schooler, 2006). If the flow of thought reflects the structure of the mental system, then it is reasonable to suggest that the internally generated flow of self-evaluative thought reflects the structure of one's self-concept (Vallacher & Nowak, 2007).

This possibility, however, counters the prevalent view that self-esteem represents a homeostatic mean of self-esteem with random variance that can be treated as noise (Rosenberg, 1986; Wylie, 1974). In such accounts, self-esteem change in the absence of external influence is unstructured, uncorrelated, and stationary. In recent years, however, cracks have accumulated in the classical model of self-esteem. Contrary to predictions of the classical model, Savin-Williams and Demo (1983) observed that self-esteem time series were neither predictable nor random. Building on this work, Delignières, Fortes, and Ninot (2004) found long-range dependence in self-esteem time series in the form of autocorrelated, fractal patterns. These findings of temporal structure, autocorrelation, and nonstationarity in self-esteem have been replicated (de Ruiter, Den Hartigh, Cox, Van Geert, & Kunnen, 2014; Wong, Vallacher, & Nowak, 2014).

If self-esteem time series possess temporal structure, then it's possible to use dynamical systems theory. Dynamical systems theory accounts for the system's behavior whose time evolution is structured and rule-based. A dynamical system may have many possible states, but over time the system will evolve towards a subset of these states. With respect to the self-system, the sequence of states characterizing such evolution can be assessed along a dimension ranging from very

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negative to very positive. If self-esteem acts like a structured dynamical system, then we would expect that across time, the self-esteem trajectory will "prefer" certain states over others, and exhibit those frequently. These "preferred" states are called attractors.

The concept of an attractor sounds similar to that of a mean, the common statistical measure of location, but is quite different. An attractor is a stable value towards which the time series gravitates and is pulled from other values. In contrast, the mean presents a single static central tendency. If a time series' temporal structure were destroyed by shuffling its order, the mean would remain the same, but the attractors would not because they reflect the sequential change information in the time series. It is possible for a system to have multiple attractors, so that the system can evolve towards very different values. In this case, calculating the mean of a time series would produce a rarely experienced value and misleading characterization of the system.

A repeller is another dynamical pattern found in time series. Unlike attractors, repellers are unstable values the system avoids. Repellers naturally and spontaneously co-occur with attractors as complementary pairs, and always appear together when there are multiple fixed points (Kelso & Engstrøm, 2006, pp. 162–164). Repellers occur between attractors because they define the boundaries of attractive basins (Abraham & Shaw, 1992), and separate different attractive behaviors (Butner, Gagnon, Geuss, Lessard, & Story, 2014). From a statistical point of view, repeller fixed points are areas of low probability density, just as conversely, attractors are areas of high probability density. Repellers are areas of low probability because although the system can settle on them (i.e., change is zero), they are precarious and thus do not occur frequently or for long duration (Grasman, van der Maas, & Wagenmakers, 2009).

Attractors and repellers generate a host of important novel questions, such as how self-esteem changes as a function of its current state, which self-esteem states pull or repulse others, how magnetic or repulsive are these states, and whether attractor and repeller dynamics signify individual differences in self-concept properties.

Regarding the last question, we hypothesize that self-esteem dynamics reflect individual differences in self-concept clarity (Campbell, 1990). The rationale is straightforward: having a clear (integrated, consistent, certain) sense of self is necessary to maintain stability across time and circumstances. Research has confirmed that low clarity people have tumultuous affective and behavioral experiences because their self-views shift daily (Campbell, 1990; Kernis, Paradise, Whitaker, Wheatman, & Goldman, 2000). In the traditional view, such shifts represent heightened sensitivity to events that might have little or no impact on the self-esteem of people with higher clarity. In terms of dynamical patterns, however, low clarity may be associated with weak attractors and strong repeller tendencies, such that the self-system cannot settle on specific states of self-esteem that provide stable frames of reference for thought, feeling, and action. Because attractors and repellers reflect intrinsic dynamics, the instability of low clarity people should be observed even in the absence of external influence.

In sum, we hypothesize that self-esteem time series are structured rather than indicative of random variation, and that the temporal structure is governed by attractor and repeller dynamics. We hypothesize, moreover, that individual differences in self-concept clarity are reflected in the pattern of attractor and repeller dynamics. People with higher clarity are expected to converge on higher stable values of self-esteem (attractors) as they reflect on themselves, whereas those with lower clarity are expected to have stronger repeller tendencies, with their thoughts unable to settle on a set of self-esteem states. We offer no predictions whether clarity will relate to number of attractors (i.e., one or multiple) because there is no evidence that clarity is related to the number of self-views. Variables related to self-concept pluralism (e.g., self-complexity, self-compartmentalization) are unrelated to self-concept clarity (Campbell, Assanand, & Di Paula, 2003).

2. Method

2.1. Participants

Participants were recruited from undergraduate courses ($M = 18.9$, $SD = 2.0$, age range = 18–39, $N = 77$ women and 60 men) and compensated with course credit. One participant was excluded from analyses for not performing the self-esteem task.[1]

2.2. Procedure

2.2.1. Measures

2.2.1.1. Trait self-esteem. Self-esteem was assessed with the reliable and valid Rosenberg (1965) Self-Esteem scale (Gray-Little, Williams, & Hancock, 1997).

2.2.1.2. Trait self-concept clarity. Self-concept clarity was assessed with the Self-Concept Clarity scale, which measures the extent self-beliefs are clear, consistent, and stable. It is reliable and valid (Campbell et al., 1996).

2.2.1.3. State self-esteem time series from Mouse Paradigm. After completing the questionnaires, participants described themselves into a recording microphone for 3 min in a private workspace. The instructions encouraged participants to discuss whatever came to mind, and suggested topics like personality, relationships, and goals. Participants followed the prompt's instructions, and typically spoke about their personality traits, preferences, goals (e.g., school, work), and social life (e.g., family, friends, and relationships). The audio narratives were typically several hundred words long. For example, the following is an excerpt from one participant's narrative:

"*I'm currently in a relationship right now, and we've been together for about a year and a half. And it's going ok, it's going ok. You know when we first got into a relationship I never thought that it would last this long but, you know, it's a good thing that it has. I've really learned from it and it's a real, it's an experience I guess. My goals? I have a real problem setting long term goals. I tend to forget them, but I like setting short term goals.*"

Participants used the Mouse Paradigm (MP, Vallacher et al., 2015) to evaluate their self-narratives as they listened to them played back for 3 min. The MP is a computer program that presents a Likert-scale for recording moment-to-moment state evaluation, and has measured social judgment (Vallacher, Nowak, & Kaufman, 1994) and state self-esteem (Vallacher, Nowak, Froehlich, & Rockloff, 2002). The MP displays eight regions representing intensity of negative and positive evaluation (Fig. 1) and records evaluation once per second, for 181 measurements. The X-axis represents evaluation, the Y-axis is meaningless. The MP procedure in the present context is consistent with notions of state self-esteem (see also Brown, Dutton, & Cook, 2001) because it indexes positive and negative self-feelings moment-to-moment across a wide range of specific self-contents. Fig. 2 displays one participant's self-esteem time series.

2.3. Data preparation: creating self-esteem change time series

Self-esteem fixed-point analysis was performed with equations of change (Butner et al., 2014). The goal is to model the relationship between self-esteem level and its change. Self-esteem change is obtained by taking the difference between adjacent time points of a time series. For example, differencing the time series 4, 5, 3, 6 yields its change time series 1, −2, 3. The self-esteem time series was trimmed of its

[1] This sample was utilized in another article (Wong et al., 2014), in which the correlational structure of self-esteem time series using fractal analyses was investigated. The present study's results involving self-esteem attractor measures are statistically independent of these prior published effects.