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It's About Time: A Special Section on Affect Dynamics

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Abstract

The study of affect dynamics aims to discover the patterns and regularities with which emotions and affective experiences and components change across time, the underlying mechanisms involved, and their potential relevance for healthy psychological functioning. The intention of this special section is to serve as a mini handbook covering the contemporary state of research into affect dynamics. Contributions address theoretical viewpoints on the origins and functions of emotional change, methodological and modeling approaches, biological and social perspectives on affect dynamics, and the downstream consequences for well-being and psychopathology.

Keywords

affect dynamics, emotion dynamics, emotional change, flexibility

One would be hard-pressed to find someone, be it an affective scientist or layperson, who would disagree with the idea that the fact that emotions change is fundamental to their nature. Emotions or affect,[1] more than several other human characteristics such as personality, values, or attitudes, are considered to be fleeting phenomena rather than stable attributes of an individual that come and go with the ebb and flow of daily life. Indeed, one of the primary functions of emotions, to alert us of personally relevant changes in our environment and to motivate us to cope with these changes, attests of the fundamentally dynamic nature of emotions and their experiential, cognitive, physiological, and behavioral ingredients.

The dynamic nature of emotions features prominently in theoretical accounts of emotions. In a recent issue of this journal, four of the most dominant theoretical perspectives on the nature and causes of emotion were presented, and each explicitly puts forward dynamical processes as crucial to understanding emotions. The conceptual act theory of emotions (Barrett, 2014) considers that people experience emotions as the result of categorizing physical *changes* (internal changes or sensory changes from the world) using emotion conceptual knowledge. The sociodynamic model of emotions (Mesquita & Boiger, 2014) considers emotions as *dynamic* systems that emerge from the continuous social interactions and relationships in which they take place. Appraisal theories of emotions (Moors, 2014) hold that emotions consist of or follow from *changes* in appraisals. Evolutionary accounts of distinct emotions (Tracy, 2014) consider emotions as multicomponential, *unfolding processes* shaped by natural selection to adjust to specific recurring environmental threats or opportunities.

In contrast to the prominence of dynamics in the lay and theoretical view on emotion, emotion research and its associated disciplines have predominantly studied their object from a rather static perspective. In experimental studies, emotions were often studied as states that simply switch on and back off (preferably before the next trial); correlational studies most often focused on emotion traits that imply a stable tendency to experience certain emotions or take but a snapshot of one's emotional state. While such research has taught us a great deal about emotions, it nevertheless neglects the inherent time-dynamic nature of emotion and affective experiences: that they continuously evolve across time in different forms and shapes, can linger on from one moment to the next, vary in duration, and so on. These key aspects are taken as the explicit focus in research on affect or emotion dynamics.

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The Study of Affect or Emotion Dynamics

During the past decades, several prominent theorists have called for a paradigm shift in the study of emotions that moves the spotlight from the study of emotions as static entities to emotions as dynamic phenomena (Larsen, Augustine, & Prizmic, 2009; Lewis, 2005; Scherer, 2000). In 1998, Davidson (1998) coined the term affective chronometry that describes the parameters of the temporal dynamics of emotional responding and emphasized the need for its study. The field of affect or emotion dynamics is concerned with this study of emotional change, more precisely with the trajectories, patterns, and regularities with which emotions, or one or more of their subcomponents (such as experiential, physiological, or behavioral components) fluctuate across time, their underlying processes, and downstream consequences. This involves a broad range of phenomena, ranging from short-term emotional fluctuations to longer term mood swings, involving one single emotion (component) or the interrelations or concordance across multiple emotions (or components) across time. The study of affect dynamics aims to describe the principles and regularities behind these changes, uncover the processes driving them, and understand the implications they bear for psychological functioning.

Although in many ways the study of affect dynamics involves and overlaps with many other areas and questions being pursued in affective science, its common denominator is the explicit recognition that a thorough understanding of the nature, causes, and consequences of emotions entails explicitly taking into account their dynamical nature. The individual contributions of this special section deliver testimony of this viewpoint.

This Special Section

The aim of bringing together the contributions in this special section is to cover the state of the art of current thinking and findings originating from affect dynamics research. It includes contributions on the theoretical foundations on how affect dynamics should be understood, the methodological and modeling aspects involved in studying affect dynamics, their biological and social grounding, and its relevance for psychological well-being and psychopathology. As such, the implicit intention is to create a mini handbook of contemporary research on affect dynamics, disguised as a special section. In what follows I provide a short overview of the separate contributions to this special section.

Theoretical Foundations

First, two contributions discuss theoretical foundations for understanding the origins and nature of affect dynamics. Starting from his control process view, Carver (2015) sets off from the notion that affect follows from the rate of progress we make towards achieving our goals. Positive affect results from a rate that is higher than desired, negative affect from a rate that is lower than desired, with further distinctions between affective states depending on whether approach or avoidance goals are involved. From this perspective, he elucidates clearly how affect dynamics follow from changes in perceived rates of goal progress, changes in desired rates of goal progress, or the prioritization or abandonment of goals. His theoretical analysis describes an encompassing system for affect and goal-oriented behavior that provides many testable predictions about the origins of affect dynamics, many of which affect dynamics research would be and hopefully will be ideally equipped to evaluate.

An integration of affect and regulatory feedback is also a central notion in the contribution by Hollenstein (2015). He argues that the existence of positive and negative feedback loops in the affective system simultaneously give rise to attractor states the system gravitates towards and to flexibility in responding to internal or external changes. He describes how this results in affect dynamics playing out on different time scales, from the micro timescale occurring from moment to moment, to the meso timescale where the operating characteristics of the system can change due to changing environmental demands (which could be linked up to changes in goals or prioritization in the view presented by Carver, 2015). A central notion in his perspective is that of flexibility, which is proposed to characterize healthy emotional functioning.

Mathematical Modeling of Affect Dynamics

Technological advances have given rise to an explosion of possibilities to collect intensive longitudinal data, obtained in the lab or real life. It goes without saying that such data potentially provide very fertile ground for affect dynamics research. Yet, without suitable and accessible tools to make sense of the complexity of such data, theoretical predictions will remain in want of empirical verification. Without a doubt, the field of affect dynamics—but equally (psychological) science as a whole—will rely increasingly on sophisticated mathematical and statistical modeling to deal with the complexity of the data that is becoming available through technological progress. Hamaker, Ceulemans, Grasman, and Tuerlinckx (2015) provide an up-to-date overview of the statistical and mathematical modeling approaches that have or are being developed to analyze intensive longitudinal data and that are relevant to the questions being pursued in the affective sciences. They start from a number of central distinctions or choices that researchers in affect dynamics encounter when designing their studies or deciding on the appropriate way to analyze their data. Based on these distinctions, they provide an overview of the available options that have been developed so far to analyze intensive longitudinal data to answer the most pressing questions about how, why, and with what consequences emotions change across time. Their contribution provides an invaluable source for researchers in affect dynamics struggling or wanting to learn more on how to approach their data.

Emotion Dynamics and the Brain

Next, two contributions delve into the psychological and associated neural determinants of affect dynamics. Both contributions

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rely on established theorizing and findings on the processes playing a role in emotion, ranging from appraisals over emotion regulation to personality. On the basis of this, they synthesize emerging new insights detailing how these aspects and their neural correlates are specifically involved in dynamical aspects of emotions. Waugh, Shing, and Avery (2015) walk us through the temporal unfolding of an emotional episode and show us the neural scenery along the way. Reviewing findings from research involving EEG, ERP, and fMRI techniques, they discuss the psychological and neural mechanisms identified so far involved in three specific aspects of the timing of an emotional response: its time of onset, duration, and resurgence. Verduyn, Delaveau, Rotgé, Fossati, and Van Mechelen (2015) zoom in on one of these aspects—duration. In contrast to most research that has focused on understanding what causes the start of an emotion, essentially they try to understand what contributes to a faster or slower ending of emotional episodes, distinguishing between characteristics of the emotional event, of the emotion itself, and of the person experiencing the emotion.

Social Dynamics of Emotions

Emotions are not experienced in a social vacuum, but by and large take place between people. Even when alone, our emotions often originate from interpersonal tensions, hopes, and regrets. It is therefore crucial to understand how emotions unfold not just within but also between people and how their dynamics are affected by social factors and processes. Butler (2015) starts from this premise and guides us through research that addresses how the emotional worlds of different individuals collide, either by responding to shared circumstances, by responding to each other's emotions, or by regulating each other's emotions, and by delineating the dynamic patterns that result from this. The quintessential example of how feelings originate from the bond between people is probably that of intimate or romantic relationships, a topic next addressed by Schoebi and Randall (2015). They show how emotions arise from close relationships between individuals, identifying the different processes through which this takes place, and, in turn how the resulting emotional dynamical patterns between people affect the relationship between them. Combined, these two contributions convincingly demonstrate how emotions should be studied as interpersonal and not just intrapersonal phenomena.

The social basis of emotion is also evident in the fact that emotions can be experienced because people identify themselves with a group. This is intriguing because it reflects how emotions may not only arise from events that impinge on mere personal concerns, but also to the concerns of the groups we feel we belong to. In their contribution, E. Smith and Mackie (2015) shed light on this social aspect of emotions, and discuss the particular causes and consequences of emotion dynamics that originate from the fact that people's identities and concerns are shaped by the similarities or dissimilarities they share with others.

Emotion Dynamics and Psychological Well-Being

Aside from the previous intrinsic reasons why I would argue it is fascinating and important to study the ways with which people's emotions change and fluctuate across time, affect dynamics also bears significant relevance to one of the most coveted aspects of the human condition: healthy mental well-being. It does so in two ways. First, patterns of emotion dynamics can be indicative or diagnostic for healthy or unhealthy psychological functioning or for several types of psychopathology. This is mostly the focus of the contribution by Trull, Lane, Koval, and Ebner-Priemer (2015). They review research on a number of specific patterns of emotion dynamics that have been found to be associated with particular types of psychopathology. In essence, by doing so they aim to identify some of the key emotion dynamical signatures of psychological maladjustment. Second, evidence is emerging that emotion dynamical patterns may not only merely reflect phenomenological surface characteristics of psychological well-being, but rather that the ways with which emotions fluctuate across time may contribute or lie at the base of human mental flourishing and suffering. Wichers, Wigman, and Myin-Germeys (2015) explore avenues how this can take shape. Starting from a dynamics systems perspective, they elucidate how short-term emotion dynamical processes may build up over time to create risk or resilience for the development, maintenance, or recovery of mood disorders. While this research is still largely in its infancy and many hypotheses remain untested, it nevertheless attests to the large potential relevance affect dynamics research can have for improving the alarming mental health status of the world's population (K. Smith, 2014). Together, both contributions highlight the relevance of affect dynamics research for well-being, and its direct relevance for clinical practice.

Conclusions

Finally, almost two decades after introducing the term affective chronometry, Davidson (2015) in his commentary takes stock and provides the field with directions for moving forward. He formulates a number of questions he considers fundamental for understanding the time course of emotions and their role in well-being but that are still in wait of answers. Many of his questions and suggestions motivate the need for integration of different approaches or subdisciplines to the study of affect dynamics. They call for studying for instance how more objective (physiological) emotion components exactly relate to subjective (experienced) components, how different components that act on different time scales (and are measured with different methods) interrelate, which dynamical parameters encountered in affect dynamics research are most relevant for well-being, and how they could be targeted by intervention. To obtain a full picture of the temporal dynamics of emotion and their role for psychological functioning, we need to establish connections between the different facets of affect dynamics by using different methods, connecting different time scales, and

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answer both fundamental and applied questions. Let us hope that this special section can help to play a role in achieving these aims.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Note

1 In my experience, the distinction between the terms emotion and affect is interpreted in many different ways by the people studying them. For reasons of ease, these terms will be used interchangeably throughout this text. This implies that this special section concerns emotion dynamics as much as it concerns affect dynamics.

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