

# Chapter 1

## Introduction

Imagine that you are cycling to work during traffic hours. Suddenly, somebody behind you crashes into the back of your bike, and swears at you for being a loser. One possible reaction, which is likely to neutralize the situation, is go to the right, and let your fellow biker pass. Alternatively, however, you could respond by staying in the middle of the bike lane, keeping the biker from overtaking you. In the latter case, you might soon find yourself embroiled in an altercation. How would you respond?

The answer that came to mind reveals something about the anger that may be aroused in a potentially volatile situation. Anger is a basic human emotion that arises from the obstruction of one's goals (Berkowitz, 1990), and typically involves a sense of being offended or intentionally hurt by another person (Frijda, 1986; Ortony, Clore, & Collins, 1988). Anger is experienced by most people as a negative emotion. However, unlike other negative emotions like disgust or anxiety, anger is characterized by the motivational impulse to move toward instead of move away (Carver & Harmon-Jones, 2009). When you are in an angry state, you are likely to confront people who provoke you, rather than acquiesce or leave the situation.

Almost everyone becomes angry at least once in a while. However, some people are more prone to anger than others. It is therefore useful to distinguish between state anger and trait anger (Spielberger, 1988; Spielberger & Reheiser, 2009). State anger is an acute emotional-physiological reaction that ranges from mild irritation to intense fury or rage. Trait anger, on the other hand, refers to a stable personality dimension of anger proneness. People high in trait anger tend to experience anger more frequently, more intensely, and with longer duration than people low in trait anger (Deffenbacher, 1992; Spielberger, 1988; Wilkowski & Robinson, 2008).

Trait anger is associated with a number of negative outcomes. For instance, high trait anger is associated with aggressive driving behavior (Deffenbacher, Stephens, & Sullman, 2016), more conflicts at work (Booth, Ireland, Mann, Eslea, & Holyoak, 2016), and more aggression to relationship partners (Stith, Smith, Penn, Ward, & Tritt, 2004). It could be argued that the latter outcomes are primarily negative for the interaction partners of people with high trait anger. However, high trait anger is also associated with many psychological disorders (Fernandez & Johnson, 2015) and high blood pressure and cardiovascular disease (Suls, 2013). Thus, people with high trait anger themselves also appear to be adversely affected by their volatile temperament. Consequently, it seems important to learn more about the psychology of trait anger, and about processes that might prevent people with high trait anger from becoming angry or aggressive.

### **Overview of Things to Come**

This dissertation consists of seven chapters. Nevertheless, the chapters are tied together by a common theme, which is the question how motivational processes influence the pathway whereby trait anger becomes translated into state anger and aggression. It should be noted that each chapter has been written as a separate paper that can be read on its own. Indeed, each chapter has either been already published or else has been submitted for publication as an independent article. The chapters therefore inevitably contain some overlap.

**Chapter 2** starts with a brief review of the psychology of trait anger. Individual differences in how easily people become angry have been observed at least since the ancient Greeks (Merenda, 1987; Stelmack & Stalikas, 1991). The modern notion of trait anger, however, originates from Charles Spielberger and associates, who introduced the distinction between trait anger and state anger (Spielberger, 1988; Spielberger & Reheiser, 2009), and pioneered the development of self-report measures of trait anger. Chapter 2 discusses research supporting the validity of self-report measures of trait anger, which predict angry feelings and aggression in everyday life, as well as in controlled laboratory settings.

Recent research has furthered understanding of trait anger by illuminating the underlying cognitive and motivational processes. Cognitive research shows that trait anger is linked to chronic tendencies to attend to hostile aspects of the situation, attribute hostile intentions to others, and reduced effortful control over hostile thoughts and feelings. Motivational research has shown that trait anger is linked to chronic increased approach motivation, or the “drive to move toward”, especially in threatening situations. This motivational approach to trait anger is central to the main part of this dissertation, which focuses on the question of how motivational aspects influence people’s anger and aggression.

**Chapters 3-7** are empirical chapters that investigate the motivational dynamics that are associated with trait anger and its relations with state anger and aggression. Overall, these experiments tested 1154 participants in a variety of experimental paradigms, ranging from moving a joystick to faces on a computer screen to visualizing an anger-relevant situation. Moreover, the experiments examined several different operationalizations of motivational states, including seating posture, arm movements, and ambient lighting, and different kinds of responses, including response latencies, self-reported feelings, behavioral measures like inserting pins in a voodoo doll, and physiological responses like hormonal changes. The empirical data in these chapters will be made publicly available through the Open Science Framework ([www.osf.io](http://www.osf.io)) after the relevant chapter has been accepted for publication in a peer-reviewed scientific journal.

Despite their methodological diversity, the five empirical chapters are united theoretically in that they each explore some of the implications of a new way of thinking about trait anger. Traditionally, personality dispositions like trait anger have been considered as general tendencies to display the same kind of behavior across different situations. However, according to a situated conception of personality (Mischel & Shoda, 2010, p. 154; see also Mischel & Shoda, 1995) behaviors related to a certain personality are not necessarily consistent across situations, but rather are “distinctive but stable patterns of if... then... situation-behavior relations that form contextualized, psychologically meaningful personality signatures (e.g., she does *A* when *X*, but *B* when *Y*)”. Trait anger thus represents a situated motivational trait, that is, as a disposition that manifests itself primarily in contexts that promote approach motivation.

**Chapter 3** tests the validity of this situated conception of trait anger by examining the readiness by which people varying in trait anger make approach and avoidance movements in response to faces with different emotional expressions. Participants’ trait anger was measured with Spielberger’s Trait Anger Scale (TAS; Spielberger, 1988;



Spielberger & Reheiser, 2009). In addition, participants completed an approach-avoidance task, in which they made approach or avoidance movements with a joystick to categorize the expressions of faces that were presented on a computer screen. The faces had an angry, or happy expression, and a direct or averted eye gaze. It has been well-documented in prior research that people are faster in making approach (rather than avoidance) movements to happy faces, but faster in making avoidance (rather than approach) movements to angry. Given that trait anger is associated with increased chronic approach motivation, Chapter 3 tests whether higher trait anger predicted faster approach instead of avoidance movements towards angry faces. Moreover, it examines whether this approach bias towards threat was only present for angry faces with a direct eye gaze, i.e., stimuli that pose a specific social threat, in contrast to angry faces with an averted gaze or happy faces, given that people high on trait anger may only display more approach motivation in anger-relevant-situations.

**Chapter 4** examines whether manipulating basic motivational states can alter the association between trait anger and state anger/aggression. If increases in approach motivation are the causal mechanism that leads increased trait-anger to be associated with more anger and aggression, then momentarily induced motivational states can be expected to moderate the association between trait anger and state anger/aggression. This hypothesis is tested in three experiments, in which participants with varying levels of trait anger imagined or experienced a potentially anger-provoking situation. Next, participants' anger or aggression was measured while their motivational state was manipulated. The motivational manipulation consisted of arm movements or body postures that are associated with motivational states. Pulling and leaning forward are associated with approach motivation, whereas pushing and leaning backward are associated with avoidance motivation. The experiments in Chapter 4 test whether avoidance-related states attenuate the positive relation between trait anger and state anger/aggression compared to approach-related states.

**Chapter 5** addresses hormonal influences on anger and aggression. Besides personality dispositions like trait anger, hormones may contribute to increased levels of aggression, as well as increased levels of approach motivation. Specifically, people with a combination of high testosterone-low cortisol are more prone to become aggressive (Mehta & Josephs, 2010; Terburg, Morgan, & van Honk, 2009), often explained by their increased levels of approach motivational attention and behavior in response to threat. Chapter 5 considers whether motivation-related body postures – manipulated as in Chapter 4 – can moderate the hormone-aggression link.

**Chapter 6** examines if the motivational principles examined in the previous chapters can be incorporated in anger-management training. If avoidance motivation indeed is able to attenuate anger and aggression in people with anger management problems, repeatedly linking avoidance movements to angry faces may reduce people's increased feelings of anger and aggression. Chapter 6 reports two experiments that test whether an avoidance (compared to an approach) motivation training towards threatening stimuli lowers anger and aggressive impulses in people with relatively high levels of trait anger.

**Chapter 7** investigates whether basic motivational states towards approach and avoidance can be manipulated via ambient lighting cues. Because humans are diurnal animals, well-lit environments are likely to elicit more approach motivation than dark environments. Building on this notion, dark environments may lower approach-oriented emotions like anger, especially among people who have higher levels of trait anger. Chapter 7 investigates whether ambient lighting cues may influence people's motivational orientation, and its subsequent influence on the relation between trait anger and state anger.

Finally, **Chapter 8** considers the broader theoretical implications of a situated approach for the scientific understanding of how people regulate anger and other emotions. This chapter argues that traditional theories have depicted emotion regulation as a mental process that unfolds pretty much entirely inside people's heads. A major shortcoming of such mentalistic models is that they fail to consider the emergent qualities of emotion regulation that arise from people's dynamic interactions with the environment. Chapter 8 goes on to outline an alternative way of thinking about emotion regulation, which is inspired by theories of situated cognition (e.g., Barsalou, 2007; Smith & Semin, 2004, 2007).

In this situated cognition approach, emotion regulation arises from the dynamic interplay between the person and affordances of the situation. Affordances can be defined as the possibilities for the kind of actions that people want to pursue (Gibson, 1979). One such affordance is the physical body. Emotions are fundamentally embodied, such that perceiving and thinking about emotion involve perceptual, somato-visceral, and motoric re-experiencing of the relevant emotion (Niedenthal, 2007). Consequently, affordances of the body are of vital significance in supporting emotion-regulatory activities. In this way, the last chapter explains how people rely on their immediate sensory-motor interactions with the environment (e.g., motivation related postures, movements or ambient lighting ) to regulate their actions and emotions (anger and aggression).

In sum, the upcoming chapters of this dissertation each highlight a different aspect of trait anger as a situated personality disposition. The chapters cut across different scientific sub-disciplines, including social and personality psychology, cognitive science, psychophysiology, clinical psychology, and environmental psychology. Nevertheless, the chapters jointly investigate how motivational processes underlying anger influence people's anger and aggression. All in all, this dissertation offers a nuanced view of the way in which our impulses to become angry or aggressive evolve and subside dynamically.



