Emotion, Consciousness, and Attention

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Abstract

Emotion is a specific type of conscious experience. Like all conscious experiences, it provides us with information about how our self is affected by our activities and the objects with which we interact. Unlike other types of conscious experience, it helps preserve the integrity of our self by guiding us toward actions that restore equilibrium in response to unexpected or unusual events. Although there is no single universally accepted theory of emotion, dominant theories agree that emotion is a complex process involving the interaction of several components, which can be grouped into two main categories: emotion-elicitation mechanisms and emotional responses. Emotion-elicitation mechanisms include core affect, appraisal processes, and direct elicitation mechanisms. Emotional responses include physiological responses, behavioral expressions, action tendencies, and subjective experiences.

Emotion affects basic cognitive processes like attention and perception. Emotional information is prioritized, capturing our attention more quickly and making it harder to shift our focus away. Research shows that emotional attention mechanisms are flexible and can be modulated by social identity, personality traits, and affective context. Likewise, emotion can change how physical attributes like steepness, distance, or object significance are perceived.

1. Emotion is a conscious experience

What we call *emotion* is a type of conscious experience. Generally speaking, every type of conscious experience—be it emotion, sensation, perception, thought, memory, language, or something else—provides us with a specific kind of information: a sense of self and how the self is affected by our own (physical and mental) activities (Marchetti, 2022). Moving, perceiving, feeling emotions, thinking, remembering, imagining, speaking, and so on are all ways we experience our self and understand how it is affected differently by the ways we act.

The sense of self is characterized by some fundamental features, the main ones being the following (Marchetti, 2024): (i) The sense of being an entity differentiated from other entities.

This sense provides us with a sense of mineness or ownership; (ii) The point of view or perspective from which any content is experienced; (iii) The feeling of continuity, that is, the sense that our experience flows uninterruptedly; and (iv) The feeling of unity or a "single voice" (Damasio, 2010), that is, the sense of being an organism composed of multiple parts interconnected in a unified way.

Each of the main features of the self is shaped by one or more of the five dimensions of conscious experience—qualitative, quantitative, hedonic, temporal and spatial (Marchetti, 2022, 2024). The sense of being an entity differentiated from other entities is primarily made possible by the hedonic dimension; perspective, by the spatial dimension; the feeling of continuity, by the temporal dimension; and the feeling of unity, by the concurrent support of the qualitative, quantitative, temporal, and spatial dimensions.

According to the theory of consciousness I have put forward (Marchetti, 2010, 2018, 2022), the most important—though not the sole—process responsible for the production of conscious experience is attention. What we consciously experience is primarily determined by our attentional activity: where we focus it (internally or externally), how long we focus it, how we focus it (narrowly or widely), at what level of intensity, and so on. Attention is deployed periodically; the attentional activity performed in each period, modulates the energy level of the area of the neural organ of attention that supports the specific attentional activity. It is precisely this modulation that generates the phenomenal aspect of consciousness.

Each dimension of the phenomenal aspect of consciousness can be explained by a specific aspect of the modulation of the energy level of the organ of attention: (i) The qualitative dimension is defined by the specific area of the organ of attention that underpins and is consequently modulated by attentional activity. (ii) The quantitative dimension is defined by the amplitude of the modulation. (iii) The hedonic dimension is defined by the direction of the modulation, that is, whether the energy level of the area of the organ of attention moves toward or away from the set-point at which the energy level of the area is set. Set-points define the optimal reference energy level for the functioning of the specific area of the organ of attention that underpins the attentional activity being performed. Set-points can—up to a certain limit—be adjusted by the agent according to plans, goals, motivations, etc. Consequently, a stimulus

such as a non-painful thermal one can be perceived either as pleasant or unpleasant according to the internal thermal state of the agent (on the concept of set-point, see Cabanac, 1971, 2006; Cabanac and Russek, 2000). In this view, pleasant and unpleasant experiences occur when the energy level moves toward or away from the set-point, respectively. Neutral experiences—a state characterized by physiological normality and indifference toward the environment—occur when the energy level fluctuates within an acceptable range of the set-point. A similar explanation of the hedonic dimension in terms of deviations to and from a set-point is also put forward by Solms (2019). (iv) The temporal dimension is determined by the periodic nature of the attentional activity—a nature that limits the duration of the modulation and, consequently, of any conscious experience. This limit is overcome primarily with the support of working memory. (v) The spatial dimension is determined by the egocentric spatial nature of attention.

The primary determinant of this modulation is the object of attention—that is, what attention focuses on: an external object, one's body, a memory, an idea, and so on. Once focused, each object modulates the energy level of the organ of attention in a specific way and consequently helps shape the self. It must be noted that, theoretically, attention can be deployed even if there is no object, as if it were in a "suspended" state, though usually we tend to focus on some object. In this sense, we can say that, most of the time, conscious experience provides information about its object and how it relates to us.

Another important factor in the modulation of the energy level of the organ of attention is the amount of energy supplied to it by the organism. Like any other organ of the organism, the functioning of the organ of attention depends on the energy it receives from the organism. To function properly, it requires a certain amount of energy, which can vary based on factors such as the individual's expectations, motivations, and the task he must perform. The energy supplied by the organism to the organ of attention also varies according to conditions such as the individual's physical and mental activity, energy reserves, general state of health, and intake of stimulants. This energy supply determines the individual's state of arousal (or wakefulness). Various states of arousal are possible, including conscious wakefulness, REM sleep, deep sleep, vegetative state, near-death experience (NDE), and coma (Laureys, 2005; Laureys et al., 2009).

Due to the specific attentional and energy mechanisms underlying conscious experience, the information provided by conscious experience differs from that provided by other systems (e.g., computers, artificial intelligence) in that its content—the message it delivers—coincides with its form (Marchetti, 2018). While the information provided by other systems can take various forms—in the sense that the same content can be encoded in different codes or languages—the information provided by conscious experience can only have one form: precisely the form we experience in and through consciousness. We know that we have pain and what pain is because we *feel* it; we know that what is occurring to us now is happening only within us, and not outside in the world, because we are *remembering* it; and so on. In other words, the content of the information provided by conscious experience is encoded in the form of conscious experience itself.

As we will see during our discussion on emotions, three elements among those considered so far are particularly relevant for understanding how emotions function: the hedonic dimension (pleasure-displeasure), arousal, and the object of attention.

We will begin our discussion by analyzing the differences between the conscious experience of emotion (or simply, *emotion* from now on) and other types of conscious experience. This will help us understand the specificity of the information provided by emotion. But before doing so, let me clarify two aspects of my statement about emotion as a conscious experience that might raise some controversy or disagreement: the qualification of emotion as a conscious phenomenon and the object of emotion. Moreover, a specification is needed to clarify why I have approached the topic of emotion by utilizing the phrase “what we call”.

1.1. Unconscious emotions

By qualifying emotion as a conscious phenomenon, I do not intend to deny that there may be cases in which emotions are not felt, nor do I deny that certain components of emotion (e.g., emotion-eliciting stimuli, autonomic changes, motor expressions) may go unnoticed. On the contrary, I simply mean to prioritize the conscious aspect over the unconscious one when scientifically addressing emotions. This is because conscious experience is the privileged form of

knowledge we have of them. After all, if we can talk about emotions and if emotions can be studied scientifically, it is only because we have some conscious experience of them or their effects. Without any conscious experience of emotions or their effects, we would neither know of their existence, nor would scientists know what they need to explain and investigate in the first place when dealing with emotions (Barrett, Mesquita et al., 2007).

The topic of the existence of unconscious emotions has not been without controversy. On the one hand, some scholars argue clearly that it does not make much sense to speak of unconscious emotions. For example, LeDoux (1994, p. 291) maintains: "Emotions are affectively charged, subjectively experienced states of awareness. Emotions, in other words, are conscious states. While nonconscious emotions do not exist, conscious emotional states are produced by unconscious processes." On the other hand, other scholars (Öhman et al., 2000; Berridge and Winkielman, 2003; Winkielman and Berridge, 2004; Prinz, 2005; Winkielman et al., 2005; Winkielman & Hofree, 2012), based on empirical evidence and conceptual considerations, argue that emotions are not always conscious. As Winkielman and Hofree (2012, p. 3366) specify, "The absence of consciousness can come in the form of (1) unawareness of the stimulus eliciting the emotion or (2) unawareness of the emotion itself, producing an emotion that is not subjectively felt." For example, Winkielman et al. (2005) showed that subliminally presented emotional faces can cause affective reactions that alter consumption behavior, without eliciting conscious feelings when the affective reactions are caused. In their experiments, the participants were first subliminally exposed to happy, neutral, or angry faces embedded in a cognitive task requiring them to classify a clearly visible neutral face as male or female. They were then asked to rate the pleasantness of a fruit beverage. The experiments showed that those who had been shown happy faces not only rated the pleasantness of the beverage higher than those shown angry or neutral faces, but also consumed larger amounts of the beverage than those shown angry or neutral faces. Importantly, the participants reported no differences in how they felt emotionally. Therefore, the participants' behavior indicated that emotions influenced their actions, even though the emotions were not consciously detected.

Some scholars have addressed this controversy by excluding conscious experience from their definition of emotion. Damasio (1999, 2010), for example, reserves the term *feeling* to describe

what others might call *conscious emotion*. For him, emotions are unconscious processes involving lower, more automatic parts of the brain (e.g., the brainstem, amygdala, and hypothalamus) and the body. Emotions become conscious as *feelings* when higher brain areas (such as the cerebral cortex) recognize and interpret the bodily changes caused by emotions. Likewise, for Prinz (2005, p. 9), "emotions are feelings when conscious, and they are not feelings when unconscious."

Apart from this terminological solution, a more promising way out of the controversy over the conscious nature of emotions can be derived from the notion of levels of processing (see, for example, Grandjean et al., 2008; Sander and Delplanque, 2021). In its essence, this notion holds that emotional information can be processed at varying depths or extents: information that is only superficially or minimally processed remains unconscious, while deeply or extensively processed information becomes conscious and can eventually be verbalized. If we adapt this notion to my theory of consciousness, we find that the controversy regarding the conscious nature of emotions is resolved. As we have seen, the most important process that determines whether information is consciously experienced is attention: information becomes conscious when, and to the extent that, it is processed by attention. All other conditions being equal, if attention fully processes information, information becomes conscious; if it only partially processes information, that is, below a certain threshold, information may remain partly unconscious; and if it does not process information, information remains unconscious. If we apply this adapted version of the notion of levels of processing—which we may term "levels of attentional processing"—to emotions, we can readily explain various cases of emotional unawareness or unconscious emotions.

Firstly, consider the case of complete emotional unawareness described by Prinz (2005). You are lying in bed when the sound of a window breaking in another room startles you. You Instantly assume it might be a burglar and concentrate intensely on the noise, trying to detect any further sounds. Although your body immediately reacts with a fear response, you don't consciously feel the fear *because your attention is fully absorbed* in listening for any signs of an intruder. After a moment of silence, you hear your cat scrambling around, and it dawns on you that she must have knocked something over. Only then do you notice that your heart is racing, your breathing is

strained, and your body is tense with fear. You were afraid all along, but you didn't realize it because your focus was entirely on listening for danger.

Secondly, consider the case of unawareness of the emotion demonstrated by Winkielman et al.'s (2005) experiments. The participants' failure to report any change in emotion, despite the fact that emotions do alter their behavior, can be accounted for by differences in the attentional processing involved in feeling an emotion versus registering, reflecting on, and reporting the felt emotion. In these cases, the participants would actually experience a certain emotion but would be unable to consciously reflect on and report it (Whiting, 2018).

Thirdly, the notion of levels of attentional processing can also readily accommodate evidence showing that individuals are not always aware of all autonomic changes (e.g., pupil dilation or electrodermal response), motor expressions, or action tendencies induced by an emotional stimulus, nor of the source that elicits the emotion (see, for example, Öhman and Soares, 1994; LeDoux, 1996; Moors, 2010; Morsella & Bargh, 2011). When these elements are not processed by attention, they remain unnoticed.

Additionally, it is worth noting that the notion of levels of processing, in general, can readily account for the differing ways and extent to which unconscious and conscious emotions influence an individual's behavior, particularly in terms of adaptive advantage, the capacity to cope with environmental challenges, and the facilitation of planning novel responses.

1.2. The object of emotion

The second aspect that might raise some controversy concerns the object of emotion. As we have seen, conscious experience in general usually provides information about its object. But do emotions always have an object? Do they always inform us about how a certain object affects our self?

The majority of scholars argue that emotions have an object (Sander, 2013). In this view, emotions are seen as an interface between the experiencing subject and the experienced object. According to Scherer and Moors (2019, p. 721): "Theorists generally agree that emotion should be viewed as an interface between an organism and its environment, constantly mediating

between changing events and social contexts on the one hand and the individual's responses and experience on the other."

However, some other scholars argue, on various grounds, that emotion is not always directed at a specific object (see, for example, Lamb, 1987; Damasio, 1999; Shargel, 2015). Examples often given of objectless emotions include euphoria, depression, and apathy, and what Damasio calls *background emotions*, such as well-being, and tension.

In my opinion, this controversy stems primarily from a terminological issue. Much depends on how the term "object" is defined. Defining "object" as something external to the experiencing subject leads to accepting the existence of objectless emotions, whereas including also sensations from within the subject (e.g., proprioceptive and interoceptive sensations) in the definition of "object" (as I do) leads to rejecting the existence of objectless emotions. Indeed, emotions such as euphoria, depression, and apathy, as well as background emotions like well-being and tension, are usually intransitively experienced and perceived with reference to oneself.

An additional source of confusion is how the term "emotion" is defined. Some authors prefer to categorize affective states that do not have an external object—such as euphoria, anxiety, well-being, and tension—as "moods" rather than "emotion", thus avoiding the problem of considering the existence of objectless emotions. In this regard, it is no coincidence that Damasio (1999) felt the need to create the category of "background emotion" in addition to the canonical categories of primary and secondary emotions: "I will talk about three levels of emotion—background, primary, and secondary. This is revolutionary enough for one day, given that background emotions are not part of the usual roster of emotions" (Damasio, 1999, p. 341).

Finally, it should be noted that the argument about the existence of objectless emotions can, at least in some cases, be rebutted on the grounds that emotions may sometimes appear objectless because their object is inexpressible, not properly formulable, or even unconscious.

1.3. The importance of language in experiencing emotions

As one may have noted, I have framed the discussion of emotion with the phrase "what we call." I did this purposefully not only to acknowledge a certain degree of linguistic or conceptual

ambiguity about the term “emotion” but, above all, to stress the importance of language in the experience of emotions.

Language helps us make sense of our conscious experiences in general. It enables us to recognize, distinguish, and label a specific instance of conscious experience as a “perception” rather than a “memory” or an “idea.” Undoubtedly, without language, such classifications would be impossible.

While language is typically (though not always) effective in helping us recognize and label certain types of conscious experiences—such as memories and dreams—there are cases where it is clearly insufficient. This is particularly true for emotions and other affective phenomena.

Sometimes, we may experience a vague sensation or an undefined state of mind that we have never felt before and cannot define. We might not know what to call it, whether it is an emotion, a feeling, a mood, or something else; and even if we are able to identify it, for example, as an emotion, we may still be uncertain about what specific type of emotion it is.

In other cases, we might be convinced that what we are feeling is, say, anger, only to realize later that we were mistaken: it was actually an emotion of jealousy or envy.

Cases like these clearly show that what we consider to be an emotion rather than a feeling, anger rather than jealousy (or even a dream rather than a memory), is so only because it results from a constructive process by which we interpret, conceptualize, categorize, and name a given event—one that has taken place in our mind and body—based on how our culture has taught us to interpret, conceptualize, and name it; on what we have learned from our past experiences in similar cases; and on the resources our language provides us.

That’s what I meant by framing the discussion of emotion with the phrase “what we call”: I intended to highlight and remind the reader that there is no “emotion” as such without our interpretative, conceptualizing, and labeling activity of events occurring within us.

The importance of this constructive process in emotion, driven by concept knowledge and supported by language, is particularly emphasized by psychological constructionist approaches, such as the Conceptual Act Theory (CAT) (Barrett, 2006; Lindquist and Barrett, 2008; Lindquist et al., 2015). According to Lindquist et al. (2015), language influences emotions not only after the fact but also during the perception and experience of the emotion itself, shaping the nature of

the emotion that is perceived or felt from the outset. This is because language "helps individuals to initially acquire and then use emotion concept knowledge to form situated conceptualizations of affect" (Lindquist et al., 2015, p. 5). As they specify, language likely plays a role in the acquisition and use of all category knowledge; however, this is particularly true for emotion because emotion concepts (e.g., anger, disgust, fear, etc.) "are embodied and abstract representations that form populations of conceptual information rather than concrete concepts grounded by physical types that form prototypes for emotion category knowledge. Words for emotion categories (e.g., *anger*, *disgust*, *fear*) thus serve as the *glue* or *essence place-holder* (…) that helps bind together otherwise disparate instances of a given emotion category" (Lindquist et al., 2015, p. 4).

Among the empirical works supporting their theory, Lindquist et al. (2015) cite experiments showing that: (i) impairing subjects' access to the meaning of emotion words impairs their ability to subsequently perceive emotions on faces (Lindquist et al., 2006, 2014; Gendron et al., 2012); (ii) subjects exposed to a "fear" label (vs. an "anger" or neutral label) before listening to unpleasant music are subsequently more likely to engage in behaviors characteristic of fear (i.e., risk aversion) than those exposed to an anger label or no emotion category label (Lindquist and Barrett, 2008); (iii) perceptions of emotion are not universal but depend on cultural and conceptual contexts (Gendron et al., 2014).

1.4. A comparison between emotion and other types of conscious experience

After clarifying the controversial points of my definition of emotion as a specific type of conscious experience, we can proceed to compare emotion with other types of conscious experience. This comparison will help us gain a general understanding of what makes the conscious experience of emotion distinctive. I will first address two types of conscious experiences that are not considered affective—perception and language—before examining some types of conscious experiences that are typically considered affective—feeling, mood and sentiment—as well as a type of conscious experience—motivation—that is usually regarded as closely related to, but distinct from, emotion. With regard to the comparison with perception,

for simplicity's sake, I will refer exclusively to the perception of the external environment and omit the perception of internal states.

One final note on my distinction between “affective” and “non-affective” experiences (or states). Even though I have used (and will continue to use in this work) this distinction in line with prevailing academic convention, I believe it is rather artificial and should not be taken as reflecting the nature of conscious experiences in general. In psychology, the term “affect” refers to feelings that are typically described as consisting of an integral blend of hedonic (pleasure–displeasure) and arousal values (Russell, 2003). Affect, which is believed to have evolved to help differentiate hostile from hospitable stimuli and to organize adaptive responses to them (Cacioppo et al., 2012), is considered central to phenomena such as emotions, moods, and sentiments (Russell, 2003; Scherer, 2005; Carver & Scheier, 2012), and is consequently used as an umbrella term to refer to this restricted set of phenomena (Bagozzi et al., 1999; Scherer, 2005; Naven, 2013). This is the sense in which I have used the labels “affective” and “non-affective.” However, it should be noted that the hedonic dimension characterizes and constitutes every conscious experience (Cabanac, 1996, 2002; Russell, 2003; Solms, 2019; Marchetti, 2022). Since the hedonic dimension ranges from one extreme (pleasure) to its opposite (displeasure), passing through a neutral point (indifference) (Cabanac, 2002; Russell, 2003), individuals may not notice it when its value is minimal or zero. As a result, it is often overlooked, leading to the classification of experiences with minimal or zero hedonic value as “non-affective”, which is technically incorrect.

1.4.1. Emotion versus perception

From a biological point of view, both perception (as noted, I refer specifically to the perception of the external environment) and emotion aid an individual’s survival and adaptation to their surroundings by guiding behavior and providing useful information for interacting with the environment. Essentially, perception achieves this by providing information about the features of physical objects that are most relevant to the possible actions that individuals can take to meet their needs and achieve their goals. In Gibson’s (1979) terms, this means that perception allows

the individual to detect *affordances*. Affordance is a technical term that indicates the possibilities for action (whether they manifest as opportunities or obstacles) that an object offers to the individual. For example, a chair affords sitting, a staircase affords climbing, and a solid surface affords walking.

In contrast, emotion fulfills its biological function by providing information necessary to restore "the individual to a state of equilibrium when unexpected or unusual events create disequilibrium" (Plutchik, 2001, p. 347), which, in terms of my theory of consciousness, is equivalent to saying that emotion serves the purpose of preserving the integrity of the self.

Psychologists generally agree that the type of information that emotion must provide to fulfill its function is complex and multifaceted, involving multiple aspects, dimensions and systems. For example, according to Frijda and Scherer (2009), emotion prompts the individual to (i) appraise objects in terms of their relevance and consequences for the individual's needs, plans, and values; (ii) prepare appropriate actions for dealing with or adapting to these objects, both mentally and physically; (iii) integrate the information acquired from these two steps into a central representation that allows for the monitoring and regulation of the potential responses; and (iv) often, though not always, categorize and communicate the emotional episode to other people. Likewise, Izard (2010, p. 367) describes emotion as follows:

"Emotion consists of neural circuits (that are at least partially dedicated), response systems, and a feeling state/process that motivates and organizes cognition and action. Emotion also provides information to the person experiencing it and may include antecedent cognitive appraisals and ongoing cognition including an interpretation of its feeling state, expressions or social-communicative signals, and may motivate approach or avoidant behavior, exercise control/regulation of responses, and be social or relational in nature."

As these and similar descriptions make clear, the processing complexity of emotion exceeds that of perception: it requires more components and systems, involves greater coordination efforts, and consequently takes longer to develop, lasts longer, and fills time with richer experiential content (De Monticelli, 2016). But these are not the only differences. Emotion and

perception also differ because perception is underpinned by the activity of sense organs, which is not always the case with emotions: emotion can be about completely abstract ideas that, strictly speaking, do not require any sense organs, such as when one regrets the lack of justice in one's country, or hopes that Darwinism is true (Deonna and Teroni, 2014, p. 24).

Moreover, when physical objects are involved, emotion requires perception, in the sense that it is cognitively dependent on it (Deonna and Teroni, 2014; Noar, 2022). As Noar observes (2022, p. 2724), "In order to be afraid of something, I first need to see that thing, or to believe that it is there, or at least to think of it in some way. In other words, I need to have a prior grasp of it, a grasp which is not given by my fear."

At the same time, it is equally true that emotions determine *the way* we see something. This can happen in at least two main ways. On the one hand, emotion can influence perception by altering basic perceptual parameters such as steepness, distance and global vs. local processing. For example, observers who feel sad perceive a hill to be steeper than observers who feel happy (Riener et al., 2011; Zadra and Clore, 2011). On the other hand, emotions can *select* and *activate*—among the affordances offered by a physical object—which one(s) to utilize or to be engaged with. It should be noted that a physical object offers various affordances (e.g., a chair affords sitting but also being thrown at someone), most of which remain unexploited or even unnoticed by the individual (as Gibson observed, an object's affordances exist even when they go unnoticed). Emotions have precisely the capacity to select and activate one or more of an object's affordances by mobilizing the individual's relevant bodily resources and providing a *motivational pull*—an urge to act or do something. Shargel and Prinz (2017) illustrate this capacity with the example of a swimmer swimming for leisure far from shore. At a certain moment, she begins to struggle against a strong undertow and realizes that it will require all her strength to return safely. As she enters a state of fear, her body responds by generating additional energy to support the intense effort needed, ultimately aiding her escape. This physical change has significant consequences. Before experiencing fear, she viewed the ocean as a place for leisurely swimming, not as *something to flee from*. The fear-induced bodily response makes escape her primary focus, triggering a flight reaction. Moreover, these physical changes enable her to navigate waters that would have been too difficult without the fear. Consequently, both her

capabilities and her motivation change. In this sense, her fear appears to have activated new affordances available to her. In other words, fear has enhanced her abilities and changed the type of action that presents itself to her. It's a temporary solution to a temporary problem, reshaping her interaction with the environment.

Finally, it must be noted that emotion usually greatly exceeds perception in its capacity to help one understand how and to what extent an object affects oneself, and what one's own limits and boundaries are—in short, to foster self-awareness. There is, indeed, a difference in the depth and significance of self-knowledge between realizing that you are able to see the color or shape of an object and recognizing that the object is a threat to your life.

1.4.2. Emotion versus language

Emotion and language share important aspects. They both (i) have evolved as crucial tools for the maintenance and continuation of life: emotion facilitates immediate reaction to the environment, such as when fear prompts flight from danger, while language allows for sharing knowledge and efficiently coordinating complex activities among individuals (Maturana, 1990; Jablonka, 2012; De Jesus, 2016, 2018); (ii) serve as a means of symbolization and communication: just as thought and internal states can be communicated through speech and writing, emotional states such as fear and anger can be communicated through facial expressions, body language, and the tone of voice; (iii) support social interaction and coordination, consolidate group organization, and strengthen group identity: language enables clear communication, while emotions provide immediate cues that guide social interactions (for instance, showing gratitude can reinforce positive behaviors); (iv) transmit knowledge, values, and cultural norms: for example, just as language plays a role in the learning and consolidation of ethical behavior, so do emotions, such as guilt, empathy, and moral outrage.

Despite these commonalities, emotion and language differ in a significant aspect: language, unlike emotion, allows for the systematic, efficient and economical codification, storage, processing, and communication of information. Language achieves this by conveying meaning in an abstract way through words and combinations of words. More specifically, each word encodes

the set of cognitive operations—with attentional processes playing a pivotal role—that the user must perform to consciously experience the word's meaning. Whenever we use language, we perform the cognitive operations codified by the meanings of words. The meanings of words—or linguistic meaning—isolate, condense, "freeze", and reduce the manifold, ever-changing flow of our experiences into a decontextualized and shared form, making it univocal, valid for, and shareable by everyone, and, to a certain extent, stable over time (Marchetti, 2010, 2023).

The abstractness of linguistic meaning is what determines the qualitative emptiness of the conscious experience of linguistic meaning compared to the rich and concrete qualitative aspect of emotions (Marchetti, 2023). We understand the meaning of the word "fear" perfectly well without needing to experience any instance of fear. Obviously, if we are granted enough time beyond the minimal time needed to understand the meaning of a word, we can mentally elaborate extensively on such a meaning, thinking about, imagining, or recalling the various occurrences of what the word refers to, which will make us experience additional conscious states (such as memories and emotions) different from the one initially evoked by the linguistic meaning of the word. However, these additional conscious states must not be confused with or mistaken for the initial, minimal conscious experience associated with understanding the meaning of a word.

The abstractness and qualitative emptiness of linguistic meaning make it suitable to be applied to a wide range of objects and events: the word "fear" can refer to any instance of fear, regardless of who experiences it, or when, where, and how it is experienced. In contrast, each time we feel fear, we have a specific experience of it, which may differ from the experiences of fear we had in the past and will have in the future. Additionally, the way I experience fear may differ completely from how another person experiences it.

Moreover, the abstractness and qualitative emptiness of linguistic meaning enable inner speech and thought, thereby playing a crucial role in problem-solving, decision-making, and innovation.

As Jablonka et al. (2012) observe, most likely the abstractness of linguistic meaning may have been favored by the need to exercise and extend *emotional control* during complex tool-making, tutoring, alloparenting (the care of the young by individuals other than the mother), and hunting

and gathering, when individuals had to bring food to a home base instead of consuming it immediately while foraging. As Jablonka et al. (2012, p. 2157) exemplify:

"When told about a predator that is far away, individuals had to be able to control their fear and their wish to run away. Volitional imagining, which is a crucial facet of linguistic communication, therefore entails an inhibitory control of actions and the emotions that trigger them. This inhibition of emotions is at the root of the distinction humans make between thought and feelings (…) Experiments with apes that can count and perform arithmetic operations show that they do better with abstract symbols than with concrete items, such as balls and bananas, which they associate with emotionally laden play or eating activities."

In other words, the abstractness of linguistic meaning brings with it the advantage of not carrying any inherent emotional baggage and, consequently, reducing the need for inhibiting it. In turn, the evolution of language created new emotions—such as humor, suspicion and doubt—and enhanced the generation of communal feelings, such as solidarity and collective pride.

1.4.3. Emotion versus feeling

Although the terms "emotion" and "feeling" are often used synonymously in everyday language (and sometimes even equated by some scholars: see, for example, James, 1884; Goldstein, 2002), they denote different affective phenomena (Nussbaum, 2001; Ben-Ze'ev, 2002; Damasio, 2004). On the one hand, the same person may experience varied feelings in response to the same emotion over time. Nussbaum (2001, p. 60), referring to the emotion she felt after her mother's death, observes: "In my own grief, feelings of crushing alternated in a bewildering way with periods when I felt preternaturally wide awake and active; but it seemed wrong to say that either of these was a necessary condition of my grief." Likewise, different individuals may experience different feelings in response to the same emotion. As Nussbaum (2001, pp. 60-61) still observes:

"Many men report experiencing anger in connection with a boiling feeling; this seems to be somewhat less true among women, or among people in general, who are taught to suppress or fear their own anger. My own experience of anger is that it is associated with tension at the back of the neck, or a headache that appears the next day. This doesn't mean that I am not really angry."

On the other hand, different emotions may give rise to the same feeling: for example, fear and excitement can engender a feeling of nervous anticipation. Or consider guilt; as Prinz (2005, p. 19) observes:

"We feel pangs of guilt. When we reflect on a subject of guilt, a lump forms in our throats, and our heads hang low. All of these bodily symptoms are shared with other emotions. Most obviously, they are shared with sadness. I think the phenomenology of guilt is often just like the phenomenology of sadness. In some cases, guilt may also share its phenomenology with anxiety."

In sum, feeling cannot be equated with emotion.

Based on this reasoning, Nussbaum (2001) even goes so far as to argue that feeling is not a necessary condition for emotion. In my view, this perspective seems quite extreme, as it restricts the definition of emotion to a very narrow range of cases—specifically, to unconscious emotions, which by definition are not felt (as we have seen, Nussbaum is not the only scholar to reach this conclusion; Damasio [1999, 2004, 2010] also does). I find it difficult to see how feelings could be excluded from emotions in cases of conscious emotions. After all, feeling is central to our conscious experience of emotion because it provides the information that allows us to introspectively label and understand our emotional state. To consciously experience an emotion is, essentially, to feel it.

Consequently, because conscious emotions cannot occur without the presence of feelings (though the reverse is not true: purely somatic feelings, such as queasiness, chilliness, and itchiness, can occur without entailing any accompanying emotion, and feeling the wind does not necessarily imply an emotional state of "wind" [Prinz, 2005]), a more comprehensive account of

the relationship between emotion and feeling should address not only the fact that they are distinct but also that they are tightly interrelated. Moreover, the account should also address the greater complexity involved in emotions compared to feelings: for example, as Frijda (1986, p. 253) highlights, whereas emotions involve an action tendency or other mode of action readiness change, feeling do not. This is precisely the kind of account provided by theories that define emotions in terms of multicomponential processes, such as Scherer's Component Process Model (CPM) (Scherer, 2005, 2009; Grandjean et al., 2008), which includes feeling as one of its components.

In Scherer's CPM, emotions are understood as dynamic processes that arise from the interaction of five key components. These components represent different systems that each contribute to the overall emotional experience. The five key components are cognitive appraisal, physiological responses, action tendencies, motor expression, and subjective feeling. The cognitive appraisal component evaluates a stimulus based on factors such as its relevance, implications, and ability to meet goals or needs. This appraisal process elicits physiological responses (such as changes in heart rate, sweating, and muscle tension), and action tendencies (such as approach, avoidance, being with, interrupting, dominating, and submitting), which prepare the organism to respond adaptively to the stimulus or event. The motor expression component involves the outward expression of emotion, including facial expressions, body language, and vocalizations. These expressions help communicate the emotional state to others, facilitating social interaction. Finally, subjective feeling builds an integrative, conscious representation of the activities performed by the other four components.

1.4.4. Emotion versus mood

Generally, moods (e.g., being gloomy, cheerful, listless, depressed, or buoyant) are "characterized by a relative enduring predominance of certain types of subjective feelings that affect the experience and behavior of a person" (Scherer, 2005, p. 705). They are considered to last longer—ranging from a few hours to days—and to be of lower intensity than emotions. Moreover, they are diffused and unfocused in the sense that they are not directed at anything

specific (Bagozzi et al., 1999; Scherer, 2005) but are instead generally perceived as related to oneself (Zadra and Clore, 2011). Finally, moods, though they fluctuate over time, are continually present and shape the background of our moment-to-moment experience, whereas emotions are phasic—that is, they have a moment of onset and then dissipate (Lischetzke and Könen, 2022).

1.4.5. Emotion versus sentiment

Both emotions and sentiments (or passions) carry an evaluative function, involving appraisals of the relevance of an object to one's well-being, values, or goals, which help us navigate our social and moral world. Both are characterized by an intentional structure, as they are directed at a specific object. However, they differ in some important aspects.

Emotions are typically brief episodes triggered by specific events or stimuli, representing momentary reactions with physiological and psychological changes occurring rapidly. Sentiments, on the other hand, are more enduring affective states, representing long-term dispositions or attitudes toward a particular object. As Frijda (1986, p. 102) notes: "They are there, presumably, even while asleep. They are there when they do not manifest themselves in joys, sorrows, or angers, although one can know about them when taking stock of one's likes and dislikes, while quietly lying in bed."

Emotions are often marked by heightened intensity, manifesting in immediate, sometimes overpowering responses. Sentiments are usually less intense but more pervasive, forming a framework for recurring feelings rather than single, intense episodes.

Unlike emotions, which can be fleeting and context-dependent, sentiments, due to their lasting nature, are foundational in forming and expressing one's enduring value and belief systems. For example, feelings of admiration for someone may develop into a sentiment of respect over time, which could influence one's ethical stance. As such, sentiments contribute more deeply to shaping one's personal self and identity, influencing long-term attitudes, behaviors, and moral judgments. The role of sentiments in shaping one's personal identity is effectively described by De Monticelli (2016, p. 42):

"Only encounters with what kindles sentiments in me - whether of admiration and contempt, love and hate, political passions, religious or artistic devotions - will, over time, tell me *who I am.* By *sentiments* I mean those relatively abiding dispositions to assent to or dissent from the very being of someone or something (…) They nourish and motivate higher-order emotions, emotions which would be impossible in the absence of their sentimental background, but also choices, actions, and behaviours. The kind of hope I have for a friend's success would be unknown to me without the friendship binding me to him, and neither would the pleasure of benevolence and other friendly behaviours towards him. In so doing, sentiments gradually reveal our personal identity (…) In the course of our personal growth (…) our sentimental dispositions lead us to discover, wonder about, change, establish or disrupt *our* individual scales of value priorities and our systems of value preferences. Sentimental life, in this expansive sense that *grounds* our long-term desires, passions, intentions, choices and actions, is what first awakens what we may call the personal layer of our sensibility, which will in a way in return take root in the subsoil of evaluative feeling and acting at the level of its more basic, sensory and vital layers. Sentiment is always indicative of the growing core of selfhood, or personal identity, whose discovered aspects are often astounding or disconcerting to us, in exactly the same way as newly gained knowledge of the real can be in other cases."

This does not exclude, however, that emotions also help shape one's self and personal identity. By helping to define what matters to us and how we relate to the world, and by guiding our reactions, decisions, and priorities, emotions contribute to our sense of self, albeit to a lesser extent—both qualitatively and quantitatively—than sentiments.

1.4.6. Emotion versus motivation

Emotion and motivation are tightly interrelated. An emotional reaction can turn into motivation—such as when feeling fear motivates one to change one's habits—and motivation can predispose or lead one to particular types of emotional reactions, such as when an obstacle

to a goal we are motivated to achieve makes us angry or frustrated. They also share certain aspects; for instance, both guide our behavior by signaling what matters to us.

Emotion and motivation, however, differ in some important ways. Emotions are short-lived, intense, and urgent, while motivations are stable and enduring, unfolding over time with continuity.

Emotions are often spontaneous and experienced as difficult to control, whereas motivation may involve deliberate planning and self-regulation.

Emotions are relatively primitive in terms of organizational complexity and largely stereotypical in their expressive and behavioral manifestations: they are more reactive and require less conscious thought. In contrast, motivations are complex structures that often require cognitive evaluation and intentions (such as deciding on the steps to reach a goal) and gradually refine over the course of ontogeny through continuous and reciprocal interaction with the environment.

Motivation directly influences decision-making, especially when setting priorities or choosing actions to fulfill goals. Emotions, while they also impact decisions, often serve as immediate signals or feedback rather than as long-term planning tools.

As Caprara (1994, pp. 108-109, translation mine) clearly summarizes:

"Emotions are reactions to internal or external emergencies along the *pleasure/displeasure* axis, revealing a disruption of balance. Motivations, on the other hand, are tendencies oriented toward acting in the external world along the *possibility/impossibility* axis, aiming to establish new internal balances and expressing plans regarding potential future scenarios of interaction between the individual and the environment. Motivation is the unfolding of a *strategy* for achieving goals that are more or less delayed over time. Emotion is the *tactic* that accompanies this long-term strategy in the short term, tracking and signaling its processes, pauses, and changes. (…) In summary, what marks the actual formation of motivations, their emancipation from the stereotyped and almost automatic patterns of emotions, or the transformation of emotions into motivations, is a qualitative leap in cognitive organization. This is accompanied by new capacities for representation, anticipation, and self-regulation. Motivation should therefore

be considered a construct that is superordinate to emotion and cognition, as it refers to forms of psychic organization that arise from the interaction of emotional and cognitive components, resolving the relationship between emotion and cognition on a more complex level."

2. The components of emotion

In the previous section, we have seen that emotion is a specific type of conscious experience, differing from other types of conscious experience in the information it provides us with. We have also seen the fundamental role that attention plays in producing consciousness: information becomes conscious when, and to the extent that, it is processed by attention. But how is this information brought forth? What are the cognitive and psychological mechanisms that produce it?

Let's clarify right from the start that there is no general agreement on what emotion is (Kleinginna and Kleinginna, 1981; Izard, 2010; Dixon, 2012; Mulligan and Scherer, 2012; Sander, 2013). For example, in their review of the literature, Kleinginna and Kleinginna (1981) compiled a list of 92 different definitions of emotion! Similarly, there is no single theory of emotions that prevails over all others or is universally accepted by scholars. It is possible to list at least the following major psychological theories of emotion (Sander et al., 2018):

(i) basic or discrete emotion theories: Ekman (1992), Izard (1992);
(ii) dimensional theories: Wundt (1896), Russell (1980);
(iii) appraisal theories: Lazarus (1968), Scherer (1984, 2005), Smith and Ellsworth (1985), Frijda (1986), Sander et al. (2005, 2018), Scherer and Moors (2019), Moors (2020);
(iv) constructivist/constructionist theories: Schachter and Singer (1962), Russell (2003), Barrett (2006), Lindquist et al. (2015);
(v) adaptational and neurophysiological theories: Panksepp (1998, 2005), Damasio (1999, 2010), Lang and Bradley (2010).

Notwithstanding the variety of theories and opinions, dominant theories of emotion appear to converge (Sander, 2013), at least in viewing emotion as a psychological process that has a relevant object, requires a certain amount of time to be processed, and involves a complex interplay of some fundamental components. This process is articulated in two main steps: (i) *emotion-elicitation mechanisms* (e.g., core affect, appraisal processes, and/or other elicitation mechanisms) that produce (ii) *emotional responses* (e.g., physiological responses, behavioral expressions and action tendencies, and subjective experience).

I will briefly review, first, emotion elicitation mechanisms and then discuss emotional responses.

2.1. Emotion-elicitation mechanisms

Most contemporary models of emotion consider emotion-elicitation mechanisms to be constitutive of emotion rather than merely antecedent to it, as these mechanisms are key to determining the nature of emotional experience. However, there is no consensus among models and theories of emotion regarding which mechanisms elicit emotions (Barrett, Mesquita et al., 2007; Scherer, 2009; Sander, 2013). Let us consider the three most important elicitation mechanisms: core affect, appraisal processes, and direct elicitation mechanisms.

2.1.1. Core affect

Core affect is a psychological term that, very broadly speaking, describes a state or feeling of pleasure or displeasure (Russell and Barrett, 1999; Russell, 2003; Barrett, Mesquita et al., 2007; Barrett and Bliss-Moreau, 2009). In addition to this experiential content of pleasure or displeasure—which corresponds to what psychologists define as the *valence* dimension—the term core affect can also include the dimension of *arousal* or activation (feeling energetic versus enervated), although it is debatable whether arousal is truly a fundamental aspect of core affective states (Barrett, Mesquita et al., 2007).

As Russell (2003, p. 149) explains, "core affect is a continuous assessment of one's current state, and it affects other psychological processes accordingly". The effects of this assessment are numerous and contribute in various ways to how a person experiences and responds to his environment. Firstly, core affect influences how a person reacts to a certain stimulus or event. A person who feels bad in a certain context or undergoes an unpleasant situation will likely try to avoid it. Conversely, a person who feels good will seek to prolong or repeat the experience. In this perspective, core affect represents "a form of affective responding that functions as a kind of core knowledge about whether objects or events are helpful or harmful, rewarding or threatening, calling for acceptance or rejection" (Barrett, Mesquita et al., 2007, p. 377). Secondly, it influences perception and cognition. As Russell (2003, p. 156) highlights, "Pleasant core affect facilitates attention to and the accessibility of positive material; unpleasant core affect facilitates attention to and the accessibility of negative material. The more pleasant core affect is, the more positive are evaluative judgments (…) The more pleasant core affect is, the more optimistic one's simulation of the future". This has a clear impact on a person's choices: for example, a person might decide to buy an object because their core affect led them to focus on its positive features (rather than other attributes). This also influences a person's thinking style. As Russell (2003, p. 156) observes: "Negative core affect generally leads to more detailed and critical thinking, whereas positive core affect leads to more heuristic and divergent thinking". Thirdly, core affect influences memory and learning. As demonstrated by Pavlovian or classical conditioning, neutral stimuli that are repeatedly paired with a stimulus (the unconditioned stimulus) that has the capacity to perturb core affect, such as a loud noise or an electric shock, acquire the capacity to elicit the same affective response as the unconditioned stimulus (Barrett and Bliss-Moreau, 2009). Moreover, as Bower (1992, p. 14) observes: "a strong affective reaction after an event also causes the reactivation, rehearsal, or 'mulling over' in working memory of the encoded version of that event (…) Such rehearsal enhances the degree of learning of whatever has been encoded of the emotional experience".

Let's briefly review some of the characteristics of core affect.

Core affect is usually described by scholars as *primitive*. According to Russell (2003, p. 148), core affect "can exist without being labeled, interpreted, or attributed to any cause. As an

analogy, consider felt body temperature. You can note it whenever you want. Extremes can become very salient. Felt temperature exists prior to such words as hot or cold, prior to the concept of temperature, either in folk or scientific theory, and prior to any attribution about what is making you hot or cold."

Closely related to this characteristic is the *ubiquity* of core affect—its quality of being an intrinsic aspect of any conscious experience (Barrett, Mesquita et al., 2007, p. 388). A person always has core affect and is always in some state of core affect, even if that state is neutral (Russell and Barrett, 1999, p. 806; Russell, 2003, p. 148). Consequently, every mental state is intrinsically infused with affect content (Barrett and Bliss-Moreau, 2009, p. 178) and all objects and events—whether real, imagined, remembered, or anticipated—enter consciousness affectively interpreted (Russell, 2003). As Russell (2003, p. 149) explains: "Objects and events all have affective qualities, the perception of which is as much a part of contact with the external world as perception of nonaffective qualities". As we have seen, my model of consciousness (Marchetti, 2018, 2022, 2024) effectively captures the ubiquity of core affect by assigning a fundamental role in consciousness to the hedonic dimension and arousal.

A third characteristic of core affect is its *universality*. As Barrett, Mesquita et al. (2007, pp. 377-378) observe, (i) the capacity to experience pleasure and displeasure is universal to all humans, (ii) experiences of pleasure and displeasure are present at birth, and (iii) all instrument-based measures of emotion give evidence of a person's pleasant and unpleasant state or its intensity (e.g., peripheral nervous system activation, facial electromyographic activity, vocal acoustics, expressive behavior, and neural activations). Moreover, (iv) all known human languages have words to communicate pleasure and displeasure (Wierzbicka, 1992; Russell, 2003).

Finally, core affect can be *backgrounded* or *foregrounded* in consciousness (Barrett, Mesquita et al., 2007, p. 388; Barrett and Bliss-Moreau, 2009, p. 178), depending on where reflective attention is applied. When core affect is backgrounded, it colors conscious experience in a less direct fashion but has the potential to influence behavior implicitly. "Backgrounded core affect is experienced as a property of the external world rather than as the person's reaction to it. We experience some people as nice and others as mean, some foods as delicious but others as

distasteful, some pictures as pleasing and others as negative" (Barrett, Mesquita et al., 2007, p. 388). When core affect is in the foreground of consciousness, it is experienced directly as a personal reaction to the world (we "like" or "dislike" a drink, a person, or a painting) and can serve as information for making explicit judgments and decisions.

2.1.2. Appraisal processes

Although necessary, core affect is not sufficient to elicit an emotion. On the one hand, core affect—even in its most extreme forms—is present in events that are not considered prototypical emotional episodes, such as feeling miserable from a low-grade infection, feeling tension at the end of a stressful day, and feeling serenity on a lazy summer day spent at the shore (Russell and Barrett, 1999, p. 806). On the other hand, the same core affect (e.g., feeling displeased) can lead to different emotions, such as anger, sadness, or frustration, depending on how the person interprets the situation.

Therefore, to elicit an emotion, core affect must integrate with other components. Most scholars agree that, because emotions are directed at an object, these components should enable the individual to cognitively and conceptually appraise the object in relation to his personal values, goals, desires, and expectations, as well as contextual factors, social and cultural norms.

According to Scherer (2009), the cognitive appraisal of an object is based on several basic criteria, which allow the individual to adaptively react to it. The criteria can be classified into four major dimensions: (i) Relevance: how relevant is the event to the individual? Does it directly affect the individual or their social reference group? (ii) Implication: what are the implications or consequences of this event and how do they affect the individual's well-being and immediate or long-term goals? (iii) Coping potential: how well can the individual cope with or adjust to these consequences? (iv) Normative significance: what is the significance of this event for the individual's self-concept and in relation to social norms and values? These criteria include aspects such as the novelty or familiarity of the event or stimulus, its intrinsic pleasantness or

unpleasantness; its significance for the individual's needs or goals; its perceived causes, its conduciveness to satisfying a need or achieving a goal.

At first glance, the set of appraisal criteria proposed by Scherer may seem somewhat extensive, complex, or even unnecessary. However, to appreciate its adaptive usefulness, consider the emotions elicited by the sight of a bar of chocolate. While the chocolate may be intrinsically pleasant to a person, it can also elicit negative feelings if that person is on a diet or has already eaten too much. Conversely, a medicine can be appraised as beneficial for one's health and can therefore elicit a positive feeling, even though it smells and tastes unpleasant.

Not all appraisal processes require conscious thought. Many appraisal processes can occur automatically, without the person being consciously aware of them. Automatic appraisals are fast, instinctive, based on evolutionary mechanisms or past experiences, and they allow for a quick evaluation of whether a situation poses a threat or offers a benefit. Depending on the context, automatic, unconscious appraisals can benefit from conscious appraisals, whereby an individual deliberately and reflectively evaluates their ability to cope with the situation, its causes, and possible future outcomes.

It must be pointed out that, notwithstanding their usefulness, cognitive appraisal processes alone are not able to fully explain why people feel the way they do when experiencing an emotion (Barrett, Mesquita et al., 2007, p. 380). The variability in emotional intensity and qualia when people experience the same situation, the influence of cultural and social factors, and the existence of non-cognitive influences on emotions—such as physiological reactions or automatic sensory processing, which we will consider in the next section—suggest that factors beyond cognitive appraisal play a role in shaping emotional experience.

2.1.3. Direct elicitation mechanisms

In addition to appraisals and core affect, *direct* emotion elicitation mechanisms have also been hypothesized. Among them, Sander (2013, p. 18) lists direct sensory triggering, reflexes, instincts, and memory associations. These direct mechanisms would allow for the possibility that some emotions are directly elicited without the mediating role of any evaluative interpretation and

cognitive appraisals[1]. This view has been held by various scholars, among whom is Zajonc (1980, 1984), who clearly answers "yes" to the question of whether "untransformed, pure sensory input can directly generate emotional reactions" without any cognitive support (Zajonc, 1984, p. 122). Even Lazarus, who strongly opposes Zajonc's view on the primacy of emotion over cognition, and advocates that cognitive appraisals precede, and are constitutive of, emotions, admits that there may be some exceptions in the case of *fear*: "The only doubts I have are in the arena of phylogenetically based triggers or releasers of fear in humans such as those postulated by Hebb. Perhaps humans are 'instinctually' wired to react with fear to spiders, snakes, or strangeness." (Lazarus, 1982, p. 1021).

Even though it is controversial, the idea of direct emotion elicitation mechanisms seems quite plausible from a purely evolutionary perspective. If we conceive of (at least some elementary or primary forms of) emotions as neuropsychological mechanisms shaped by natural selection to provide organisms with immediate responses that help them deal with critical situations quickly and efficiently, thereby increasing the probability of survival and reproductive success (Damasio, 1999, 2010; Ekman, 1992, 1999; Plutchik, 2001; Lang and Bradley, 2010), it follows naturally that emotions can be triggered directly, without the mediation of cognitive processes.

This idea goes hand in hand with the notion of *basic (or prototypical, or primary) emotions* (Ekman, 1992; Izard, 1992; Damasio, 1999; Plutchik, 2001). An emotion is considered basic when it is triggered (by a given object or event) in a direct or reflexive manner by dedicated, evolutionarily conserved neural circuits (or affect programs) and is expressed through clear and unambiguous biobehavioral signals. These signals include specific configurations of facial muscle activity (commonly referred to as "facial expressions"), physiological responses, instrumental behaviors (or tendencies to act), and a distinctive phenomenological experience (Barrett, Lindquist et al., 2007, p. 327). Basic emotions are "assumed to be universally present in humans, homologous in animals, selected for over the course of evolution, and biologically primitive,

[1] At first glance, direct emotion elicitation mechanisms might be mistaken for the automatic, unconscious appraisals we considered at the end of the previous section. However, as Sander (2013) cautions, the two types of processes should not be confused. The automaticity implied by unconscious appraisals does not exclude—as direct emotion elicitation mechanisms instead do—the mediating role of evaluative and cognitive interpretation. An illuminating example is provided by reading: "Indeed, the process of reading is automatic, but no one would claim that reading is not a cognitive process" (Sander, 2013, p. 37).

thereby constituting the fundamental elements of emotional life" (Barrett, 2006, p. 30). The set of basic emotions is generally limited, with common candidates including joy, anger, sadness, fear, surprise, and disgust, though the list may vary depending on the authors and the criteria they use to define this set. Russell and Barrett (1999) identified at least seven possible criteria: the facial expression associated with the emotion, the pattern of autonomic nervous system activity involved, the dimension of cognitive appraisal through which the object of the emotion is interpreted, the cognitive structure presupposed, the behavioral response/action tendency involved, the person's own categorization of the episode, and the brain structures and neurotransmitters underlying emotional episodes.

Basic emotions can be seen as adaptive mechanisms that provide immediate support to individuals engaged in vital adaptive behaviors such as nourishment, fight-or-flight responses, sex, caregiving, and exploration.

Just as it is assumed that they are triggered in a direct or reflexive way, it is likewise assumed that they can be decoded reflexively by a perceiver, in an innate and pan-cultural manner.

The existence of basic emotions has been challenged on various grounds. For example, a review by Barrett (2006) highlights a lack of sufficient empirical evidence supporting the idea that basic emotions are natural kinds. Neither the hypothesis that different basic emotions entail distinctive sets of physiological, behavioral, and experiential responses, nor the hypothesis that different basic emotions arise from distinct causal mechanisms, is supported by conclusive and consistent empirical findings. Moreover, findings from developmental psychology challenge the notion that perceivers possess an innate ability to derive distinct emotional information from facial expressions. For example, face-perception ability does not appear to be innate, and young children lack the conceptual knowledge about emotion necessary to support emotion perception: only after acquiring the conceptual knowledge of "fear", "anger", and other emotions, can they label emotional faces according to the distinct categories of emotion as labeled by our languages. Consistent with these findings from developmental psychology, further evidence suggests that culture and learning play a significant role in shaping emotional responses, making the existence of universal and innate emotion categories unlikely. Finally, research on the subjective experience of basic emotions indicates that feelings are not organized

into discrete categories but rather along continuous dimensions, such as valence (pleasant-unpleasant) and arousal (high-low).

In light of these controversies, it might therefore be more appropriate to speak not of basic emotions but of innate, evolutionarily inherited mechanisms and processes—interoceptive and sensorimotor in nature—that are activated by specific stimuli and disrupt the individual's normal state of equilibrium. These episodes can only later, and if our languages provide the necessary resources, be recognized and labeled according to the ways in which culture has taught us to interpret and name them (Barrett, Lindquist et al., 2007; Lindquist et al., 2015).

2.1.4. Emotion-elicitation mechanisms: a final consideration

This brief review of the main types of emotion-elicitation mechanisms suggests that none is sufficient on its own. Core affect alone cannot trigger emotions and requires additional cognitive or conceptual processing. Similarly, cognitive appraisal alone cannot fully explain why people feel the way they do when experiencing an emotion (Barrett, Mesquita et al., 2007). Moreover, the effects of reflexes, instincts, and other direct elicitation mechanisms require conceptual and linguistic support to be interpreted and labeled.

This perspective leads us to adopt the view that multiple emotion-elicitation mechanisms are closely interrelated and operate simultaneously. This view helps to explain why "A person might experience his or her core affective state as a particular sort of sadness, anger, or nervousness, depending on the conceptual knowledge that he or she brings to bear in that situation" (Barrett, Mesquita et al., 2007, p. 386).

2.2. Emotional responses

Typical emotional responses produced by emotion elicitation mechanisms include physiological responses, behavioral expressions, action tendencies, and subjective experience.

Examples of *physiological responses* triggered by emotional stimuli include changes in heart rate, blood pressure, hormone levels, skin conductance, and pupil dilation. These physiological

responses, along with behavioral, neuronal, and self-reported data, are used in the context of emotion studies to determine an individual's arousal or activation level—that is, their state of alertness, wakefulness, and attentiveness—induced by emotional stimuli.

Typical *behavioral expressions* associated with emotions are facial expressions, such as smiling when happy or frowning with anger (Ekman, 2003; George, 2013).

Emotions can also result in, or be identified with, specific *action tendencies* such as approach, avoidance, dominating, and submitting, that is, states of action readiness that prepare and orient the body to respond to the possibilities and challenges that matter most to the organism at the time (Frijda, 1988, 2009). For example, anger typically involves the action tendency to inflict harm through aggression, and fear is linked with the urge to escape.

The final emotional response is the subjective feeling—the conscious experience an individual has of the emotion, such as feeling happy, sad, or angry. As we noted earlier, however, this response does not always occur.

3. The effects of emotion on behavior

We can summarize what we have discussed so far about emotions by saying that, when they arise, they inform us—via core affect—that our self has entered a state of disequilibrium. They also indicate the nature of this disequilibrium (positive or negative) and its intensity (strong or weak). Moreover, through appraisal processes or some mechanisms of direct elicitation, emotions signal that this disequilibrium has been caused by an object and typically identify which object it is (though the object may remain unknown, resulting in the feeling of a vague emotion). Finally, emotions guide us—by eliciting specific physiological responses and action tendencies—toward actions aimed at restoring, if not the original equilibrium, at least, a new equilibrium acceptable for our self. From this perspective, Plutchik's (2001, p. 348) statement is entirely understandable: "Overall, emotion is a kind of homeostatic process in which behavior mediates progress toward equilibrium (…) Emotion is a chain of events made up of feedback loops."

In sum, using the terms of my theory of consciousness, we can say that emotions serve to preserve our self.

Generally speaking, when we are confronted with an unexpected object or one that conflicts with our plans, goals, values, or needs, preserving our self can be achieved through various strategies along a spectrum between two extremes: adapting the self to the object or adapting the object to the self. Emotions can guide our behavior in either of these two extreme directions.

The option of adapting the self to the object is exemplified by grief. When someone to whom we are deeply attached dies, we generally fall into a state of distress, sadness, and sometimes even depression, commonly referred to as "grief". Over time, the awareness of our helplessness in the face of the event's irreversibility leads us to come to terms with it and accept the death of our loved one. This intense emotional response to the loss of a loved one, represented by grief, guides us toward regaining balance by reshaping our sense of self and making us conceive of our existence as being possible even without the presence of the deceased person. Similarly, interest and curiosity, by motivating us to explore, engage with the unknown, and pursue discovery, usually play a fundamental role in our personal change and growth.

The option of adapting the object to the self is exemplified by certain instances of anger. When confronted with injustice, frustration, or threat, we are usually seized by a desire to correct the source of distress. This can even lead us to actively attack and destroy it. In such cases, the emotional response of anger drives us to defend and preserve ourselves by modifying the object of our anger. The same holds true for some instances of jealousy, which—as Shakespeare reminds us in *Othello*—can lead a person to kill his or her spouse.

Intermediate options are possible. Fear, for example, can lead us to temporarily change our posture and spatial position—such as stepping back—without necessarily implying a change in our self (even though, in certain circumstances, it is the very emotion of fear that makes us discover the hidden sides of our personality).

In all these cases, emotions—by informing us of the existence of objects that are "other" than ourselves, providing us with the initial means to face and manage them, and supporting us in preserving our self—contribute to defining the boundaries of our self as an entity differentiated from other entities.

The various options we have seen above—ranging from the two extremes of adapting the self to the object to adapting the object to the self—represent the most evident, outward, and

complex manifestations of how emotions can guide behavior. Yet, these complex manifestations would not be possible without the workings of simpler and more basic cognitive processes, such as attention, memory, and perception: it is through these processes that more complex ones are built. Although the workings of emotions often go unnoticed at these basic levels of processing and may consequently seem negligible, empirical evidence shows that it is precisely at this level where the influence of emotions on behavior begins and progressively unfolds. In the following sections, we will review some of this evidence, focusing specifically on attention and perception.

3.1. The effects of emotion on attention

Extensive behavioral and neuroimaging research using various experimental paradigms on both healthy and clinical populations demonstrates that emotional information is prioritized: emotional stimuli capture attention more rapidly, are detected more easily, impede attentional disengagement for a longer time, and are more likely to reach awareness than neutral stimuli (Vuilleumier and Brosch, 2009; Yiend, 2010; Brosch et al., 2013).

Let us briefly consider some of this research.

In the attentional blink task, an individual's ability to detect a second target stimulus (T2) is impaired when it appears shortly after the first target stimulus (T1) within a rapid sequence of visual stimuli. This phenomenon is generally attributed to the fact that, at the time T2 appears, attentional resources are still engaged in processing T1 and are therefore unavailable for identifying T2. However, this impairment is significantly reduced when T2 is emotional (Anderson, 2005), and it worsens when a neutral T2 follows an emotional T1. This suggests that emotional stimuli tend to either capture or divert attention when attentional resources cannot be evenly distributed across consecutive stimuli.

Double cueing, also known as the "dot probe task—probably the most widely-used technique to investigate attention to emotion—consists of displaying two cues of different valence (e.g., two faces, one emotionally arousing/significant and the other neutral) simultaneously on either side of a fixation point for a brief interval. Following the offset of the cues, an emotionally neutral target (e.g., a dot or a rectangle) appears in one or the other location. Usually, the target replaces the emotional cue in 50% of the trials (so-called "valid" trials) and the neutral cue in the other

50% (so-called “invalid” trials). Participants are asked to detect or identify the target as quickly and accurately as possible. Typical results show faster responses to targets replacing the emotional rather than the neutral cue. This is explained on the grounds that attention, being biased toward the emotional cue and consequently already fixed on its location before the target detection task, facilitates the detection of the target that appears in the same spatial location as the emotional cue (compared to the target that appears in the spatial location of the neutral cue).

Theoretically, these results could be explained in terms of a dedicated, hard-wired emotional module that is automatically activated by stimuli recognized as emotionally significant, either innately or because they were learned very early in life, and is relatively impenetrable to cognitive control (Öhman and Mineka, 2001). However, Brosch and Van Bavel (2012), using a variant of the dot probe task that includes an additional brief (1-minute) social learning phase prior to the presentation of the cues, demonstrated that attentional prioritization mechanisms can be flexibly tuned by social identity learned during this phase. In their experiments, Brosch and Van Bavel (2012) endowed initially neutral face-photo stimuli with emotional relevance by randomly assigning them to a social in-group or out-group during this learning phase. Group membership was indicated by the background color of each photo, and participants were instructed to learn whether each face belonged to the in-group or out-group (it is well-known that classifying people into arbitrary social groups can significantly alter evaluations and behaviors toward both in-group and out-group members. This often results in biases such as in-group favoritism and out-group derogation, even when established categories, stereotypes, or pre-existing attitudes are absent. Out-group members, in particular, may be subject to stereotyping, reduced empathy, and perceived homogeneity, which can influence social interactions and judgments). The faces were then used as cues in a subsequent dot probe task to measure rapid attentional orienting. The experiments revealed that target stimuli were detected more rapidly when they were preceded by images of out-group members, that is, faces for whom the out-group membership had been encoded during the learning phase, demonstrating the adaptability of attentional prioritization mechanisms in response to newly-learned social identities. As Brosch and Van Bavel (2012, p. 314) concluded: “The minimal learning manipulation employed in our experiments led to a

change in attentional prioritization, consistent with our hypothesis that emotional attention mechanisms subserving the selection and prioritization of relevant aspects of the environment are not static and hard-wired, but may rapidly adapt to recent changes in motivational contingencies."

Emotional attention mechanisms can also be modulated by stable personality characteristics or dispositional traits. For instance, individuals with specific phobias often exhibit a heightened attentional bias toward threatening stimuli. Snake phobics, for example, tend to focus more quickly on images of snakes compared to spiders, while spider phobics show the opposite pattern (Öhman et al., 2001). Additionally, people with depression tend to have a stronger bias toward negative information, whereas those with higher levels of optimism are more likely to direct their attention to positive information.

Another factor that can modulate emotional attention mechanisms is the individual's affective context. It is well known that increasing the accessibility of a stimulus or a category of stimuli (for example, through a priming procedure) leads people to preferentially focus on the more accessible stimuli. In their study, Smith et al. (2006) used a variant of the emotional Stroop task to show that the attentional bias toward negative information—a well-documented phenomenon in social psychology whereby people automatically pay more attention to negative information than to positive information—can be reduced or even eliminated by increasing the accessibility of positive constructs in memory.

In a typical emotional Stroop task, participants are shown emotion-relevant words (e.g., "failure", "disease") written in different colors and are asked to name the color of the word as quickly as possible. Typically, the speed of color naming for emotion-relevant words is slower compared to that for matched neutral words (i.e., neutral words selected for their similarity to emotion-relevant words in characteristics such as length, frequency, and complexity). This indicates that the meaning of emotion-relevant words, which must be ignored to name the color, draws attention away from the color-naming task.

In the variant of the emotional Stroop task used by Smith et al. (2006), participants were primed with positive and negative information prior to the Stroop task. In Experiment 2, participants were subliminally primed with either positive prime words (e.g., "sunshine",

"friend") or negative prime words (e.g., "cancer", "crime") (an additional control group was not primed). In Experiment 3, participants were primed negatively or positively through social interactions. In the negative-prime condition, the experimenter acted harshly toward the participants: they were treated curtly and rudely, made to wait outside for 5 minutes before beginning the experiment, and the door was slammed shut behind them once they entered the room; instructions were framed as orders rather than requests, and the tone of voice used was brusque and unfriendly; etc. In the positive-prime condition, the experimenter acted kindly: participants were thanked repeatedly for their participation, treated with kindness and respect, and asked multiple times whether they were comfortable throughout the procedure; instructions were given in a friendly tone of voice; etc.

After the priming phase, in both Experiments 2 and 3, participants performed an emotional Stroop task with negative and positive target words.

The results of Experiment 2 revealed that when participants had not been primed or had been negatively primed, negative target words elicited longer reaction times than positive target words. In contrast, when participants had been positively primed, reaction times to positive and negative stimuli did not differ. The results of Experiment 3 revealed that participants' attention was biased toward negative target words in the harsh experimenter condition and toward positive target words in the friendly experimenter condition. In sum, Smith et al.'s (2006) study shows that the tendency to focus on negative information is not immutable but can be reduced or eliminated when a positive affective context is made accessible in memory.

Experimental evidence also shows that the influence of emotion on attention may vary according to the valence of the emotional information (e.g., positive, negative). Several studies have shown that positive emotions tend to broaden the breadth of attention (Fredrickson and Branigan, 2005; Rowe et al., 2007), while negative mood and depression tend to narrow it (it should be noted, however, that these effects can be influenced by other factors, such as the nature of the information presented, or the individual's motivations, goals and characteristics, which may lead to different outcomes: see Zadra and Clore, 2011; Grol and De Raedt, 2014).

In conclusion, the evidence reviewed here, along with other evidence (Vuilleumier and Brosch, 2009; Yiend, 2010), shows that:

(i) Emotion affects attention by prioritizing certain stimuli, speeding up their processing, making it harder to disengage from them, carrying over its effects to the processing of subsequent stimuli, and so on.

(ii) The way emotion affects attention may vary according to the valence of the emotional information.

(iii) Attentional mechanisms can be flexibly tuned by the emotional significance we assign to an object based on our individual needs, expectations, goals, motivations, mood, personality traits, culture, and so on. Depending on how much emotional meaning an object holds for us due to these subjective factors, we will tend to attentionally act and behave toward it differently.

Let me briefly discuss two important aspects concerning point (iii). The first aspect relates to the notion that emotional significance is *assigned by us* to an object based on our personal needs, expectations, goals, motivations, etc. In this context, the use of the verb "assign" underscores the fact that it is primarily up to us to perceive and conceive an object as emotionally significant—or not emotionally significant at all. In this respect, the same object can elicit any kind of emotion or no emotion at all; an emotion can be elicited by any object; and no object must always and necessarily elicit a specific emotion (there is no inherent or universal connection between any given object and a specific emotional response).

At first glance, this notion seems quite extreme: one could indeed argue that certain objects and events—such as seeing another person bleeding—inevitably elicit some emotion in us, or that witnessing someone crying or laughing induces us to feel the same emotion. However, this is not always the case. Professionals such as doctors can (and often must) perform their work without feeling any emotion toward the blood or wounds they see. Likewise, seeing someone sarcastically laughing at the misfortunes of others does not always automatically make us laugh.

This notion is important and must be taken into account when dealing with emotions because it helps us avoid the trap of considering emotions in a naively realistic sense—viewing them as objective entities that exist independently of us—rather than as our own constructs. As shown

by the theory of the *Learnable* (Magni, 2011; Magni et al., 2023, 2024), all our conscious experiences—including emotions—are shaped by a cognitive horizon that is continuously formed through social interaction and the sharing of meanings via systems of symbolic representation such as language, art, and mathematics.

The second aspect concerning point (iii) relates to the notion that the process of assigning emotional significance is *based on* subjective factors such as our needs, expectations, goals, motivations, mood, etc. This notion raises the question of what mechanisms enable emotional significance to be "based on" these subjective factors. According to the theory of consciousness that I have put forward (Marchetti, 2010, 2018, 2022), there are at least two concurrent mechanisms that make this possible.

The first mechanism utilizes the flexibility provided by the set-point of the organ of attention. As I explained earlier in the section *Emotion is a Conscious Experience*, the set-point defines the optimal reference energy level for the functioning of the specific area of the organ of attention that underlies the attentional activity being performed. The set-point can be adjusted according to an individual's needs, plans, goals, motivations, and so on. Different needs, goals, plans, motivations, expectations, moods, and attitudes imply different set-points and involve different areas of the organ of attention. For example, an individual who is strongly motivated to achieve a certain goal will be willing to expend more energy in various activities for a longer time than someone with little or no motivation. This means that the strongly motivated individual—compared to one who is less or not motivated at all—adopts set-points involving higher energy use (that is, set-points that allow the agent to sustain higher energy fluctuations and expenditures for longer periods) across various areas of the organ of attention. These differences in set-points help explain the variations in emotional experiences between highly motivated and poorly motivated (or unmotivated) individuals. Highly motivated individuals, who adopt set-points involving higher energy use, tend to experience more intense emotions—both positive (e.g., excitement, joy, pride) and negative (e.g., frustration, disappointment)—in response to success and failure, respectively. This occurs because higher energy fluctuations and expenditures imply moving further away from the set-point, thereby eliciting more intense emotions. In contrast, poorly motivated individuals, who adopt set-points that impose stricter

limits on energy fluctuations and expenditures, tend to experience weaker emotional responses or none at all (e.g., quiet satisfaction, feeling at ease without strong excitement, resignation, or indifference).

The second mechanism is represented by the modulation of the energy level of the organ of attention caused by variations in the amount of energy supplied to it by the organism. The energy supplied by the organism to the organ of attention fluctuates based on factors such as the individual's physical and mental activity, energy reserves, overall health, and intake of stimulants. These fluctuations affect the individual's arousal state, which in turn shapes his conscious experiences. For example, when an individual is tired due to intensive physical activity, less energy is made available by the organism to the organ of attention. Consequently, the organism takes longer (or may even be unable) to restore the energy level of the organ of attention to its set-point. This engenders emotional states such as anxiety, irritability, discomfort, and discouragement.

(Conversely, the habit of performing certain actions and carrying out specific tasks, learning, and the consolidation of experience inevitably lead to the automatization of movements and operations, the attenuation and stabilization of expectations, and, more generally, to adaptation and habituation. Consequently, the individual learns to manage his overall energy resources—including the attentional ones—more efficiently and, primarily through a more precise use of the set-point mechanism and its intervention tolerances, to better handle the energy fluctuations he must face. All of this is reflected in an overall reduction in the occurrences that elicit emotions and, more broadly, in a more controlled behavior, less prone to and dependent on emotional swings and constraints).

In summary, our discussion of the relationship between emotion and attention reveals a close and circular interplay between the two. Subjective factors, such as an individual's needs, expectations, goals, motivations, mood, personality traits, culture, energy reserves, and overall health, influence the functioning of the organ of attention by primarily affecting its set-point and/or energy level. This influence fosters the emergence of emotional states, which, in turn, affect the functioning of attention by prioritizing certain stimuli, accelerating their processing,

making it harder to disengage from them, and so on, all with the overarching aim of guiding behavior toward actions that restore an equilibrium acceptable to the self.

3.2. The effects of emotion on perception

The effects of emotion on perception are primarily determined through the emotional modulation of attention: by affecting attentional processing, emotion determines what we perceive and how we perceive it. However, this is not the only way in which emotion impacts perception. As Phelps et al. (2006) show, emotion also directly influences the most basic perceptual abilities, such as enhancing contrast sensitivity, thereby multiplicatively amplifying the perceptual benefits brought about by attention.

The impact of emotion on perception can manifest in various ways. For example, it influences whether one perceives global or local stimuli.

Typically, people exhibit a tendency to process information globally rather than locally, as demonstrated by Navon (1977). In Experiment 3, Navon investigated global versus local visual processing using hierarchical stimuli, where large letters (global level) were composed of smaller letters (local level). For instance, a large letter “H” could be made up of smaller consistent letters (“H”) or smaller conflicting letters (“S”). Participants were asked to identify either the global or local letters. The results showed that global perception (identifying the large letter) was faster than local perception. When participants were instructed to identify the global shape, they could do so quickly, even when the local elements conflicted with the global shape (e.g., a large “H” made of smaller “S”s). Conversely, when they were asked to identify the local elements, their responses were slower if the global shape conflicted with the local elements (e.g., identifying the small “S”s in a large “H”).

Emotion can alter this tendency. Gasper and Clore (2002) showed that individuals in sad moods are less likely to perceive global stimuli and more likely to perceive local stimuli than individuals in happier moods. In Experiment 2, they induced happy, sad, or neutral moods by having participants write for nine minutes about a personal life event that had made them feel either “happy and positive,” “sad and negative,” or about an “average, normal, typical weekday.” After the mood-induction phase, participants were asked to indicate whether a target figure (e.g.,

a triangle made up of small triangles) was more similar to a group of objects that matched its global shape (e.g., a triangle made up of small squares) or to a group of objects that matched its local components (e.g., a square made up of small triangles). The results showed that participants in negative moods were less likely than participants in positive or neutral moods to use the global form as a basis for matching the objects (this was also confirmed by participants' self-reports which were intended to ascertain that they accurately perceived the basis of their choices: participants in sad moods reported basing their choices less on the global forms than did participants in positive moods, and more on the local details than did participants in positive moods).

Further experiments have shown that the impact of emotion on global-local perception is even more articulated; that is, it is not fixed—i.e., positive and negative affect are *not* uniquely dedicated to global and local orientations, respectively—and can be modulated by other factors. In two experiments using two different methods of perceptual focus priming, two different methods of mood induction, and two different tests of attention to the global versus local aspects of visual stimuli, Huntsinger et al. (2010) demonstrated that the impact of emotion on global-local perception may be flexibly modified based on the accessibility of global versus local focus. When a global focus is made more accessible (through a priming procedure), positive moods lead to a greater global focus than negative moods; but when a local focus is made more accessible (through a priming procedure), this pattern reverses—positive moods lead to a greater local focus than negative moods. This data indicates that positive affect can empower (and negative affect can inhibit) either a big or a small view, depending on which is more accessible in a given situation.

Another way in which emotions can influence perception is through their impact on the perception of spatial features such as slant and distance.

Stefanucci, Proffitt, Clore, and Parekh (2008) show that viewing a slope in a fearful way increases conscious estimates of slant. Participants stood at the top of a steep 7° slope either on a skateboard (fearful condition) (the skateboard was, however, secured to be stationary) or on a wooden box of the same height (control condition). None of the participants had previous experience with skateboarding. All participants were then asked to imagine themselves going

down the slope (post-experimental debriefs indicated that those on the skateboard imagined descending on the skateboard, whereas those on the box imagined stepping off the box and walking down the slope). Participants then provided three estimates of the slant of the slope: a verbal report of the slope's angle in degrees, a visual estimate of the slant by aligning the adjustable angle of a disk to the cross-section that best represented the angle of inclination of the slope, and a haptic palmboard measure, performed by adjusting a palmboard with an unseen hand to match the slope's inclination. After providing the slant estimates, participants' fear of descending the slope was also assessed. The results showed that participants who stood on the skateboard and reported fear, verbally judged the slope to be steeper and exhibited a greater overestimation with the visual-matching measure than those who stood on the box and were unafraid. The haptic palmboard measure was unaffected by the fear-induction manipulation.

(The discrepancy between the haptic palmboard measure and the verbal and visual-matching response measures can be explained by the differing natures of these two types of measures. While the haptic palmboard measure involves the actual *execution* of an action, the verbal and visual-matching response measures involve the *planning* of an action. The actual execution of a movement requires the body to act with *precision* in response to environmental conditions. For instance, when ascending a steep hill, a person must lift his foot to align it perfectly with the ground where it will land. In contrast, *overestimating* a measure can be useful when making decisions or planning future actions, as it allows the individual to be cautious about costs and benefits, the effort and energy required, and so on, thereby remaining "on the safe side". See: Schnall, 2011; Zadra and Clore, 2011).

Riener et al. (2011) expanded this finding by showing that participants in a sad mood perceive a hill to be steeper than those feeling happy. In their experiments, they first manipulated the participants' mood by having them listen to sad or happy music (Experiment 1) and by having them outline and think about (with the intent of later writing a story) a very positive or very negative event in their life (Experiment 2). After the mood manipulation phase, participants were asked to estimate the slant of a hill from the bottom. The results showed that participants in the negative mood group estimated the hill to be steeper than those in the positive mood group.

Fear also plays a role in the perception of height and size. For example, Teachman et al. (2008) showed that individuals with high acrophobic symptoms—that is, a phobia of heights—judge a height viewed from the top to be taller compared to those with low acrophobic symptoms. In their experiment, two groups of participants, one high and one low in acrophobic symptoms—as measured using the Acrophobia Questionnaire (AQ), which evaluates trait-level fear associated with heights, other questionnaires, and specific tasks intended to assess fear—looked over a two-story, 26-foot-high balcony ledge and estimated the vertical distance from the balcony ledge to a target disk placed on the ground beneath the balcony. Moreover, participants gave size estimates of the target disk, which indirectly provided a measure of the distance (the size estimation task measures height perception indirectly by assuming that apparent size is related to estimates of apparent distance. Following simple trigonometry, for a target subtending a given visual angle, the greater the distance, the greater the target size). The results showed that while both groups overestimated the vertical distance, the high-fear group, compared to the low-fear group, estimated the vertical distance to be greater and judged target sizes to be larger.

Stefanucci and Proffitt (2009) also verified the influence of emotional states on the perception of height and size in non-clinical participants. In their experiments, participants were asked to estimate the distance of a target disk from themselves and the size of the target under two contrasting conditions: they either stood on a balcony and looked down at the target on the ground beneath them, or stood on the ground and looked up at the target on the balcony. Stefanucci and Proffitt conducted the experiments under various conditions and employed direct (through a visual matching task) and indirect measures (through size estimation) of distance. In each experiment, participants' fear of heights was assessed using two measures: the Acrophobia Questionnaire (AQ) and the Subjective Units of Distress Scale (SUDS), which assesses the state-level fear participants experienced during exposure to the heights in the experiments. In some experiments, participants were also asked to estimate the likelihood of being injured if they fell from the height.

Across all measures, the perception of height was greatly overestimated, particularly when assessed from the top (Experiments 1A, 1C, 2, and 3), though overestimation decreases with smaller heights (Experiment 1B). The perception of size was overestimated when assessed from

the top but not from the bottom (Experiments 1A, 1C, and 2). For instance, in Experiment 1A, which used an 8-meter balcony, participants who viewed the height from the top overestimated it by 60%, whereas those who viewed it from the bottom overestimated it by 29%. The magnitude of the overestimation difference between the top and bottom conditions was 31%. Participants who viewed the target from the top overestimated its size by 24.6%, while those who viewed it from the bottom overestimated its size by only 2.5%. The magnitude of the size overestimation difference between the top and bottom conditions was 22%.

The role of fear in the perception of height was verified through both a direct measure of distance in Experiment 1—participants who were afraid (as measured by the AQ and SUDS) overestimated height more than those who were unafraid[2]—and an indirect measure of distance (size estimation) in Experiments 1A, 1C, and 2—participants who were more anxious about the balcony (as measured by the SUDS) estimated the target to be larger.

In sum, as the scientific evidence we have briefly reviewed here shows, emotion clearly influences perception in various ways. In doing so, it informs us *directly* and, above all, in an *anticipatory* manner about the possible consequences, costs, and benefits of our actions, the resources we will need to perform a certain action, the opportunities and risks we might face, and more. For instance, the fear of heights warns us about the danger of falling and its potential consequences for our health. As Proffitt (2006, p. 119) effectively explains when describing how we perceive the geometry of spatial layout based on our various possibilities to act on the environment and the costs associated with these actions:

"Seeing these costs in the world eliminates or reduces the need to explicitly deduce their influence. Explicit action plans can be based on how things appear, so that one does not have to separately take into account each of the relative costs. (A principal function of perception is to defend people from having to think.) Simplified action planning is an adaptive consequence of seeing the world in terms of costs and benefits."

[2] This result was not replicated in the other experiments, most probably due to changes in experimental conditions, such as much shorter exposure to the height, the use of a balcony with a solid brick wall at waist height instead of a steel railing, and so on.

By incorporating this information into perception, emotion helps the organism achieve an "economy of action" effortlessly, unconsciously, and instantaneously (Proffitt, 2006; Zadra and Clore, 2011). In this way, emotion helps us plan our actions, make decisions, satisfy our needs, and ultimately preserve our self.

These considerations lead us to a final question: what are the specific mechanisms or processes through which emotions influence and shape conscious perception? For example, by what processes does the fear of heights make us perceive vertical distances as greater than they actually are?

I think the types of processes depend largely on and vary with the specific emotion involved. However, given that conscious experience is primarily determined by attentional activity (Marchetti, 2010, 2018, 2022), any such processes must necessarily involve attention and its organ. Consider the fear of heights as an example. This kind of fear, as we have seen, causes people to overestimate height when looking down from above. At first, this might seem surprising, as one might expect the opposite. In situations with fewer visual cues—where common references for judging distance are missing—distances are typically underestimated (Philbeck and Loomis, 1997). When viewing from above, there are fewer cues, like texture gradient, eye height, and the horizon, compared to viewing from the ground. So why does being at the top of a height lead to overestimating its extent instead of underestimating it?

A plausible explanation for this contradictory effect is the level of arousal associated with fear.

Using both direct (visual matching task) and indirect (size matching task) measures of height, Stefanucci and Storbeck (2009) found that participants who had viewed emotionally arousing images (unrelated to height perception) before estimating the height of an 8-meter balcony (viewed from the top) overestimated the height more than those who had viewed non-arousing images (Experiments 1 and 3). For example, in Experiment 1, participants judged the height of the balcony, on average, to be 13,6 meters if they had viewed emotionally arousing images, whereas they judged it to be 11,4 meters if they had viewed non-arousing images. Furthermore, as demonstrated in Experiment 4, participants who heightened their subjective arousal by imagining themselves or a loved one as the central figure in the picture overestimated height more than those who viewed arousing images without regulation or with down-regulation

strategies, such as adopting a detached, third-person perspective. In summary, the combination of the arousal induced by the arousing images and the arousal elicited by the height of the balcony causes a greater degree of height overestimation.

As psychological evidence shows (for a review, see Kahneman, 1973), high levels of arousal enhance the attentional capacity to process stimuli: less attention is required to process stimuli than is typically needed, or alternatively, stimuli can be processed at lower or marginal levels of attention. Therefore, stimuli are processed faster and more deeply at high levels of arousal than at low levels. Psychophysiological and neurophysiological studies also indicate that emotionally arousing stimuli are processed more quickly and automatically compared to neutral stimuli (Öhman and Soares, 1994; LeDoux, 1995).

This means that, at high levels of arousal, fewer stimuli are sufficient to generate the same perceptual effects that would be generated by a greater number of stimuli at a lower level of arousal. Consequently, given an equivalent number of stimuli or cues, an observer in a high-arousal state will perceive a given distance or height as greater than an observer in a low-arousal state.

Nonetheless, it is important to highlight that arousal alone is not always sufficient to explain the overestimation of distance; additional factors must be considered, such as motivational direction or the degree to which situations engage an impulse to approach or avoid (Balcetis, 2016). Stefanucci and Storbeck's (2009) Experiment 2 revealed that when participants were asked to judge the horizontal extent of a hallway, no overestimation occurred. This was most likely due to the fact that the experimental situation was relatively affectively neutral for the participants and provided no reason to avoid it (unlike, for instance, standing on the edge of a high balcony). The hallway lacked a sense of imminent danger or potential cost, and, consequently, the arousal artificially induced through the images was disregarded or deemed irrelevant in forming perceptual judgments of the hallway's distance. The results would have been quite different if the participants had instead been asked to estimate the length of an infamous alley in a foreign city, a swaying Tibetan bridge suspended over an abyss, or a perilous horizontal section of an iron path on a rock face in the Dolomites—all of which they had to

traverse alone. For example, as reported by Mattson and Rengert (1995), people judge the length of a journey through a dangerous Philadelphia neighborhood as greater the more they feel fear.

In a similar vein, the findings of Harber et al. (2011) and Cole et al. (2013) can be interpreted as showing that an approach orientation reduces the perception of distance. In their experiments, they induced such an approach by exposing participants to dangerous threats (for example, a tarantula or an aggressive man) in contexts that made it impossible for participants to avoid them, escape, or move away. This led participants to judge distances as shorter than they actually were.

4. Conclusion

In this paper, we have seen that emotions are a specific type of conscious experience that helps preserve the integrity of our self by guiding us toward actions that restore our state of equilibrium in response to unexpected or unusual events. Emotions accomplish this function by informing us that our self has entered a state of disequilibrium, indicating the nature of this disequilibrium (positive vs. negative, or pleasure vs. displeasure) and its intensity (strong or weak), signaling—through appraisal processes or some mechanisms of direct elicitation—that this disequilibrium has been caused by an object and typically identifying which object it is, and, finally, guiding us—by eliciting specific physiological responses and action tendencies—toward actions aimed at restoring the original equilibrium or establishing a new equilibrium acceptable for our self.

The information that our self has entered a state of disequilibrium is primarily provided by the hedonic dimension (pleasure–displeasure) of conscious experience. Generally speaking, conscious experience is primarily determined by the attentional activity we perform. The attentional activity we perform modulates the energy level in the area of the neural organ of attention that supports the specific attentional activity. It is precisely this modulation that generates the phenomenal aspect of consciousness. The hedonic dimension is defined by the direction of the modulation, that is, whether the energy level in the area of the organ of attention moves toward or away from the set-point at which the energy level of the area is set. Pleasant and unpleasant experiences occur when the energy level moves toward or away from the set-

point, respectively (neutral experiences occur when the energy level fluctuates within an acceptable range of the set-point). Set-points—which define the optimal reference energy level for the functioning of the specific area in the organ of attention that underpins the attentional activity being performed—can, up to a certain limit, be adjusted by the individual according to his needs, plans, goals, motivations, etc.

The energy level of the organ of attention can also be concurrently modulated by fluctuations in the amount of energy that the organism supplies to the organ of attention. The energy supplied by the organism to the organ of attention fluctuates based on factors such as the individual's physical and mental activity, energy reserves, overall health, and intake of stimulants. These fluctuations affect the individual's arousal state, which in turn shapes his conscious experiences

An individual's state of equilibrium can be restored through various strategies along a spectrum that ranges between two extremes: adapting the self to the object or adapting the object to the self. Emotions can guide behavior in either of these two extreme directions.

Whatever strategy emotions lead an individual to adopt, its implementation and execution require the support of very basic cognitive processes, such as attention, memory, and perception. Only through these processes can more complex ones be built.

The empirical findings I have reviewed in the section "The effects of emotion on behavior" illustrate how emotion may influence some of these basic processes. Numerous additional examples can be found in scientific literature examining the impact of emotion on memory, learning, reasoning, problem-solving, and various aspects of perception. For instance, it is well established that heightened arousal levels, triggered by diverse emotional stimuli (e.g., faces, images, film clips, electric shocks), lead to distortions in time perception, resulting in temporal lengthening (for a review, see Wittmann and Droit-Volet, 2024).

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Reference

Anderson, Adam K. 2005. "Affective influences on the attentional dynamics supporting awareness". *Journal of experimental psychology: General*, 134(2): 258-281.

Bagozzi, Richard P., Mahesh Gopinath and Prashanth U. Nyer. 1999. "The Role of Emotions in Marketing". *Journal of the Academy of Marketing Science*, 27(2): 184-206.

Balcetis, Emily. 2016. "Approach and Avoidance as Organizing Structures for Motivated Distance Perception" *Emotion review*, 8(2): 115-128.

Barrett, Lisa F. 2006. "Solving the emotion paradox: Categorization and the experience of emotion". *Personality and Social Psychology Review*, 10(1): 20–46.

Barrett, Lisa F. and Eliza Bliss-Moreau. 2009. "Affect as a psychological primitive". *Advances in Experimental Social Psychology*, 41: 167–218.

Barrett, Lisa. F., Kristen A. Lindquist and Maria Gendron. 2007. "Language as context for the perception of emotion". *Trends in cognitive sciences*, 11(8): 327-332.

Barrett, Lisa. F., Batja Mesquita, Kevin N. Ochsner and James J. Gross. 2007. "The experience of emotion". *Annu. Rev. Psychol*., 58: 373-403.

Ben-Ze'ev, Aaron. 2002. "Emotions are not feelings". *Consciousness & Emotion*, 3(1): 81-89.

Berridge, Kent C. and Piotr Winkielman. 2003. "What is an unconscious emotion? (The case for unconscious 'liking')". *Cognition and Emotion*, 17(2): 181-211.

Bower, Gordon H. 1992. "How might emotions affect learning?" In S.-Å. Christianson (ed.), *The handbook of emotion and memory: Research and theory*. Hillsdale, NJ: Erlbaum, 3-31.

Brosch, Tobias K. R. Scherer, D. Grandjeana and D. Sandera. 2013. "The impact of emotion on perception, attention, memory, and decision-making". *Swiss medical Weekly*, 143(w13786): 1-10.

Brosch, Tobias and J. J. Van Bavel. 2012. "The flexibility of emotional attention: Accessible social identities guide rapid attentional orienting". *Cognition*, 125(2): 309-316.

Cabanac, Michel. 1971. "Physiological role of pleasure: a stimulus can feel pleasant or unpleasant depending upon its usefulness as determined by internal signals". *Science*, 173(4002): 1103–1107.

Cabanac, Michel. 1996. "On the origin of consciousness, a postulate and its corollary". *Neuroscience & Biobehavioral Reviews*, 20(1): 33-40.

Cabanac, Michel. 2002. "What is emotion?" *Behavioral processes*, 60(2): 69-83.

Cabanac, Michel. 2006. "Adjustable set point: to honor Harold T. Hammel". *Journal of Applied Physiology*, 100: 1338–1346.

Cabanac, Michel and Mauricio Russek. 2000. "Regulated biological systems". *Journal of Biological Systems*, 8(2): 141-149.

Cacioppo, John T., Gary G. Berntson, Catherine J. Norris, and Jackie K. Gollan. 2012. "The Evaluative Sape Model". In P. A. M. Van Lange, A. W. Kruglansky and E. T. Higgins (eds.), *handbook of Theories of Social psychology*. Thousand Oaks, California: SAGE Publications Inc., 50-72.

Caprara, Gian Vittorio. 1994. “Emozioni e motivazioni”. In P. Legrenzi (ed.), manuale di psicologia generale. Bologna: il Mulino, 75-110.

Carver, Charles S. and Michale F. Scheier. 2012. “A Model of Behavioral Self-Regulation”. In P. A. M. Van Lange, A. W. Kruglansky and E. T. Higgins (eds.), *Handbook of Theories of Social psychology*. Thousand Oaks, California: SAGE Publications Inc., 505-525.

Cole, Shana, Emily Balcetis and David Dunning. 2013. “Affective Signals of Threat Increase Perceived Proximity”. *Psychological Science*, 24(1): 34–40.

Damasio, Antonio R. 1999. *The feeling of what happens: Body and emotion in the making of consciousness*. San Diego, CA: Harcourt Brace.

Damasio, Antonio, R. 2004. “Emotions and Feelings. A neurobiological Perspective”. In A. S. R. Manstead, N. Frijda and A. Fischer (eds.), *Feelings and Emotions: The Amsterdam Symposium*. Cambridge, U.K.: Cambridge University Press, 49–57.

Damasio, Antonio R. 2010. *When self comes to mind*. New York, NY: Pantheon Books.

De Jesus, Paulo. 2016. “From enactive phenomenology to biosemiotic enactivism”. *Adaptive Behavior*, 24(2): 130-146.

De Jesus, Pauolo. 2018. “Thinking through enactive agency: sense-making, bio-semiosis and the ontologies of organismic worlds”. *Phenomenology and the Cognitive Sciences*, 17(5): 861-887.

De Monticelli, Roberta. 2016. “Is the Perceptual Model of Emotions Still A Good Competitor? A Small Phenomenology of Feeling”. *Phenomenology and Mind*, 11(2): 32-47.

Deonna, Julien A. and Fabrice Teroni. 2014. “In what sense are emotions evaluations?” In C. Todd and S. Roeser (eds), *Emotion and value*. Oxford: Oxford University Press, 15-31.

Dixon, Thomas. 2012. “‘Emotion’: The history of a keyword in crisis”. *Emotion Review* 4(4): 338-344.

Ekman, Paul. 1992. “An argument for basic emotions.” *Cognition and Emotion*, 6(3/4): 169–200.

Ekman, Paul. 1999. “Basic Emotions”. In T. Dalgleish and M. Power (eds.), *Handbook of Cognition and Emotion*. New York: Wiley, 45-60.

Ekman, Paul. 2003. *Emotions Revealed. Understanding Faces and Feelings*. London: Weidenfeld & Nicolson.

Fredrickson, Barbara L. and Christine Branigan. 2005. “Positive emotions broaden the scope of attention and thought-action repertoires”. *Cognition and Emotion*, 19(3): 313–332.

Frijda, Nico. H. 1986. *The emotions*. Cambridge, UK: Cambridge University Press.

Frijda, Nico H. 1988. “Teorie recenti sulle emozioni”. In V. D’Urso and R. Trentin (eds.), *Psicologia delle emozioni*. Bologna: il Mulino, 19-45.

Frijda, Nico H. 2009. “Action tendencies”. In D. Sander and K. R. Scherer (eds.), *The Oxford Companion to Emotion and the Affective Sciences.* New York: Oxford University Press, 1–2.

Frijda, Nico H. and Klaus R. Scherer. 2009. “Emotion definitions (psychological perspectives)”. In D Sander, KR Scherer (ed.), *The Oxford Companion to Emotion and the Affective Sciences*. New York: Oxford University Press, 142–44.

Gasper, Karen and Gerald L. Clore. 2002. “Attending to the Big Picture: Mood and Global versus Local Processing of Visual Information”, *Psychological Science*, 13(1): 34-40.

Gendron, Maria, Kristen A. Lindquist, Lawrence Barsalou and Lisa F. Barrett. 2012. “Emotion words shape emotion percepts.” *Emotion*, 12(2): 314–325.

Gendron, Maria, Debi Roberson, Jacoba M. van der Vyver and Lisa F. Barrett. 2014. "Perceptions of emotion from facial expressions are not culturally universal: evidence from a remote culture." *Emotion*, 14(2): 251–262.

George, Nathalie. 2013. "The Facial Expressions of Emotions". In J. Armony and P. Vuilleumier (eds.), *The Cambridge Handbook of Human Affective Neuroscience*. New York: Cambridge University Press, 171-197.

Gibson, James, J. 1979. *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Goldstein, Irwin. 2002. "Are emotions feelings? A further look at hedonic theories of emotion". *Consciousness & Emotion*, 3(1): 21-33.

Grandjean, Didier, David Sander and Klaus R. Scherer. 2008. "Conscious emotional experience emerges as a function of multilevel, appraisal-driven response synchronization". *Consciousness and cognition*, 17(2): 484-495.

Grol, Maud and Rudi De Raedt. 2014. "Effects of positive mood on attentional breadth for emotional stimuli". *Frontiers in Psychology*, 5(1277): 1-10.

Harber, Kent D., Douglas Yeung and Anthony Iacovelli. 2011. "Psychosocial Resources, Threat, and the Perception of Distance and Height: Support for the Resources and Perception Model". *Emotion*, 11(5): 1080-1090.

Huntsinger, Jeffrey R., Gerald L. Clore and Yoav Bar-Anan. 2010. "Mood and global–local focus: Priming a local focus reverses the link between mood and global–local processing". *Emotion*, 10(5): 722-726.

Izard, Carroll E. 1992. "Basic emotions, relations among emotions, and emotion-cognition relations". *Psychological Review*, 99(3): 561-565.

Izard, Carroll E. 2010. "The many meanings/aspects of emotion: Definitions, functions, activation, and regulation". *Emotion Review,* 2(4): 363-370.

Jablonka, Eva, Simona Ginsburg and Daniel Dor. 2012. "The co-evolution of language and emotions". *Philosophical Transactions of the Royal Society B: Biological Sciences*, 367(1599): 2152-2159.

James, William. 1884. "What is an emotion?" *Mind*, 9(34): 188-205.

Kahneman, Daniel. 1973. *Attention and effort.* Englewood Cliffs, NJ: Prentice Hall.

Kleinginna Jr, Paul R. and Anne M. Kleinginna. 1981. "A categorized list of emotion definitions, with suggestions for a consensual definition". *Motivation and emotion*, 5(4): 345-379.

Lamb, Roger. 1987. "Objectless Emotions". *Philosophy and Phenomenological Research*, 48(1): 107-117.

Lang, Peter J. and Margaret M. Bradley. 2010. "Emotion and the motivational brain". *Biological Psychology*, 84(3), 437–450.

Laureys, Steven. (2005). "The neural correlate of (un) awareness: lessons from the vegetative state". *Trends in Cognitive Sciences*, 9(12), 556–559.

Laureys, Steven, Mélanie Boly, Gustave Moonen and Pierre Maquet. (2009). "Coma". In L. R. Squire (ed.), *Encyclopedia of Neuroscience*. *Vol. 2*. London: Elsevier, 1133-1142.

Lazarus, Richard S. 1968. "Emotions and adaptation: Conceptual and empirical Relations". In W. J. Arnold (ed.), *Nebraska Symposium on Motivation.* Lincoln: University of Nebraska Press, 175-270.

Lazarus, Richard S. 1982. "Thoughts on the relations between emotion and cognition". *American Psychologist*, 37(9): 1019–24.

LeDoux, Joseph E. 1994. “Emotional processing, but not emotions, can occur unconsciously”. In P. Ekman and R. J. Davidson (eds.), *The Nature of Emotions. Fundamental Questions*. New York: Oxford University Press, 291-292.

LeDoux, Joseph E. 1995. “Emotion: Clues from the brain”. *Annual review of Psychology,* 46: 209-235.

LeDoux, Joseph E. 1996. *The emotional brain*. New York: Simon & Schuster.

Lindquist, Kristen A. and Lisa F. Barrett. 2008. “Constructing emotion: The experience of fear as a conceptual act. *Psychological Science*, 19(9): 898-903.

Lindquist, Kristen A., Lisa F. Barrett, Eliza Bliss-Moreau and James A. Russell. 2006. “Language and the perception of emotion”. *Emotion*, 6(1): 125–138.

Lindquist, Kristen A., Maria Gendron, Lisa F. Barrett and Bradford C. Dickerson. 2014. “Emotion perception, but not affect perception, is impaired with semantic memory loss.” *Emotion*, 14(2): 375–387.

Lindquist, Kristen A., Jennifer K. MacCormack and Holly Shablack. 2015. “The role of language in emotion: Predictions from psychological constructionism”. *Frontiers in psychology*, 6(444): 1-17.

Lischetzke, Tanja and Tanja Könen. 2022. “Mood”. In F. Maggino (ed.), *Encyclopedia of Quality of Life and Well-Being Research*. Cham: Springer International Publishing, 1-6.

Magni, Luca. 2011. “Research proposal for the application of critical discourse analysis to the study of learning cultures”. *Journal of Critical Realism*, 10(4): 527-542.

Magni, Luca, Giorgio Marchetti and Ahlam Alharbi. 2023. Learnable Theory *& Analysis*. Roma: Luiss University Press.

Magni, Luca, Giorgio Marchetti and Ahlam Alharbi. 2024. *Learnable Linguistics for Business Leaders*. Lecce: Youcanprint.

Marchetti, Giorgio. 2010. *Consciousness, Attention and Meaning*. New York: Nova Science Publishers.

Marchetti, Giorgio. 2018. “Consciousness: a unique way of processing information”. *Cognitive Processing*, 19(3): 535-464.

Marchetti, Giorgio. 2022. “The ‘why’ of the phenomenal aspect of consciousness: Its main functions and the mechanisms underpinning it”. *Frontiers in Psychology*, 13(913309): 1-20.

Marchetti, Giorgio. 2023. “Attention and the Conscious Experience of Linguistic Meaning”. In F. T. Li (ed.), *Handbook of Cognitive Semantics*. Leiden/Boston: Brill, 90-137.

Marchetti, Giorgio. 2024. “The self and conscious experience”. *Frontiers in Psychology*, 15(1340943): 1-15.

Mattson, Mark and Rengert George. 1995. “Danger, distance, and desirability: perceptions of inner city neighbourhoods”. *European Journal on Criminal Policy and Research*, 3(3): 70-78.

Maturana, Humberto R. 1990. *Emociones y lenguaje en educación y política*. Santiago de Chile: Centro de Estudios de Desarrollo.

Moors, Agnes. 2010. “Automatic constructive appraisal as a candidate cause of emotion”. *Emotion Review*, 2(2): 139–56.

Moors, Agnes. 2020. “Appraisal Theory of Emotion”. In V. Zeigler-Hill and T. K. Shackelford (eds), *Encyclopedia of Personality and Individual Differences*. Cham: Springer International Publishing: 232-240.

Morsella, Ezequile and John A. Bargh, J. A. 2011. “Unconscious action tendencies: Sources of ‘un-integrated’ Action”. In J. Decety and J. T. Cacioppo (eds.), *The Oxford handbook of social neuroscience*. Oxford: Oxford University Press, 336-347.

Mulligan, Kevin and Klaus R. Scherer. 2012. “Toward a working definition of emotion”. *Emotion Review*, 4(4): 345-357.

Naar, Hichem. 2022. “Emotion: More like Action than Perception”. *Erkenntnis,* 87, 2715–2744.

Naven, kare. 2013. “Affect”. In M. D. Gellman and J. R. Turner (eds), *Encyclopedia of Behavioral Medicine*. New York: Springer, 49-50.

Navon, David. 1977. “Forest Before Trees: The Precedence of Global Features in Visual Perception”. *Cognitive Psychology*, 9(3): 353-383.

Nussbaum, Martha C. 2001. *Upheavals of thought. The intelligence of emotions.* Cambridge, UK: Cambridge University Press.

Öhman, Arne., Anders Flykt and Francisco Esteves. 2001. “Emotion drives attention: Detecting the snake in the grass”. *Journal of Experimental Psychology: General*, 130(3): 466‑478.

Öhman, Arne, Anders Flykt and Daniel Lundqvist. 2000. “Unconscious emotion: Evolutionary perspectives, psychophysiological data and neuropsychological mechanisms.” In R. D. Lane and L. Nadel (eds.), *Cognitive neuroscience of emotion*. New York: Oxford University Press, 296-327.

Öhman, Arne and Susan Mineka. 2001. “Fears, phobias, and preparedness: toward an evolved module of fear and fear learning”. *Psychological review*, 108(3): 483-522.

Öhman, Arne and Joaquim. J. F Soares. 1994. “‘Unconscious anxiety’: phobic responses to masked stimuli”. *Journal of abnormal psychology*, 103(2): 231-240.

Panksepp, Jaak. 1998. *Affective neuroscience: The foundations of human and animal emotions*. New York: Oxford University Press.

Panksepp, Jaak. 2005. “On the embodied neural nature of core emotional affects”. *Journal of consciousness studies,* 12(8-10): 158-184.

Phelps, Elizabeth A., Sam Ling and Marisa Carrasco. 2006. “Emotion facilitates perception and potentiates the perceptual benefits of attention”. *Psychological science*, 17(4): 292-299.

Philbeck, John W. and Jack M. Loomis. 1997. “Comparison of two indicators of perceived egocentric distance under full-cue and reduced-cue conditions”. *Journal of Experimental Psychology: Human Perception and Performance,* 23(1)*,* 72-85.

Plutchik, Robert. 2001. “The Nature of Emotions: Human emotions have deep evolutionary roots, a fact that may explain their complexity and provide tools for clinical practice”. *American Scientist*, 89(4): 344-350.

Prinz, Jesse. 2005. “Are Emotions Feelings”. *Journal of Consciousness Studies*, 12(8–10): 9–25.

Proffitt, Dennis R. 2006. “Embodied Perception and the Economy of Action”. *Perspectives on Psychological Science*, 1(2): 110- 122.

Riener Cedar R., Jeanine K. Stefanucci, Dennis R. Proffitt and Gerald L. Clore. 2011. “An effect of mood on the perception of geographical slant”. *Cognition and Emotion*, 25(1): 174–182.

Rowe, Gillinan, Jacob B. Hirsh and Adam K. Anderson. 2007. “Positive affect increases the breadth of attentional selection”. *Proceedings of the National Academy of Sciences*, 104(1): 383-388.

Russell, James A. 1980. “A Circumplex Model of Affect”. *Journal of Personality and Social Psychology*, 39(6): 1161-1178.

Russell, James A. 2003. “Core Affect and the Psychological Construction of Emotion”. *Psychological Review*, 110(1): 45–172.

Russell, James A. and Lisa F. Barrett. 1999. “Core affect, prototypical emotional episodes, and other things called ‘emotion’: dissecting the elephant”. *Journal of Personality and Social Psychology*, 76(5): 805-819.

Sander, David. 2013. “Models of emotion: The affective neuroscience approach”. In J. Armony and P. Vuilleumier (eds.), *The Cambridge Handbook of Human Affective Neuroscience.* Cambridge, UK: Cambridge University Press, 5-53.

Sander, David and Sylvain Delplanque. 2021. “Unconscious emotional processing”. *Food Quality and Preference*, 92(104177): 1-3.

Sander, David, Didier Grandjean and Klaus R. Scherer. 2005. “A systems approach to appraisal mechanisms in emotion”. *Neural Networks*, 18(4): 317–352.

Sander, David, Didier Grandjean and Klaus R. Scherer. 2018. “An appraisal-driven componential approach to the emotional brain”. *Emotion Review*, 10(3): 219-231.

Schachter, Stanley and Jerome E. Singer. 1962. “Cognitive, social, and physiological determinants of emotional state”. *Psychological Review*, 69 (5): 379–399.

Scherer, Klaus R. 1984. “On the nature and function of emotion: A component process approach”. In K. R. Scherer and P. Ekman (eds.), *Approaches to emotion*. Hillsdale, NJ: Lawrence Erlbaum Associates, 293-317.

Scherer, Klaus R. 2005. “What are emotions? And how can they be measured?”. *Social science information*, 44(4): 695-729.

Scherer, Klaus R. 2009. “Emotions are emergent processes: they require a dynamic computational architecture”. *Philosophical Transactions of the Royal Society B*, 364(1535): 3459-3474.

Scherer, Klaus R. and Agnes Moors. 2019. “The Emotion Process: Event Appraisal and Component Differentiation”. *Annual review of Psychology*, 70: 719-745.

Schnall, Simone. 2011. “Embodiment in Affective Space: Social Influences on Spatial Perception”. In T. W. Schubert and A. Maass (eds.), *Spatial Dimensions of Social Thought*. Berlin, Boston: De Gruyter Mouton, 131-154.

Shargel, Daniel. 2015. “Emotions without objects”. *Biology and Philosophy*, 30(6): 831-844.

Shargel Daniel and Jesse Prinz. 2017. “An Enactivist Theory of Emotional Content”. In H. Naar and F. Teroni (eds.), *The Ontology of Emotions*. Cambridge: Cambridge University Press: 110-129.

Smith, Craig A. and Phoebe C. Ellsworth. 1985. “Patterns of cognitive appraisal in emotion”. *Journal of Personality and Social Psychology*, 48(4): 813–838.

Smith, N. Kyle, Jeff T. Larsen, Tanya L. Chartrand, John T. Cacioppo, Heather A. Katafiasz and Kathleen E. Moran. 2006. “Being bad isn't always good: affective context moderates the attention bias toward negative information”. *Journal of personality and social psychology*, 90(2): 210-220.

Solms, Mark. 2019. The hard problem of consciousness and the free energy principle. *Frontiers in Psychology*, 9(2714): 1-16.

Stefanucci, Jeanine K. and Dennis R. Proffitt. 2009. “The roles of altitude and fear in the perception of height”. *Journal of Experimental Psychology: Human Perception and Performance*, 35(2): 424-438.

Stefanucci, Jeanine K., Dennis R. Proffitt, Gerald L. Clore and Nazish Parekh. 2008. “Skating down a steeper slope: Fear influences the perception of geographical slant”. *Perception*, 37(2): 321-323.

Stefanucci, Jeanine K. and Justin Storbeck. 2009. “Don’t Look Down: Emotional Arousal Elevates Height Perception”. *Journal of Experimental Psychology: General*, 138(1): 131-145.

Teachman, Bethany A., Jeanine K. Stefanucci, Elise M. Clerkin, Meghan W. Cody and Dennis R. Proffitt. 2008. “A new mode of fear expression: perceptual bias in height fear”. *Emotion*, 8(2): 296-301.

Vuilleumier, Patrik and Tobias Brosch. 2009. “Interactions of emotion and attention in perception”. In M. S. Gazzaniga (ed.), *The Cognitive Neurosciences*. Cambridge, MA: The MIT Press, 925-934.

Whiting, Demian. 2018. “Consciousness and Emotion”. In R. Gennaro (ed.), *The Routledge Handbook of Consciousness*. New York: Routledge, 310-321.

Wierzbicka, Anna. 1992. Defining emotion concepts. *Cognitive Science*, 16: 539-581.

Winkielman, Piotr and Kent C. Berridge. 2004. “Unconscious Emotion”. *Current Directions in Psychological Science*, 13(3): 120-123.

Winkielman, Piotr, Kent C. Berridge and Julia L. Wilbarger. 2005. “Unconscious affective reactions to masked happy versus angry faces influence consumption behavior and judgments of value”. *Personality and social psychology bulletin*, 31(1): 121-135.

Winkielman, Piotr and Galit Hofree. 2012. “Unconscious Emotion”. In N. M. Seel (ed.), *Encyclopedia of the sciences of learning*. Boston, MA: Springer, 3366-3369.

Wittmann, Marc and Sylvie Droit-Volet. 2024. “Subjective Time in Ordinary and Non-ordinary States of Consciousness: How Interoceptive Feelings Inform Us About the Passage of Time”. In B. A. Ellenbroek, T. R. E. Barnes, S. L. Andersen, M. P. Paulus and J. Olivier (eds.), *Current Topics in Behavioral Neurosciences*. Berlin, Heidelberg: Springer, 1-23.

Wundt, Wilhelm. 1896. *Grundriss der Psychologie*. Leipzig: Engelmann.

Yiend, Jenny. 2010. “The effects of emotion on attention: A review of attentional processing of emotional information”. In J. De Houwer and D. Hermans (eds.), *Cognition and Emotion. Reviews of Current Research and Theories*. Hove and New York: Psychology Press, 211-275.

Zadra, Jonathan R and Gerald L. Clore. 2011. “Emotion and perception: the role of affective information”. *Wiley interdisciplinary reviews: cognitive science,* 2(6): 676-685.

Zajonc, Robert B. 1980. “Feeling and thinking: Preferences need no inferences”. *American Psychologist*, 35(2): 151-175.

Zajonc, Robert B. 1984. “On the primacy of affect”. *American Psychologist*, 39(2): 117-123.