Emotions do not enter grammar because they are constructed (by grammar)

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Abstract. This paper explores the relation between language and emotion and thus contributes to both language sciences and affective sciences. In both fields, insights from the other field are conspicuously absent. The core empirical claim presented is that there are no grammatical categories dedicated to encoding emotions. This seems to be universally the case and hence appears to be no accident. The absence of grammatical categories dedicated to encoding emotions is surprising given the otherwise close connection between language and emotions as evidenced by phylogenetic, ontogenetic, and neurological properties. Hence, one cannot attribute the absence of emotion categories to a complete disconnect between language and emotions (or cognition more generally). Moreover, one might expect such categories to exist, based on cognitive and evolutionary considerations. The conclusion to be drawn is that emotions are not to be considered primitives that could be directly linked to grammatical categories, but instead that emotions are constructed. In this way, the properties of grammar provide new evidence for the theory of constructed emotions. It is further proposed that linguistic theory may shed light on how emotions are constructed. Specifically, the article explores the hypothesis that the same architecture is responsible for the construction of complex linguistic expressions and for the construction of emotions. As such, the article introduces a novel research agenda, i.e. the emotional spine hypothesis, which invites new avenues of interdisciplinary research.

Keywords: language, emotion, constructed emotion, grammatical categories, universals

> *Emotion, indeed, is proverbially inclined to speechlessness.*
> Sapir (1921, p. 13)

1. What is the relation between language and the emotions?

The goal of this paper is to explore the relation between language and emotions. While I take a linguistics perspective, the argument I develop is informed by classic and contemporary research on emotions. Thus, my contribution is interdisciplinary and should be of interest to the language sciences, the affective sciences, and the cognitive sciences. I aim to present my empirical, analytical, and theoretical points in ways that are of interest and accessible to researchers from different disciplines and across different theoretical stances.

The linguistic perspective I take is fundamentally in the tradition of the cognitive revolution in linguistics, which views language as an intrinsic part of human cognition. There are thus two questions we can ask when exploring the relation between language and emotions:

Q1 How are emotions expressed in the languages of the world?

Q2 What is the cognitive architecture that regulates the relation between language and emotions?

The first question concerns the expressive side and is a descriptive endeavour. While it is tempting to consider this question as a purely linguistic one, I argue that it relates to the affective and cognitive sciences in two ways. First, it needs to be guided by a definition of emotions that goes beyond its folk-psychological understanding and hence should be informed by insights from the affective sciences. Second, its answer has ramifications for the affective and cognitive sciences because linguistic universals tell us something about human cognition. The novel angle I provide here is to explore in detail the role of grammatical categories in the expression of emotions; I conclude that, surprisingly, they play no such role. In this way, the question regarding the relation between language and emotions goes beyond words, which – within the affective sciences – are often considered the basic building blocks of language. When taking the view from grammar, however, grammatical categories are the essential building blocks of language. Crucially, many of these grammatical categories serve to express what can be considered core concepts in human cognition. As such, the absence of emotional content among these categories is likely a clue that there is an underlying cognitive cause, which, by hypothesis, also affects the system of emotions, thus leading towards an answer to the second question.

The paper is organized as follows. In section 2, I provide the necessary background for the rest of the paper. I define the objects of study, emotions and language, thereby identifying the states of the arts in linguistics, as well as in the affective and cognitive sciences. This will allow us to contextualize and delimit the problem regarding the relation between language and emotion. Section 3 comprises the core empirical contribution of this paper, as it addresses the first of the two questions, namely how emotions are expressed in the languages of the world. I demonstrate that there are no means that are dedicated to expressing emotions only. Moreover, among the large set of grammatical features and categories found in the languages of the world, none are dedicated to expressing emotions. In section 4, I argue that this is a surprising fact in need of explanation. I propose that it can be understood if we adopt the hypothesis that emotions

are constructed. In this way, the linguistic generalization presents a novel argument for the theory of constructed emotions. In section 5, I turn to the question as to what architecture might underlie the construction of emotions. Based on Occam's razor, I suggest that the same architecture that underlies the grammar responsible for the construction of complex linguistic expressions also underlies the construction of emotions. I support this conclusion with several pieces of evidence suggesting that language and emotions have a lot in common. Moreover, I introduce an explicit proposal regarding the nature of this grammatical architecture, i.e., *the emotional spine hypothesis*. In section 6, I conclude by outlining some predictions and implications of the emotional spine hypothesis, thus introducing it as a research agenda.

2. Research on emotion and language: The states of the arts

To explore the relation between emotion and language, it is essential to define the objects of study: emotion and language. The purpose of this section is to do so, based on relevant literature in affective science and linguistics, respectively. Within linguistics, it is implicitly assumed that it is clear what is meant by *emotion* – typically taking a common-sense meaning of the word rather than using it as a defined term. Conversely, within affective science, it is implicitly assumed that it is clear what is meant by *language* – again taking a common-sense meaning of the word. However, defining either emotion or language is not a trivial task.

2.1. Defining emotions

What is an emotion? This question has been contemplated by philosophers since ancient times, and it still is. Notably, the investigation of emotions has entered the realm of science, something that has long been deemed impossible given the apparent subjective and unobservable nature of emotions. For much of the work on emotions, language is an important tool as it serves as a window into emotions in two ways: via the study of words for emotion concepts and via self-reports, which are delivered through language. Thus, the words available for specific emotions as well as the way people talk about their emotion experiences are used as proxies for observing the seemingly unobservable.

However, just as the mind – also seemingly unobservable – has entered scientific investigation through the cognitive revolution in the middle of the last century, so have emotions: Affective science has been an emerging field since the 1980s (Gross & Barret, 2013). In this section, I provide a brief overview of the treatment of emotions within affective science and the research that led to the emergence of this field. What I wish to accomplish is to provide enough background to address the question regarding the relation between emotion and language.

When exploring the question of how emotions are expressed in the languages of the world, we have to know what we are looking for, i.e., what counts as the expression of an emotion, as opposed to something else. Linguists typically assume that it is straightforward to know what counts as an emotion, as can be gleaned from the way certain grammatical constructions are described and/or analysed (see section 3). In striking contrast, scholars who specialize in emotion research acknowledge that it is essential to define emotions, but they do not agree on the definition they provide: Already in 1981, Kleinginna and Kleinginna (1981) reviewed 101 such definitions.

What is shared among all definitions is the assumption that emotions are *reactions* to a trigger[1] (which may be an event, an object or individual, a thought, or another emotion) and that it involves *several ingredients*. However, there is no consensus on the ingredients that are involved nor on the way these ingredients relate to each other. Consequently, there is no consensus as to what counts as an emotion nor regarding the architecture of the system that generates emotions. In what follows, I refer to this latter aspect of the emotions as *emotionality*.[2] Specifically, I consider emotionality to refer to the set of capacities that allows humans to experience emotions in all their diverse forms. I take emotionality to be a species-specific capacity, which is invariant across the entire human population.[3]

A major divide within emotion research lies in the question regarding the relation between emotion and cognition, which in turn is crucial in determining the relation between language and emotion, as this largely concerns the cognitive architecture that defines this relation. Some definitions explicitly deny the relevance of cognition for emotions. For example, according to Brown (1976, p. 52), emotions are "perceived states (feelings) which give rise to nonrational adaptive reactions (approach or avoidance)". This independence of emotion and cognition (*rationality* in Brown's terms) is deeply rooted within ancient philosophical traditions that recognized a division of human faculties into cognition, emotion, and volition. As Barrett (2017b, p. 1) puts it: "These mental categories symbolize a cherished narrative about human nature in Western civilization: that emotions (our inner beast) and cognition (evolution's crowning achievement) battle or cooperate to control behaviour". According to many definitions, however, emotions involve a cognitive component. For example, in a recent overview article, Ponsonnet (2022, p. 2) defines emotions as: "internal states that have a cognitive dimension […] as well as a subjective appraisal dimension […]".

Perhaps the simplest argument that emotions involve a cognitive component has to do with the observation that most emotions, because they are reactions to something, have content and this content is cognized relative to the experiencer's goals or desires. This in turn is the source of two related ingredients of emotions: valence and appraisal. That is, experiences that give rise to an emotion can be viewed as positive or negative (their *valence*) or can be evaluated in a more nuanced way (*appraisal*), with one's well-being (*homeostasis)* as the fundamental measure of evaluation (Arnold, 1960; Brenner, 1974; Ortony et al., 1988; Lazarus, 1991; Frijda, 1993; Scherer, 1999; Charland, 2005; Van Berkum, 2019).

The combination of an experience, one's reaction, and its evaluation is what leads to the experience of an emotion (Deonna & Teroni, 2015). Crucially, the same event (e.g. a football game) may lead to different reactions and evaluations in different people and even in the same person at different times, depending on the individual's background (Ortony et al., 1988, p. 4). I will henceforth assume that emotions do have a cognitive component. This assumption is corroborated by neurological evidence: Emotion and cognition have been shown to be interactive and integrated or mingled in the brain (Lewis, 2005; Phelps, 2006; Pessoa, 2008).

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[1] It is generally assumed that experiences which intuitively resemble emotions but lack a specific trigger are different phenomena. In particular, such experiences are sometimes referred to as instances of *mood* (Ekman, 1999).

[2] I introduce this term in analogy to the corresponding term for the cognitive aspects of language, namely *linguisticality*, recently coined in Haspelmath (2019) (see section 2.2).

[3] This is not to say that animals do not have emotions, just that their emotions are different and arguably come about in different ways, i.e., via a different architecture (see section 6).

Considering these widely accepted ingredients of emotions, van Berkum (2019: 739ff.) proposes the following baseline definition, integrating previous ones (including those of Lazarus, 1991; Scherer, 2005; Frijda, 2008; Damasio, 2010; Panksepp & Biven, 2012; Adolphs, 2017):

> "…a package of relatively reflex-like synchronized motivational, physiological, cognitive, and behavioral changes, triggered by the appraisal of an external or internal stimulus event as relevant to the interests (concerns, needs, values) of the organism, and aimed at generating a prioritized functional response to that stimulus event. The changes involved need not emerge in consciousness, but to the extent that they do, they give rise to feeling." (Van Berkum, 2019, p. 739f.)

For the purpose of the following discussion, I will assume Cochrane's (2019) definition below, which encompasses these core ingredients of emotions and their cognitive component via the inclusion of *representation*:

Emotions $=_{def}$ valent representations of situated concerns (Cochrane, 2019, p. 10)

While researchers agree that emotions are complex in that there are several ingredients that either contribute to, or go along with, an emotional experience, there is no consensus as to how these ingredients relate to each other, i.e., regarding the architecture of emotionality. Roughly, there are two opposing views: the theory of basic emotions and the theory of constructed emotions. I discuss each of them in turn.

2.1.1. The theory of basic emotions

The theory of basic emotions is the one that has, to some extent, entered popular assumptions regarding the nature of emotions, and is thus reflected in some treatments of the linguistic expressions of emotions within the language sciences. It is rooted in the view of the classical philosophers dating back to Plato and Aristotle, according to which emotions are primitives without component parts. Darwin's (1872) *Expressions of the emotions in man and animals* and James' (1884) *What is an emotion?* paved the way for the modern theory of basic emotions. On this view, basic emotions are taken to be complex reflexes that are automatically triggered by an event and which correlate with a series of symptoms including feelings, facial movements, vocalizations, changes in the nervous system, motivations, and actions (Ekman & Friesen, 1971; Izard, 1971, 2007; Ekman, 1992a, 1992b, 1999; see Tracy & Randles, 2011 and Keltner et al., 2019 and for an overview). Crucially, as illustrated in Figure 1, the emotion itself is treated as an impenetrable whole – a black box of sorts. The emotional reaction, along with the physical effects it has, is considered a distinctive and hardwired neural circuit (Panksepp, 1998; Izard, 2011; Levenson, 2011 a.o.).
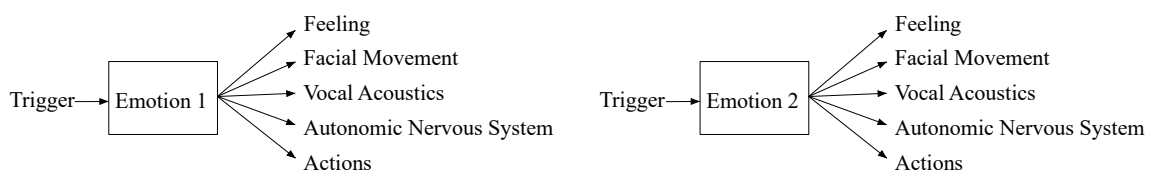

Figure 1. Basic emotions (adapted from Barret (2017b: 2 Fig. 1C))

According to this view, basic emotions are universal, developmentally early, and considered solutions to evolutionary problems that promote survival (Plutchik, 1980). Hence, some consider basic emotions to be present in animals as well (Panksepp, 1998), although there is much controversy surrounding this (see Mendl et al., 2022 for a recent overview).

While details differ, all approaches that fall under the umbrella of basic emotion theory have in common the postulation of a small number of *basic* emotions, which are viewed as primitives, and which correspond to universal innate programs. However, since its inception, there has not been a consensus as to which emotions belong to the set of basic emotions or how many there are (see Ortony & Turner, 1990; Ekman & Cordaro, 2011 for an overview). This is illustrated by the examples of basic emotions proposed by different scholars listed in (1).

(1) a. anger, aversion, courage, dejection, desire, despair, fear, hate, hope, love, sadness
(Arnold, 1960)

    b. interest, enjoyment, surprise, fear, anger, distress, shame, contempt, disgust
(Tomkins, 1984)

    c. anger, disgust, fear, joy, sadness, surprise   (Ekman et al., 1982)

    d. fear, love, grief, rage   (James, 1884)

    e. happiness, sadness   (Weiner & Graham, 1984)

    f. pain, pleasure   (Mowrer, 1960)

Note that the controversy does not concern the existence of emotions other than those listed above, rather it concerns the number of basic emotions. That is, proponents of the theory of basic emotions still acknowledge the existence of secondary emotions—emotions that are derived from basic emotions and arise in combination with cognitive processes (e.g., Damasio, 1994).

Nevertheless, the lack of consensus regarding the list of basic emotions is already an indication that there might be problems with the theory of basic emotions in general (Ortony, 2022). Specifically, if indeed there was a set of universal basic emotions, then one might expect that after more than a century of research on the topic, there would be a consensus regarding what and how many basic emotions there are. But this is not the case, and it is one of several reasons that have led some to suggest that the theory of basic emotions is on the wrong track. This view is known as the theory of constructed emotions, to which I turn next.

2.1.2. The theory of constructed emotions

The modern theory of constructed emotions is mainly associated with the work of Feldman Barret and her colleagues (Barret, 2017b). The core assumption is that *all* emotions are constructed based on different, more basic components or dimensions (Schachter & Singer, 1962; Mandler, 1975; Russell, 2003; Barrett, 2006, 2013, 2017a, 2017b; Clore & Ortony, 2008, 2013; Feldman Barrett 2011, Cunningham et al., 2013; Lindquist, 2013; see Gendron & Barrett, 2009 for an overview). On this view the relation between the types of responses that are typically associated with emotions and the emotion itself can be viewed as reversed – the emotional black box is made transparent, as it were. Specifically, the assumption is that the relevant event does not trigger the emotion itself but instead triggers physiological changes which in turn are

interpreted via several cognitive processes. These components interact to construct different emotions, as illustrated in Figure 2.
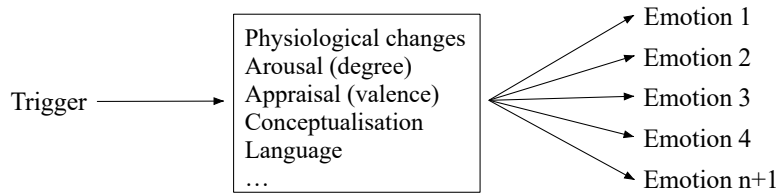

Figure 2. Ingredients for the construction of emotions

According to the theory of constructed emotions, the main question to be resolved does not concern the inventory of emotions but rather the ingredients involved in their construction and how they relate to each other, i.e., the architecture of emotionality, and how it is embedded within the cognitive architecture. If one accepts the assumption that emotions are constructed, one can immediately derive from this assumption that emotions may differ in their complexity, without positing a set of basic (primitive) emotions that would contrast with secondary (more complex) emotions.

In this paper, I introduce a novel language-based argument for the theory of constructed emotions. Note that language has long played an important role in the critique of the theory of basic emotions. Specifically, two arguments have been made to this effect. First, languages differ significantly in the set of words denoting emotion concepts (Lutz, 1988; Wierzbicka, 1992; Jackson et al., 2019). Not all languages have words for the basic emotions postulated and existing words for emotion concepts typically do not refer to the same state across different languages. This leads Wierzbicka (1999) to the view that emotion concepts are constructed, thus providing an argument against the theory of basic emotions. Specifically, she points out that the theory of basic emotions is likely to be Anglo-centric: It presupposes that the English words that denote the basic emotion concepts are, as if by coincidence, the terms that precisely denote the postula-ted basic emotions. In contrast, speakers of other languages would have the same emotions (assuming that basic emotions are universal) but might lack a precise term for them.

The second language-based argument against a theory of basic emotions has to do with the finding that language influences the quality (if not perception) of emotions (see Lindquist, 2021 for a recent overview). Thus, language (mostly in the form of words for emotion concepts) must be one of the components that contribute to the construction of emotions (Lindquist et al., 2006; Lindquist et al., 2015).

Here I add another language-based argument for the theory of constructed emotions, one that goes beyond words denoting emotion concepts but exploits aspects of grammatical knowledge. To fully appreciate the significance of grammatical knowledge, which forms part of our linguistic knowledge, I now turn to defining language.

2.2. Defining language

In this subsection, I briefly review core assumptions about language that many linguists share. My purpose here is twofold. For readers with a background in affective science, it is useful to know how the different ways of exploring the relation between language and emotions are grounded within linguistics. For readers with a background in linguistics, it is essential to start

exploring the relation between language and emotion based on a common understanding of what language is. I thus intend to introduce a baseline shared across different frameworks.

The question regarding how emotions are expressed in the languages of the world concerns aspects of language that are directly observable. This observability is presumably the reason why language has long served as a window into emotions. However, within philosophy and affective science, this was typically restricted to the investigation of *words* for emotion concepts. While such an investigation can be a useful endeavour when trying to understand cultural differences in the conceptualization of emotions, it has its limits when it comes to exploring potentially universal aspects of the relation between language and emotions, as well as the capacity for emotions (i.e., our emotionality). This is because words are always language-specific and do not straightforwardly reflect universal aspects of human cognition and/or emotions. Moreover, what we typically do with words is *describe* emotions and this requires some kind of conscious process by which we bring a current or past emotional experience into our awareness, as in (2a,b), or we can describe other people's emotions, based on what we know and observe about their behaviour, as in (2c).

(2) a. I am so happy about this gift you gave me.
    b. I was pretty angry about your call yesterday.
    c. He is really scared of the dog.

Because of the conscious awareness necessary to describe emotions and the observed linguistic variation, words are not an ideal window into emotions, nor into emotionality, nor into the relation between language and emotions. As I show in section 3, languages have other means that allow their speakers to directly express their emotions, such as interjections. Arguably, their use provides a more direct access to emotions because conscious thought is not required to use them.

The second way in which we can explore the relation between language and emotion is by exploring the underlying cognitive architecture that relates the two capacities. While cognitive architecture is not directly observable, there are nevertheless good reasons to think that the observable properties of language provide us with a window into it. That is, linguistics has been a cognitive endeavour since the middle of the last century, ever since Chomsky (1959) denied the behaviourist idea that mental capacities (inside a black box) cannot be explored scientifically. The core idea, still relevant today and not only restricted to Chomskyan linguistics, is as follows. The original argument had to do with language acquisition. Given the speed with which children acquire the language of the speech community they are born into, and given the limited data they are exposed to, it stands to reason that they do not come to learning that language with a cognitive blank slate. In other words, there must be something in our initial cognitive make-up that facilitates the acquisition of language. This hypothesis is further corroborated by the fact that all human languages share certain fundamental properties. These properties, which by hypothesis must be rooted in our cognition (and are thus not directly observable) are assumed to be deducible from the directly observable properties of the languages that are externalized through different modalities (spoken or signed). The distinction between the observable (spoken or signed) languages of the world and the underlying unobservable knowledge of any language that characterizes the human species is, within the generative tradition, referred to as a

difference between E(xternal)-language and I(nternal)-language. While the precise characterization of this distinction is a matter of much debate, making this distinction (however it is referred to) is useful and necessary, including in the exploration of the relation between language and emotion. That is, the first question regarding the expression of emotions in the languages of the world concerns E-language(s), whereas the second question regarding the cognitive architecture that regulates this relation concerns I-language.

While the assumption that language is embedded in and determined by human cognition is uncontroversial, there is no consensus as to exactly how. There are two views on this matter which are often considered to be diametrically opposed, namely *generative linguistics* and *cognitive linguistics*. Here I introduce the main differences but will also highlight some points of agreement in order to make the discussion that follows relevant to all linguists no matter their theoretical conviction.

According to the generative tradition, associated with the work of Chomsky, knowledge of language is due to an innate language-specific faculty that is embedded within cognition, but which is characterized as an autonomous system. By hypothesis, it is not influenced by other aspects of cognition but only interfaces with other capacities (e.g., the articulatory-perceptual system which makes the externalization of language possible, and the conceptual-intentional system which makes interpretation of language possible). In contrast, according to the tradition of cognitive linguistics, knowledge of language emerges via general cognitive capacities (just as other cognitive capacities do). Thus, language is not assumed to be special and/or autonomous but shares in and is shaped by general cognition. These two views of language are illustrated in Figure 3.
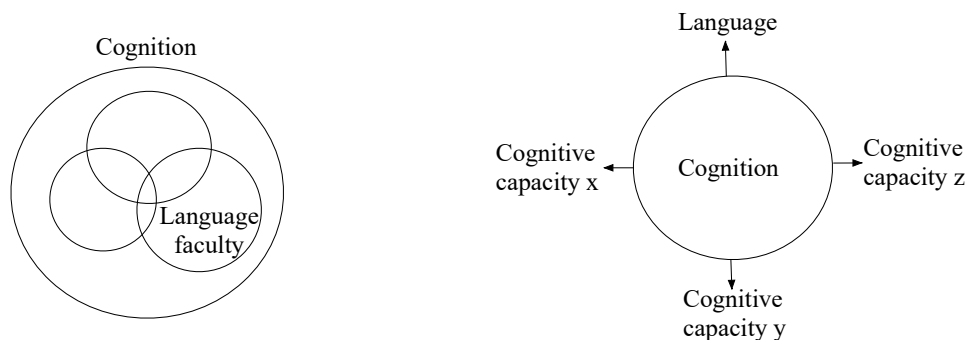

Figure 3. Generative vs. cognitive views on the way language is embedded in cognition

Historically these two paradigms have been considered as fundamentally opposed to each other. This is reflected by the fact that the division led to the so-called *Linguistics Wars* (Harris, 1993). However, for the present purpose, one of the assumptions they share is crucial, namely that the observable properties of language, especially those that hold universally, tell us something about cognition. Hence exploring the cognitive architecture that regulates the relation between language and emotion, as I attempt to do here, is a question that can and should be asked within both paradigms.

To get away from framework-specific terminology and assumptions that do not affect the present goal, I adopt the term *linguisticality* for those aspects of language that relate to this cognitive question. This term was introduced by Haspelmath (2019) in analogy to the term *musicality,* which refers to the human capacity for music. It is defined as in (3).

(3) Linguisticality =def the set of capacities that allows humans to learn and use languages in all their diverse forms. It is a species-specific capacity and is invariant across the entire human population, it is appropriately studied from a biological perspective.

(Haspelmath, 2019, p. 2)

The term roughly corresponds to the generative terms *Universal Grammar* (UG) or *faculty of language* but without implying innateness or language-specificity. Note that within the generative tradition, too, some recent approaches consider fewer aspects of language to be part of a truly language-specific faculty Specifically, only the formal aspects of language that are considered responsible for the computation of form-meaning relations remain at centre stage of the language faculty in the narrow sense (Hauser et al., 2002). And even this formal aspect of language is considered to be at least influenced by other cognitive abilities, in that it is hypo-thesized to be a perfect solution to an interface problem, namely, how to externalize thoughts (i.e., how to relate the conceptual-intentional aspects of language to its articulatory-perceptual ones). In addition, the language faculty in the broad sense is now assumed to include a *third factor*, namely principles that are not specific to the faculty of language (Chomsky, 2005).

In sum, I use the term *linguisticality* for those aspects of human cognition which led to the fact that there are currently more than 7,000 languages in the world. I use this term to do justice to the framework-independent relevance of the problem regarding the relation between langua-ge and emotion. In the next subsection, I turn to a brief overview of how this problem has been addressed.

2.3. Defining the problem: The relation between language and emotion

As introduced in section 1, there are two ways in which the relation between language and emotion can be explored. One concerns the expressive side (How are emotions expressed in the languages of the world?) and the other concerns the cognitive side (What is the cognitive archi-tecture that regulates the relation between language and emotion?)

Neither of these two questions has received much attention within modern linguistics. The stage for this lack of exploration was set by Sapir and Jakobson, both of whom subscribe to the view that it is rational thought (*ideation*) that "reigns supreme in language", and "that volition and emotion come in as distinctly secondary factors" (Sapir, 1921, p. 30). This contrasts with the view held by Van Ginneken (1907) according to whom emotional meaning is primary, with feeling being the essence of language. Somewhere in the middle is Bühler's (1934) view, according to which language is characterized by three equally important functions: apart from *representation* (the rational aspect of meaning), it also has an *appealing* function (which highlights the social dimension of meaning) and an *expressive* function, which serves to express the speaker's (unconscious) attitudes, feelings, and emotions (see also Lyons, 1977 for an overview of these aspects of meaning). Van Ginneken's and Bühler's views are opposed to the tradition of Western philosophy, according to which emotions are too subjective to be studied. This might be one of the reasons why Sapir's view is the one that took hold in linguistics. Never-theless, despite this bias for rationality, the pervasiveness of the expressive function of language is hard to overlook. Already Jakobson (1960) acknowledges that the role of emotion in language cannot and should not be neglected. This is because the emotive function of language "flavours

to some extent all our utterances, on their phonic, grammatical and lexical level […] we cannot restrict the notion of information to the cognitive aspect of language" (Jakobson, 1960, p. 336).

While the grandfathers of modern linguistics thus recognize emotion as an ingredient of language, systematic exploration of language expressing emotional content has always been scarce and somewhat at the fringes of linguistics (see Van Berkum, 2019 for a recent overview). Thus, while the question regarding the inventory of expressive language (and to some degree the analytical challenges it poses) has continuously received some attention (though not nearly to the same degree as its representational function), the question regarding the cognitive aspect of the relation between language and emotion is hardly addressed. But if we take language to be a window into the human mind, as is the case in the cognitive approaches to language, then it behoves us to explore how linguisticality and emotionality interact, thus contributing to a general model of cognition. Of course, the question regarding human cognition is ultimately an empirical question, although the unobservable character of cognitive architecture necessitates a more indirect approach, such as using the observable properties of language as a window into it (but see Van Berkum, 2019 for a processing view). This approach necessarily brings with it a dependency on theoretical assumptions regarding the cognitive architecture of language.

Consider first the problem from the point of view of cognitive linguistics. On the assumption that language is shaped by general cognition, we might expect at least the cognitive aspects of emotions to reflect the same cognitive architecture as language does (see Schwarz-Friesel, 2015 for an overview). No specific predictions are made, however, regarding the relation between linguisticality and emotionality. Indeed, specific models that address this question are conspicuously rare. Two notable exceptions are worth pointing out.

First, Kövecses's (1986, 2020) seminal work on conceptual metaphors of emotion across languages and cultures comes close to modelling the relation. He argues that emotions are in part socially constructed, with language being essential to creating cultural models of emotions, which are thus language- and culture-specific. He views these models as mental representations of emotions. In this way, Kövecses parallels the word-based investigation of emotion concepts of Wierzbicka (1999) to metaphors and follows the Lakoffian heuristic of taking metaphors as windows into cognition. This pertains to the construction of individual emotions and hence sides with the theory of constructed emotions. However, there is no explicit modelling of the cognitive architecture that underlies this construction.

The only model within cognitive linguistics I am aware of that attempts to address this is that of Foolen (1997). He views cognition and emotion as two separate inner processes, fed by the same input (via the senses, ideas, and actions), which can simultaneously be the object of thought and arouse emotions. Furthermore, cognition and emotions lead to separate communicative outputs: Cognition is responsible for verbal utterances (e.g., via language) while emotion is responsible for non-verbal utterances (e.g., cries and laughter). He further argues that the expressive dimension of language is based on its representative cognitive use and provides some linguistic evidence for that. However, Foolen leaves the cognitive underpinnings of this mechanism as a question for future research.

Finally, let us turn to the point of view that generative linguistics makes available. On the assumption that there is an autonomous, language-specific component of cognition, the question becomes an interface question. That is, just as the language faculty must interface with the conceptual-intentional system and the articulatory-perceptual system, one might hypothesize

that there is also an interface between language and the system of emotions (Corver, 2013, 2017, 2021). The only explicit proposal to this effect to my knowledge is that of Ruda (2019), who proposes that there is indeed such an interface, namely a so-called *affect interface.* She further proposes that this interface is not part of core of grammar, but instead belongs to the periphery.

In sum, the state of the art in linguistics regarding the relation between language and emotion is rather poorly developed. While there is significant work on the expression of emotion (see below) the implications of the properties of such expressions for our understanding of language within a general theory of cognition are rarely addressed.

3. Emotions do not enter grammar(s)

In this section, I proceed to address the first question regarding the relation between language and emotions: How are emotions expressed in the languages of the world?[4] I start in section 3.1 with some general observations that already point to the conclusion that emotions do not enter grammar. I then introduce the core empirical claim: the absence of grammatical categories dedicated to the expression of emotions (section 3.2). In section 3.3, I discuss some apparent exceptions to the generalizations, and I argue that they are only apparent. Finally, in section 3.4, I conclude that the absence of dedicated grammatical categories for emotions constitutes a new argument for the theory of constructed emotions.

3.1. How are emotions expressed in the languages of the world?

Perhaps the most basic property of language is the fact that it relates form and meaning in systematic ways. The fact that early on linguists and psychologists have distinguished the emotive function of language from its representational function leads us to ask whether the form-meaning relation is the same across these two functions. While this question has not been addressed in this way, aspects of it have, and the findings suggest, perhaps unsurprisingly, that the answer is negative. The expression of emotions follows a different logic than the representation of thought. To see why, it is useful to separately consider questions regarding: i) the *forms* used, ii) the types of *meanings* involved; and iii) the logic behind the *form-meaning relation* in each domain.

As for the *forms* used, those that have been considered are typically words denoting emotion concepts. However, it is well-known that the expression of emotions is not restricted to words; emotions can be expressed through different linguistic means including prosody, morphology, syntax, semantics, and pragmatics (Ochs & Schieffelin, 1989; Besnier, 1990; Majid, 2012; Finkbeiner et al., 2016; and see Foolen, 2015, and Ponsonnet, 2022 for a recent overview). At first sight, this appears to suggest that the expression of emotions is similar to the representation of thought as the latter, too, implicates all linguistic domains. However, as is well-known, the expressive function of language has a different logic than the representational function. While it does pervade the linguistic system, it does so in a way that differs from the forms that carry the representational function of language. Notably, the expression of emotions through

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[4] I here abstract away from non-verbal expressions of emotions, such as facial expressions, non-linguistic vocalizations, bodily movement, gaze, gesture, etc. (see Keltner et al., 2016, Keltner et al., 2019 for an overview). While the relation between these expressions of emotions and language is an interesting question, it goes beyond the scope of the present article.

language is often achieved by exploiting existing means of representational language for affective purposes (Besnier, 1990, p. 425).

As for the *meaning* involved, it has long been acknowledged that emotive meaning is fundamentally different from representational meaning. Already Frege, the grandfather of modern (truth-conditional) semantics, acknowledges that certain words carry – in addition to their denotation – an emotive *Färbung* ('colouring'), which often expresses a negative attitude towards the referent. Frege's often-cited German example is the use of *Köter* ('cur') instead of *Hund* ('dog'). The intuitive concept of colouring did not receive explicit analysis until Potts (2005, 2007), who builds on work by Kaplan (1999). Specifically, Potts argues that expressive language (including interjections such as *damn, ouch, oops, oh)* has its own logic, distinct from symbolic or representational language. For example, unlike representational language, it is non-displaceable: It is always used to express an emotion of the speaker here and now. Potts develops a two-dimensional semantics where truth-conditional meaning defines one dimension and expressivity the other, but both are amenable to formal analyses (see also Recanati, 2004 and Gutzmann, 2015, who refer to this dimension of meaning as *use-conditional*).

Turning now to the question regarding the *form-meaning relation*, this fundamentally concerns the grammatical properties of the expression of emotions. That is, while for simple forms (e.g., morphemes) the relation between form and meaning is (mostly) a matter of convention, for complex expressions it is grammar that mediates this relation. One crucial aspect of grammar (broadly construed) which is responsible for this mediating role is what is known as the principle of compositionality (ascribed to Frege). According to this principle, the interpretation of a complex expression depends on its constituent parts and the way they are combined, where grammar is responsible for this combinatorial aspect.

Crucially, the grammatical properties of emotion expressions are rarely discussed – a gap which is not surprising given that much of emotive language appears grammatically simple or even outside of grammar proper (but see Gutzmann, 2019). For example, interjections may serve as single-word utterances and hence grammar does not appear to be involved – at least at first glance. But see Dingemanse (2023, 2024) for a recent overview and account of the systematicity underlying the form-meaning relation of interjections.

To my knowledge, the only work on the expression of emotions that is explicitly concerned with the grammar of emotive language is that of Corver (2013, 2017, 2021). Based mainly on evidence from Dutch, he hypothesizes that there is no special grammar for the expression of emotions; rather existing grammatical constructions are used in special (secondary) ways (see also Ruda, 2019). Significantly, a cross-linguistic exploration of this conclusion is still outstanding, although Corver (2021) does mention a few examples from languages other than Dutch that adhere to the same general pattern. Thus, in terms of its grammatical properties, we observe that the expression of emotions either appears to lie outside of grammar or else is parasitic on the grammar dedicated to the representation of thought. This conclusion is perhaps unsurprising, given the above-mentioned fact that the expression of emotions exploits existing means from all domains of representational language (as described in detail in Besnier, 1990).

What we are led to conclude from this brief overview is that: i) the expression of emotions pervades language across all dimensions, and ii) the logic behind it is different from that of representational language. What this in turn suggests is that grammar does not regulate the expression of emotions and conversely that emotions do not partake in the grammatical

composition of representational language. This conclusion is further supported by the fact that emotions do not participate in the grammatical construction of representational meaning. Specifically, in what follows I demonstrate that there are no grammatical categories dedicated to the expression of emotions.

3.2. *There are no grammatical categories dedicated to the expression of emotions*

As mentioned above, grammar can be viewed as the driving force behind compositionality, which defines representational language. What is essential for our purpose is the fact that grammar operates over classes of words and morphemes rather than their instances. That is, the fundamental building blocks of grammar are features and categories that define units of language. I refer to these as *grammatical categories.* In this sub-section, I show that grammatical categories are never defined by expressive or emotive content, which in turn suggests that emotions do not enter grammar. Based on the fact that individual languages do not appear to have grammatical categories dedicated to the expression of emotions we can conclude that our linguisticality is characterized by a conspicuous absence of emotions among its building blocks.

I start by first introducing some of the fundamental properties of grammatical categories to establish that they are indeed never defined by emotive content.

3.2.1. What are grammatical categories?

Within linguistics, the existence of grammatical categories is hardly controversial, even though defining them is less straightforward. In this subsection, I introduce in broad strokes assumptions about the defining properties of grammatical categories, which I take to be widely accepted. After all, to know if something is missing, we need to know what we are looking for. Hence we need to ask what a grammatical category dedicated to the expression of emotions might look like.

Much of the research on the relation between language and emotions focuses on words. The types of words psychologists, for example, use to support certain claims about emotions are those that denote emotion concepts. They belong to the so-called lexical categories: nouns (e.g., joy), verbs (e.g., *frighten)*, and adjectives (e.g., *sad*). Crucially, to compose a sentence, we need more than words denoting concepts. We need grammatical categories. They are essential for the construction of reference (propositions and discourse referents). In other words, grammatical categories function as the glue that holds lexical words together to create the meaning needed to express complex thoughts. Depending on the type of language, grammatical categories can be expressed by, among other things, free-standing words (such as English demonstratives (4a)), by bound morphemes (such as English tense marking (4b)), by certain patterns of (re-)ordering (such as English subject-auxiliary inversion to mark polar questions (4c)), and by grammatical tone (such as Kalabari LH tone on nouns, which consistently appears in the context of a demonstrative independent of the underlying tone of the noun (4d)).

(4) a. this word   English demonstrative

    b. He play-ed   English tense marking

    c. i. She can read this novel

        ii. Can she ___ read this novel   English subject-auxiliary inversion

    d. námá   [mí nàmá]   Kalabari tone
       'meat'(HH)   'this meat' (H LH)
       pùlò   [mí pùló]
       'oil' (LL)   'this oil' (H LH)
       bélè   [mí bèlé]
       'light'(HL)   'this light' (H LH)

                    (Harry & Hyman, 2014, p. 6; cited in Rolle, 2018, p. 21, example 5)

Thus, grammatical categories cannot be identified based on their form. Their expression differs within and across languages. Nevertheless, they display several properties that universally set them apart from lexical categories. I will now discuss some of them.

First, within a given language, the number of words belonging to lexical categories is large and open-ended, whereas the number of forms belonging to grammatical categories is limited. Related to this property is the fact that the inventory of lexical categories constantly increases (or at least changes), reflecting the need to add concepts in an ever-changing world. In contrast, the inventory of grammatical categories is relatively stable.

Second, in terms of their meaning, words belonging to lexical categories denote concepts, which may correspond to objects of perception. By contrast, the meaning associated with grammatical categories differs. While they may be grounded in certain (typically abstract) conceptual meanings (like time, location, number, and questionhood), they typically do not display the same range of meaning that lexical categories within the same conceptual space do. Moreover, the meaning of grammatical categories is often characterized through contrastive oppositions. For example, English tense marking is restricted to present vs. past, whereas words that belong to lexical categories can denote more fine-grained distinctions within the conceptual space of temporality (e.g., *now, yesterday, last week, two years ago, ...*). Thus, the meaning that defines grammatical categories (henceforth *grammatical meaning*) is qualitatively different from the meaning that defines lexical categories (Hinzen et al., in press).

The distinction between lexical and grammatical categories is uncontroversial and can be considered a language universal. Hence, we can conclude that the existence of grammatical categories is part of our linguisticality. However, languages differ regarding the inventory of grammatical categories, and this is where much controversy exists across different theoretical frameworks. According to many typologists, grammatical categories vary so dramatically that universal categories cannot be identified; they are always language-specific (Haspelmath, 2007; Evans & Levinson, 2009). By contrast, according to some versions of the generative paradigm, grammatical categories (a.k.a. functional categories) are part of our linguisticality and thus universal (Cinque, 1999). To come to terms with this tension, Wiltschko (2014) argues that the universal categories that define our linguisticality are abstract categories that constrain the construction of language-specific grammatical categories.[5]

What is important for our purpose is the distinction between language-specific grammatical categories and the potentially universal categories that serve to construct them. When exploring the question regarding the existence of grammatical categories dedicated to the expression of

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[5] We are (again) faced with the question as to whether the abstract building blocks responsible for the construction of language-specific categories are unique to our linguistic capacity or whether they belong to our general cognitive capacity. See section 6 for some discussion.

emotions, we can ask this question from two perspectives: First, are there language-specific grammatical categories dedicated to the expression of emotions? And second, do emotions enter our linguisticality such that they play a systematic role in the construction of grammatical categories? To be sure, given that the meaning of grammatical categories is typically grounded in some conceptual meaning, there is no *a priori* reason why emotion concepts could not serve as the basis for grammatical categories.

Having introduced my assumptions about the essence of grammatical categories, I now turn to the empirical observation I wish to introduce here: the absence of grammatical categories dedicated to the expression of emotions.

3.2.2. There are no grammatical categories dedicated to the expression of emotions

As mentioned above, grammatical categories come with a variety of content, but full emotional content is conspicuously absent (though crucially components of emotions are found, as we shall see). To be sure, it is impossible to prove the non-existence of something: We can never have knowledge of all the grammatical categories in the languages of the world (present, past, or future). It is thus empirically impossible to *prove* that grammatical categories dedicated to the expression of emotions do not exist. Nevertheless, the existing empirical evidence is at least suggestive enough to be taken seriously and thus to require an explanation.

Consider first evidence drawn from the typological literature. This literature is ripe with descriptions of language-specific categories – those that are frequently found and those that are rare. A representative list is the list of morpho-syntactic and morpho-semantic features compiled by the Surrey Morphology Group (Kibort & Corbett, 2008). They include *gender, number, case, respect, definiteness, tense, aspect, mood, polarity, transitivity, diathesis and voice, question word dependency, associativity*, and *screeve*.[6] Similar categories are found in other typological databases, such as *The World Atlas of Language Structures* (WALS).[7] Moreover, even the *Rara and Universals Archive*,[8] a database of universals and rare phenomena, does not list grammatical categories dedicated to emotions. These are the golden standards for typological studies, based on the description and analysis of over 2,500 languages.

Moreover, if categories dedicated to the expression of emotions were part of the (common) inventory of the languages of the world, we would expect the standardly accepted glossing rules to reflect this fact by containing relevant glosses to this effect. However, the list of standard abbreviations in the Leipzig glossing rules (reproduced in (5)) does not contain such categories.

(5)   *1 first person; 2 second person; 3 third person; A agent-like argument of canonical transitive verb; ABL ablative; ABS absolutive; ACC accusative; ADJ adjective; ADV adverb(ial); AGR agreement; ALL allative; ANTIP antipassive; APPL applicative; ART article; AUX auxiliary; BEN benefactive; CAUS causative; CLF classifier; COM comitative; COMP complementizer; COMPL completive; COND conditional; COP copula; CVB converb; DAT dative; DECL declarative; DEF definite; DEM demonstrative; DET determiner; DIST distal; DISTR distributive; DU dual; DUR durative; ERG ergative; EXCL exclusive; F*

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[6] *Screeve* refers to a combination of tense, aspect and mood when describing a verbal paradigm. It is a notion typically associated with research on Kartvelian languages (Kibort & Corbett, 2008).

[7] https://wals.info/

[8] https://typo.uni-konstanz.de/rara/archive-overview/

feminine; FOC focus; FUT future; GEN genitive; IMP imperative; INCL inclusive; IND indicative; INDF indefinite; INF infinitive; INS instrumental; INTR intransitive; IPFV imperfective; IRR irrealis; LOC locative; M masculine; N neuter; N- non- (e.g.; NSG nonsingular, NPST nonpast); NEG negation, negative; NMLZ nominalizer/nominalization; NOM nominative; OBJ object; OBL oblique; P patient-like argument of canonical transitive verb; PASS passive; PFV perfective; PL plural; POSS possessive; PRED predicative; PRF perfect; PRS present; PROG progressive; PROH prohibitive; PROX proximal/proximate; PST past; PTCP participle; PURP purposive; Q question particle/marker; QUOT quotative; RECP reciprocal; REFL reflexive; REL relative; RES resultative; S single argument of canonical intransitive verb; SBJ subject; SBJV subjunctive; SG singular; TOP topic; TR transitive; VOC vocative

The absence of categories for emotions in the relevant lists of grammatical categories provides us with an important clue that such categories do indeed not exist or if they do, they are not among the categories commonly found in the languages of the world.

Finally, according to Wierzbicka's (1999) study on *emotional universals* "the main universal mode for describing cognitively based feelings is in terms of a comparison, that is, via LIKE, and in this, the main human strategy for talking about feelings is analogous to the main human strategy for talking about colours" (Wierzbicka, 1999, p. 305). Thus, to express emotional content, languages make available descriptive and metaphorical means, whereas grammatical means are absent.

The absence of grammatical categories dedicated to the expression of emotions across the languages of the world suggests that such categories are not part of our linguisticality. This conclusion is further supported by considering the relevant generative linguistic literature, which concerns itself with the universal architecture of the functional structure which underlies the construction of grammatical expressions. And we observe the same absence of categories with emotional content. For example, within *cartography*, the most explicit typologically oriented framework of the generative tradition (Cinque, 1999; Rizzi & Cinque, 2016 and subsequent work), no emotion-based category is found. That is, neither do we find categories dedicated to the expression of emotions in general (i.e., a generalized EmotionPhrase, for example), nor do we find categories dedicated to the expression of specific emotions (i.e., a FearPhrase, for example). The absence of such categories has not gone unnoticed and Cinque (2013, p. 50) contemplates that: "only a fraction of our cognitive concepts and distinctions seems to find a grammatical encoding in the languages of the world". He further observes that languages typically "encode distinctions relating to the external and internal temporal constituency of events (tense and aspect) and the speaker's attitude toward the truth of the proposition (mood), but they are never found to grammatically encode such human cognitive universals as " 'shame', 'mourning', […] nor otherwise cognitively significant concepts like "worry", "peril", "fear", "hunger", "love", 'death', 'awe of god'" (Cinque, 2013, p. 51). Note that among the concepts he lists as absent in language, there are several that denote emotions implying that emotions are not among the concepts expressed in grammatical categories. To my knowledge, this is the only explicit discussion of this phenomenon within the generative tradition.

In sum, the absence of grammatical categories dedicated to the expression of emotions is a significant gap – one that we should not consider to be an accident and hence it is a generalization worth exploring.

3.3. Some apparent counterexamples

The purpose of this subsection is to explore some apparent counterexamples to the claim that there are no grammatical categories dedicated to the expression of emotions. That is, while this generalization was based on large-scale typological patterns, where such categories are indeed absent, it is nevertheless the case that some languages have been reported to have such categories. In light of this, Cinque (2022) qualifies his previous conclusion by stating that:

> [G]iven the emotions listed in Darwin (1872) and Ekman (1972), one finds that only a tiny set is grammatically encoded, and universally so, it appears Commiseration (commiserative morphology), Endearment/affection (endearment morphology), Contempt (pejorative morphology), Surprise (mirative morphology), Wish/Desire (optative morphology), but not 'love', 'hatred', 'anger', 'sorrow', 'joy', 'happiness', 'disgust', 'embarrassment', 'remorse', 'relief', 'pride', 'shame', 'jealousy', 'envy', etc.

If indeed there are grammatical categories that do express emotions, as Cinque (2022) suggests (without providing evidence to this effect), this would contradict my generalization, no matter how rare their occurrence. To address this issue, I proceed as follows: I will introduce several classes of categories that have been discussed in the literature (including those mentioned in the above quote) and I shall argue that they do not qualify as grammatical categories with emotion content.

To decide whether these apparent counterexamples are indeed grammatical categories dedicated to the expression of emotions, we must approach this question informed by theories of emotions rather than by our folk-psychological understanding of them. With this in mind, I shall argue that what most of these apparent counterexamples have in common is that they express various components that play a role in the construction of emotions but do not themselves qualify as expressing emotions.

3.3.1. Surprise: Miratives and exclamatives

I start with a discussion of surprise, as this seems to be commonly expressed via grammatical categories across many languages. This includes *exclamatives*, as in the examples in (6) and (7) from English and Spanish, as well as *miratives*, as in the example in (8) from Hare (Tibetan).

(6)   What a nice guy he is!

(Zanuttini & Portner, 2003, p. 41, example 4)

(7)   ¡Qué regalo tan maravilloso me dio por mi cumpleaños!
'What a wonderful present he gave me for my birthday!'

(Gutiérrez-Rexach & Andueza, 2017, p. 183, example 2)

(8)   Context: The hero has been sitting up in a tree throwing branches down on an ogre who has been hunting for him. The ogre finally looks up and sees him and says:

Heee,	gúhde	daweda!	Ch'ifi	dach'ída	lõ!
Hey	up.there	SG.sit/3SG/IMPF	guy	sitting	MIR

'Heey, (he's) sitting up there! The guy is sitting up there!'

<div align="right">(adapted from DeLancey, 2001, p. 376, example 11)</div>

Undoubtedly, exclamatives and miratives are grammatical categories: Exclamatives are dedicated clause-types contrasting with other clause-types, such as declaratives, interrogatives, and imperatives. Crucially, in terms of their meaning, they are often described as an emotive category. For example, Trotzke & Giannakidou (2019, p. 1) propose that (my emphasis): "Exclamations, presuppose belief of truth about p (veridicality) by the speaker, and assert the **emotion of surprise** or unexpectedness about the degree expressed in p. This produces intensity".

Similarly, miratives display the hallmark characteristics of a grammatical category, as they are expressed via closed-class words such as *lõ* in (8). In terms of their meaning, they are used to mark a proposition as new and somewhat surprising to the speaker, similar to exclamatives (DeLancey, 1997, 2001; Peterson, 2016).

Thus, both exclamatives and miratives instantiate grammatical categories whose content has been described in the linguistic literature as belonging to the realm of emotions. However, once we consider the literature on emotions, this latter claim can be contested. There is evidence that surprise is not an emotional state but an epistemic one (Vogl et al., 2021). If this is so, these two categories do not contradict the claim that there are no grammatical categories dedicated to the expression of emotions. Consider the arguments to this effect.

First, within theories of basic emotions, there is no agreement as to whether surprise belongs to the set of basic emotions (Ortony & Turner, 1990). That is, among the lists of potential basic emotions (see (1) section 2.1.1), only Ekman et al. (1982) and Tomkins (1984) include surprise. Importantly, Ortony et al. (1988) argue that emotions are always affectively valenced: They must be intrinsically positive or negative. But crucially, surprise does not fit this criterion. One can be positively or negatively surprised, or even be neutral about the content of surprise. This is evidenced by the fact that one can state one's surprise while simultaneously declaring that one has no affective stance associated with it, as in (9).

(9) I'm surprised about this decision of the committee, but I don't care either way.

If indeed valence is a necessary characteristic of an emotional state, it follows that surprise does not qualify. Thus, Ortony et al. (1988) conclude that surprise is fundamentally epistemic; it is about knowledge and belief and not about affect. The fact that surprise appears to be intimately tied to an emotional state follows from the theory of constructed emotions. Among the ingredients that lead to the experience of an emotion is the cognitive content of the emotion. That is, epistemic states can affect and sometimes even cause an emotion, and the degree of unexpectedness correlates with the intensity of the emotion (Ortony et al., 1988; Rimé, 2009; Mellers et al., 2013). What is crucial for the present purpose is the conclusion that surprise itself is an epistemic state. As such it is not surprising that there are grammatical categories that are dedicated to encoding it: Epistemic states are a common basis for grammatical categories. They affect the expression of clause-typing categories (i.e., mood, such as declarative and interrogative) and (epistemic) modality, among other things.

Thus, based on considerations pertaining to emotion research we may conclude that surprise is not an emotion. Interestingly, this conclusion receives support from linguistic evidence as well. First, it has been repeatedly pointed out that surprise is the only purported basic emotion to receive extensive grammatical treatment in languages (Aikhenvald, 2012; Foolen, 2012, p. 350; Majid, 2012, p. 7; Celle & Lansari, 2017; Ponsonnet & Vuillermet, 2018). If emotions were indeed a possible basis for grammatical categories, then this would be unexpected: why only surprise? Categories expressing epistemic states encode a variety of such states and are not restricted to a single one.

Another linguistic argument that supports the claim that surprise is an epistemic state comes from the fact that the categories dedicated to the expression of surprise form a natural class with categories that are clearly epistemic. First, consider miratives. Mirative markers are often identical in form to indirect evidentials, i.e., grammatical categories used to indicate that the speaker only has indirect evidence that a proposition is true. To see this, consider the example in (10) from Gitkxsan (Tsimshianic). The indirect evidential *nakw* can be used to express that there is only indirect evidence that Alvin is here (e.g., the speaker doesn't see Alvin but only that the light in his room is on). Crucially, however, *nakw* can also be used when the speaker directly observes Alvin's arrival, in which case a mirative interpretation ensues.

(10) nakw=hl   witxw=s   Alvin
      EVID=CND   arrive=PND Alvin
      'Looks like Alvin is here.'

(Peterson, 2016, p. 1328, example 2)

Crucially, the fact that mirative marking is polysemous with indirect evidentials is not an isolated phenomenon of Gitxsan but is a widespread pattern found in evidential systems across different language families (Rett & Murray, 2013). From a linguistic point of view, we may thus conclude that mirative marking forms a natural class with evidentiality, which in turn is an epistemic category.

Next, not all mirative markers are part of a dedicated grammatical evidential system, but the fact that miratives form a natural class with other epistemic markers still holds. For example, in Mandarin, the mirative marker *jingran* enters into opposition with a marker of expectedness (*guoran*), as in (11).

(11) a. Zhangsan jingran   lai   le
         Zhangsan JINGRAN   come   PRC
         'Zhangsan came.' (contrary to expectation)
     b. Zhangsan guoran   lai   le
         Zhangsan GUORAN   come   PRC
         'Zhangsan came.' (as expected)

(Wu 2008: 103, examples 6a/7a)

Recall that unexpectedness can lead to a heightened emotional state and hence mirativity *appears* to express emotions. In contrast, expectedness is not correlated with an emotional state, hence its marking is purely epistemic. Thus, the grammatical marking of surprise via mirativity forms a natural class with epistemic categories across a set of unrelated languages. Thus, the

linguistic evidence supports the view that surprise is an epistemic state. This language-specific pattern is expected if, universally, categories denoting surprise are not categories that are dedicated to expressing emotions.

The same argument can be made for exclamatives. They belong to a set of grammatical categories known as *mood,* which (universally) include declaratives, interrogatives, and imperatives (Sadock & Zwicky, 1985; Portner, 2004). Each of these grammatical moods is associated with a specific epistemic state. Roughly, declaratives are used to express knowledge, interrogatives to express inquisitiveness (Cierdelli et al. 2019), and imperatives to express intentions and/or desires.[9] To be sure, on some folk-psychological understanding, *desire* might be construed as an emotion, though imperatives themselves have, to the best of my knowledge, never been characterized as a category dedicated to the expression of an emotion. This is consistent with the basic tenets of the Belief-Desire Theory of emotion (e.g., Frijda, 1986; Oatley & Johnson-Laird, 1987; Ortony et al., 1988; Lazarus, 1991), according to which emotions depend not only on beliefs (cognitive or informational states) but also on desires (motivational states). Thus, in line with the theory of constructed emotions, desire may serve as either a component of emotions (Castelfranchi & Miceli, 2009) or as the cause for emotions (Reisenzein, 2012), but crucially not as an emotion itself. Hence, even from the perspective of emotion theory, imperatives, though denoting desires, would not qualify as categories expressing an emotional state. Thus, once again, we have linguistic evidence that the categories expressing surprise form a natural class with categories that do not. In the next sub-section, we turn to other categories dedicated to the expression of desire.

3.3.2. Desire: Optatives and desideratives

In this subsection, I address the categories known as *optative* and *desiderative*, which serve to express a wish, regret, hope, or desire without an overt lexical item that means *wish*, *regret*, *hope*, or *desire* (cf. Quirk et al., 1972, 1985; Grosz, 2012). Hence, these categories might qualify as being dedicated to the expression of emotions. However, as with surprise, I argue that, when we take into consideration insights from emotion theories, we must conclude that they are not.

In English, optatives are characterized by a subordinating complementizer (*that* or *if*) which appears to be used in the absence of a subordinating main clause (a case of insubordination (Evans, 2007)). This is illustrated in (12).

(12) a. Oh, that I had told them both a year ago!

(Martin F. Tupper. 1851. *The Twins; A Domestic Novel.* Hartford: Silas Andrus)

b. If only I had told them both a year ago!

(Grosz, 2012, p. 1, example 1)

According to Grosz (2012, p. 40), optatives are subordinated to a null operator which "serves to express an emotion towards the denoted proposition" and this so-called emotion can be a wish, hope, regret, or desire. As mentioned in the previous sub-section, however, it is not clear that these states *are* emotions (although they can trigger them). While some emotion theorists

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[9] The usual caveats hold though. Grammatical meaning does not fully correspond to concepts that have notional equivalents and hence interrogatives, for example, can be used even in the absence of inquisitiveness, as for example in the context of a rhetorical question.

that advocate the theory of basic emotions include desire and hope among the set of basic emotions (Arnold, 1960), not all of them do (see the lists in (1), section 2.1.1). Moreover, optatives do not come with a dedicated value and are compatible with positive or negative emotions. For example, they can be used to express a wish about the past (i.e., that something should have happened, but it didn't, as in (12)). This is typically associated with a negative emotion. Optatives can, however, also be used to express a future-oriented desire, which is typically associated with a positive emotion, as illustrated in (13).

(13) Oh! What a charming creature thou art! What a happy man will he be that first makes a woman of you! Oh! That I were a man for your sake!
> (Cleland, 1749. *Memoirs of Fanny Hill*; quoted in Grosz, 2012, p. 9, example 16c)

Hence, if we assume that emotions are intrinsically valenced, then the optative cannot be viewed as a category dedicated to the expression of an emotion. Rather, it serves to express an (epistemic) ingredient that may play a role in the construction of an emotion.

Moreover, like with exclamatives and miratives, the conclusion that optatives do not have emotion content also receives linguistic support. Cross-linguistically, optatives form a natural class with other categories that clearly have epistemic content. For example, cross-linguistically insubordination (the form optatives take in English) is also associated with other functions including commands, threats, quotations, and other kinds of evidential uses (Evans, 2007) hence it cannot be a category that is somehow intrinsically associated with emotive content. Thus, I conclude that the optative is not a category dedicated to the expression of emotions.

3.3.3. Frustration

Next, we turn to another category, which, at first glance, appears to be dedicated to the expression of emotion, namely the *frustrative.* As its name suggests, this category seems to express frustration. It is a pervasive category in Amazonian languages (Overall, 2017), but otherwise quite rare. First, witness in (14) a typical frustrative marker in Desano.

(14) bãkã-ge   eha-ri-bɨ
town-LOC   arrive-FRUST-NON3.PST
'I arrived at the town (but didn't accomplish what I went there for)'
> (Miller, 1999, p. 83, quoted in Overall, 2017, p. 481, example 2)

In this example, the failure to accomplish what the speaker went to do leads to frustration. However, based on data and generalizations discussed in the relevant literature, we can conclude that the conceptual content on which this category is based is not an emotion (frustration), but instead the fact that a desired outcome was not obtained (Kuteva et al., 2019). The fact that one typically has an emotional reaction to the non-realization of a desired event has nothing to do with grammar but is a fact about humans. The claim that the so-called frustrative marker is better characterized as denoting *non-realization* is further supported by the fact that not every instance of an expected outcome that is not realized leads to frustration. Nevertheless, at least in some languages for which data is available, the so-called frustrative can still be used. This is shown for Kwaza in (15).

(15) a. hy'ja-ça-le-ki
fall-2-FRUST-DECL
'you nearly fell'

(Van der Voort, 2004, p. 31)

b. Ba'hoso-na 'a-da-day-le-'hỹ-ki
Barroso-LOC exist-1SG-1SG-FRUST-NMLZ-DECL
'I used to live in Barroso (but I don't anymore)'

(Van der Voort, 2004, p. 642)

The grammatical marker classified as frustrative (*le*) can be used in contexts where frustration is not an appropriate emotion. In (15a), *le* is used to indicate that a falling event did not happen (but nearly did). Under normal circumstances, not falling is a cause for relief, not frustration. And, in (15b) *le* is used to indicate that the speaker no longer lives in Barroso. In this example, no emotional reaction appears to be implied (neither negative nor positive). Based on these data, we can conclude that the frustrative in Kwaza is not a category dedicated to the expression of an emotion; rather it is used to indicate the non-realization of an expected outcome. Hence, the label "frustrative" is misleading. Rather than encoding frustration, it encodes a particular type of situation that often leads to an emotional reaction.

Judging from the typological discussion in Overall (2017), Kwaza is not unique in this regard: Frustration does not seem to be directly encoded but is epiphenomenal (Overall, 2017, p. 488). I conclude that there is good evidence that the existence of so-called frustrative markers does not contradict the claim that there are no grammatical categories dedicated to the expression of emotions.

3.3.4. Fear and apprehension

Another potential example of a category dedicated to the expression of emotion is sometimes referred to as the *fear* construction (Lakey, 2013). Markers that fall under this broad label have been reported for over 70 languages (Vuillermet, 2018). In what follows, I show that the categories reported to express fear cannot be classified as categories dedicated to the expression of emotions either. There are several reasons for this conclusion, all based on data and generalizations discussed in the relevant literature.

Consider the following examples from Ese Ejja (Takanan), which illustrate three different 'fear constructions', each with a different form, function, and distribution (Vuillermet, 2018). The apprehensive in (16a) is part of the mood-marking paradigm and indicates that a feared event is imminent. The avertive in (16b) also functions as a subordinator introducing an embedded clause that encodes a feared event. The timitive in (16c) is realized as a postposition and marks a feared entity.

(16) a. B'iya   b'iya b'iya b'iya! Kekwa-ka-chana   miya!
bee   bee   bee   bee   pierce-3A-APPR   2SG.ABS
'Bee, bee, bee, bee! Watch out it might sting you!'

b. Owaya   ekowijji shijja-ka-ani [e-jja-saja-ki   kwajejje]
3ERG   rifle   clean-3A-PRS   AVERT-MID-block-MID   AVERT
'He cleans his rifle [lest it get blocked].'

c. Iñawewa   kwaji~kwaji-ani   b'iya=yajjajo.
   dog   run~RDP-PRS   bee=TIM
   'The dog is running for fear of the bees.'

<div align="right">(Vuillermet, 2018, p. 259, examples 1–3)</div>

The patterns we observe with the so-called fear categories are similar to the ones we have found with the other cases of apparent emotion categories. They form a natural class with other categories, some of which are intrinsically epistemic (such as mood). According to Vuillermet (2018), this is a general pattern of fear constructions. They are often expressed as locative, ablative, causal, or temporal categories. We might thus conclude that the apparent expression of fear is parasitic on other grammatical categories and arises either via metaphorical extension or via the context of use. For example, according to Lakey (2013), in some Indo-European languages, the interpretation of fear arises via the spatial concept of distance. Lakey ascribes this pattern to the fact that the natural behaviour associated with fear is to distance oneself from the feared entity (i.e., flight). Hence, this can be viewed as an instance of metaphor.

A second way in which the fear interpretation associated with these categories arises is via the context of use. For example, the apprehensive is used in the face of the imminent occurrence of an undesirable event (Verstraete, 2005, p. 224), where the evaluation of undesirability is an epistemic judgment. In turn, the situation in combination with its evaluation as undesirable serves as an ingredient in the construction of the emotion. The semblance of expressing fear comes about because if one finds oneself in this type of situation one is likely to be in a particular emotional state. This conclusion is supported by the fact that a fear construction need not coincide with real fear, but it may also trigger a weaker emotion such as being anxious or nervous about something (as when one faces being laughed at), as in (17), again from Ese Ejja.

(17) Marina   swa-chana   mi=b'a-majje!
      Marina   smile-APPR   2SG.ABS=see-TMP.SS
      'Marina might laugh at seeing you!'

<div align="right">(Vuillermet, 2018, p. 70 (11))</div>

I thus conclude that so-called fear constructions are intrinsically epistemic rather than emotional but that they are typically used in contexts where fear is an appropriate emotion. This conclusion is consistent with the first treatment of such markers in Lichtenberk (1995), who classifies such markers in Toqabaqita (Austronesian) as '*apprehensional-epistemics*'. Specifically, according to Lichtenberk (1995, p. 293), an apprehensive marker "gives information on the factuality of the situation, which is counter-(or non-)factual and on the other hand states the attitude [of the agent of the speaker] concerning the desirability of the situation encoded, which is undesirable". Similarly, Kuteva et al. (2019) argue that fear constructions belong to a larger category dedicated to encoding *non-realization*, which in turn belongs to the class of aspectual or modal categories.

In sum, once more we observe that a grammatical category whose label suggests emotional content does not constitute a counterexample to the claim that there are no grammatical categories dedicated to the expression of emotions.

There is an important lesson to be drawn here. When searching for potential counterexamples in the grammatical descriptions of the world's languages it is important not to take the label

of a category at face value. That is, labelling grammatical categories (especially those that are typologically rare) is a subjective matter, as can be seen by the fact that fear categories of the type just described have variously been labelled as apprehensive, avertive, timitive, admonitive, adversative, fearitive, avolitional, evitative, etc. (see Vuillermet, 2018 for a detailed overview). Some of these labels focus on the nature of the described event, others on the evaluation of said event, and yet others on the emotion that typically ensues based on these ingredients.

3.3.5. Evaluative morphology

In this subsection, I turn to evaluative morphology, another candidate for a category dedicated to the expression of emotions. Several types of morphemes belong to this category: most notably diminutives and augmentatives. Evaluative morphology is especially interesting from the present perspective as it appears to be a wide-spread (near universal) category, at least the diminutive is (cf. Haas, 1972; Nieuwenhuis, 1985; Jurafsky, 1996). The typological claim of near universality correlates with the generative conclusion of Cinque (2015) who postulates (universal) hierarchically organized functional categories for evaluative morphology, as shown in (18).

(18)   Aug(mentative)P > Pej(orative)P > Dim(inutive)P > End(earment)P...> NP

(Cinque, 2015, p. 71)

Thus, evaluative morphology constitutes the only grammatical category which appears to have emotive content which has been explicitly argued to belong to our linguisticality. So, does the (near universal) existence of evaluative morphology constitute a counterexample to the claim that there are no grammatical categories dedicated to the expression of emotions? In what follows, I present evidence to the effect that it does not.

I cannot do justice to the vast empirical landscape of evaluative morphology across the languages of the world and the rich literature on the topic (see Ritter & Wiltschko, 2023 for a recent overview). Thus, I restrict the discussion to Italian, a language with a large inventory and widespread use of such morphemes. A representative sample is given in (19).

(19)		BASE	SIZE	ATTITUDE
	a.	casa	cas-ina	cas-etta
		house	house-DIM	house-DIM
		'house'	'small house'	'cozy house'

(Cinque, 2015, p. 69, example 2b)

	b.	cane	cagn-one	cagn-accio
		dog	dog-AUG	dog-AUG
		'dog'	'big dog'	'ugly dog'

(Cinque, 2015, p. 70, example 3d)

These examples illustrate some of the core functions associated with diminutives and augmentatives cross-linguistically. They are considered evaluative because they are used to *evaluate* an object or a situation. Although this evaluation can pertain to different dimensions: one objective, pertaining to size or other observable properties, and the other subjective, pertaining to the speaker's attitude towards the referent or the situation. This dual status of evaluative

morphemes already suggests that they are not dedicated to expressing emotions. They typically do so in a secondary fashion. This can be further illustrated based on the multi-functionality of *-ino*, shown in (20). It can be used to evaluate the nominal referent in terms of size (small), as in (20a) or individuation (turning a mass noun into a singulative), as in (20b). But it can also be used to evaluate the referent in terms of affect. Crucially, however, it is compatible with either positive valence (endearment), as in (20c), or negative valence (contempt), as in (20d).

(20) a. libro   libr-ino   size
      'book'   'small book'
    b. zucchero   zuccher-ino   singulative
      'sugar'   'sugar lump'
    c. marito   marit-ino   endearment
      'husband'   'dear husband'
    d. dottore   dottor-ino   contempt
      'doctor'   'untrustworthy doctor'

(Grandi & Körtvélyessy, 2015, p. 5)

Note that even the affective use of *-ino* in (20c,d) appears to derive from an interpretation relating to size: Smallness can be considered a cause for endearment or distrust, depending on the context. These examples demonstrate that *-ino* is not dedicated to expressing an emotional state in general (as it can be purely used to indicate size). Furthermore, even when it is used to express an emotional state, it is not dedicated to expressing a particular emotion, but rather is compatible with emotions of opposite valence (positive endearment/negative contempt). That is, if we take intrinsic valence to be a defining feature of an emotion, then evaluative morphology cannot be characterized as expressing an emotion. This leads to the conclusion that the meaning of a diminutive must be much more abstract than, for example, endearment. According to Jurafsky (1996), at the core of the meaning of a diminutive is the notion of "child". Consequently, its multi-functionality derives from properties that one might (stereotypically) associate with a child, including the affective notion of endearment. But as with all the other categories we have discussed thus far, the emotional state does not seem to be directly encoded. Rather, its core meaning belongs to the representational function of language but is such that it commonly triggers an emotional reaction. Hence, it may be considered as denoting an ingredient in the construction of an emotion.

3.3.6. Empathy: Commiseratives

Another category that appears to be dedicated to the expression of an emotion is the *commiserative*. Unlike evaluative morphology, which is widespread and amply discussed, there is not much literature available that deals with this category (hence I assume that it is cross-linguistically rare). Van den Berg (2021, p. 58) describes a particle (*kaasi*) in Muna (Austronesian), which "expresses the speaker's feeling of pity (encompassing sympathy, empathy, compassion, commiseration) towards a suffering person who is mentioned in the discourse". The example in (21) illustrates.

(21) No-mate-mo   ina-no   kaasi.
      3SG.REAL-die-PFV   mother-3SG.POSS   pity
      'Her mother has died, the poor thing.'

(Van den Berg 2021:58 (1))

While commiseration, as a form of empathy, can indeed be viewed as a type of (social) emotion, there are nevertheless reasons to not view this example as forming counterevidence to the claim that there are no grammatical categories dedicated to the expression of emotion. In this case, the argument has to do with its linguistic properties. Specifically, according to van den Berg, *kaasi* is a denominal particle, and as such it does not appear to form a grammatical paradigm. It appears to be more akin to words that denote emotion concepts rather than to a genuine grammatical category. This is supported by the few related examples of expressions of commiseration van den Berg mentions, which include particles that are cognates to or meaning equivalents of *kaasi* in Muna, and which the relevant grammars variously describe in similar ways, as summarized in (22).

(22) a. *inde* (Balantak)
          'what a pity/shame, sorry' (expression of empathy)
      b. *tobusi* (Pamona)
          'the poor thing' (exclamation of empathy)
      c. ka'asi (Tukang Besi)
          'what a shame!'
      d. pakasi (Ledo)
          'poor thing'
      e. kaasi (Wolio)
          'what a pity!'

(van den Berg, 2021, p. 60)

Neither of these elements seems to act as a grammatical category, i.e., a form belonging to a closed class category, and which would be essential in the combination of words into meaningful complex expressions.

3.3.7. Interjections

Finally, we turn to interjections, which Wierzbicka (1999, p. 283) describes as a universally available way of expressing emotions: "All languages have special words ('interjections') which are used to express 'cognitively based feelings', that is, feelings linked with specific thoughts, such as, for example, *gee!*, *wow!*, or *yuk!* in English." The Rara and Universals Archive[10] lists interjections as the only categories expressing emotions. Again, the question is whether interjections qualify as grammatical categories dedicated to the expression of emotion. And again, I argue that the answer is negative.

In terms of their form, interjections are a type of *word*, albeit of a different type than words denoting emotion concepts (English *fear, anger, happiness*, etc.). They share with regular words the fact that they are open-class, with a large and ever-changing inventory. According to

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[10] https://typo.uni-konstanz.de/rara/archive-overview/

Jovanović (2004), there are over 500 English interjections, a number that far exceeds the typical inventory of grammatical categories. Moreover, one of the distributional properties that defines them as a word class is that they are capable of making up an utterance on their own (Jespersen, 1922; Dingemanse, 2023, 2024). Hence, they do not pattern with grammatical categories, which are used to glue together words to form complex expressions.

Next, consider the function of interjections. They are often used to express (or voice) rather than describe their (emotional) content (Bühler, 1934; Jakobson, 1960; Wierzbicka, 1999). However, this is not the only function associated with interjections. Ameka (1992) characterizes interjections as being associated with three distinct functions: i) *expressive* (indicating an emotive state), ii) *conative* (inviting an action or response from the interlocutor, like *shhhh!*), and *phatic* (establishing and maintaining interaction, like the backchannel *mhm*). Based on a corpus study of spoken Dutch, Huls (1982) shows that only 7% of interjection tokens had expressive functions; the vast majority had interactional and interpersonal functions, such as backchannels. This multi-functionality of interjections suggests that they are not a category dedicated to expressing emotions. Significantly, a single interjection can encode all three functions. For example, Dingemanse (2023) mentions an interjection *ef* in Konso (Cushitic) the meaning of which can be paraphrased as 'I am disgusted by what you said, and I want you to stop talking about this' (Orkaydo, 2013, p. 256).

Finally, even those interjections that appear to be used with an emotive function are typically not inherently valenced. To see this, consider the examples in (23).

(23) a. Context: I'm standing in front of a most beautiful waterfall
"Wow! What a beautiful place!"

b. Context: I'm listening to the latest news on the wildfires in Spain
"Wow! This is really bad!"

As shown above, *wow* can be used to express a strong reaction, but the emotion that accompanies this reaction can be either positive (admiration, pleasure) or negative (shock, dismay). Hence, we can conclude that the emotion content is secondary. Arguably it derives from the epistemic content: Expressing surprise can lead to a heightened emotional state. Significantly, the quality of the emotion is not pre-determined. I conclude that interjections cannot be considered a grammatical category dedicated to the expression of emotions: They can neither be classified as a grammatical category in the sense defined above nor are they dedicated to the expression of emotions *per se*.

3.4. Interim conclusion

We have now seen that there is pervasive linguistic evidence for the claim that there are no grammatical categories dedicated to the expression of emotions. While it is always difficult to prove the non-existence of something, the absence of categories dedicated to the expression of emotions can be gleaned from the conspicuous paucity of discussion thereof. In addition, I have shown that categories whose label suggests that they might express emotions also do not constitute counterevidence. We have encountered two reasons to exclude them. First, they do not qualify as a grammatical category but rather are open-class, word-like, concept-denoting elements (interjections and commiseratives). Second, they do not directly encode emotions but

instead, they encode cognitive components that contribute to the construction of emotions. This is summarized in Table 1.

Table 1. Potential counterexamples and why they are not in fact counterexamples

Category	*Potential emotion*	*What does it encode?*	*Grammatical category?*
mirative, exclamative	surprise	epistemic state	Yes
optative, desiderative	wish, regret, hope, desire	epistemic/bouletic state	Yes
frustrative	frustration, disappointment	lack of expected outcome	Yes
apprehensive	fear, apprehension	likelihood of undesirable event	Yes
evaluative morphology	endearment, contempt	evaluation of size with contextually determined associations	Yes
commiserative	commiseration, empathy	commiseration	No
interjection	emotional attitude	emotive, phatic, conative attitude	No

There are several lessons we can take away from this discussion. First, there is a methodological caveat. Like with any claim about potential language universals, one might object that we can never be sure: There might be a language not yet taken into consideration that contradicts the putative universal. This is certainly true. But the above discussion bears an important caution. Even if we find a previously unrecognized category that appears to be used to express an emotion, we should not be satisfied with a surface-based label and description of this category. It is essential to determine whether its core meaning is indeed content that belongs to the realm of emotions.

Secondly, suppose we do indeed find a genuine grammatical category that is dedicated to expressing emotions (which I doubt). What is certain is that this category would not be among the categories frequently found in the languages of the world. This is in striking contrast to categories such as *tense, mood, person, number*, etc. Thus, there would still be a linguistic fact that requires an explanation. Related to this is the fact that the expression of emotions pervades all linguistic domains except for the grammatical categories. This again, is in striking contrast with those concepts that are frequently encoded via grammatical categories.

To my knowledge, the present study is the first to explore the content of categories from a perspective informed by insights from both linguistics and the affective sciences. What we have learned from this perspective is that there is a core aspect of language, namely the inventory of grammatical categories, which does not permit emotions to enter. Instead, what we observe is that some of these categories encode particular *components* that are essential in the construction of emotions or that may trigger emotions.

I conclude that we can be reasonably confident that the generalization I have introduced is a universal property of the languages of the world. In turn, according to the cognitive view of language, which I endorse here, linguistic universals tell us something about human cognition. According to Strickland (2017, p. 72), this is because "pre-verbal core knowledge may induce

biases in language evolution, therefore rendering certain corresponding grammatical forms to be more likely to appear cross-linguistically".

Hence, the absence of grammatical categories dedicated to the expression of emotions can tell us something about our linguisticality and its relation to our emotionality. Specifically, I propose that it supports the theory of constructed emotions over that of basic emotions. In what follows, I develop and support this argument.

4. A novel argument for the theory of constructed emotions

As we have seen, one of the arguments in favour of the theory of constructed emotions is the fact that language (among other ingredients) affects the experience of emotions (Lindquist, 2021). Specifically, this argument concerns the role of words that denote emotion concepts. Here, I argue that the absence of grammatical categories dedicated to the expression of emotions constitutes a novel argument to this effect. In a nutshell, the argument is as follows. If there was a set of basic emotions, then there is no obvious reason as to why there should not be grammatical categories dedicated to the expression of these basic emotions. Furthermore, the lack of such categories cannot be reduced to the (logically possible) claim that there is no (direct) connection between our linguisticality and our emotionality. There is ample evidence for a close connection between the two, based on phylogenetic, ontogenetic, and clinical considerations. I conclude by elaborating on the claim that the absence of grammatical categories dedicated to emotions is expected under the theory of constructed emotions.

4.1. If there were basic emotions, we would expect grammatical categories to express them

According to the theory of basic emotions, there is a small set of primitive emotions. If this were the case, there would be no obvious reason why grammatical categories dedicated to the expression of emotions are not attested.

First, based on the logic of existing grammatical categories, we can easily envision a grammatical category dedicated to the expression of emotions. For example, the grammatical category *tense* is used to relate the time of an event to the utterance time (*present* or *past*); the grammatical category *evidentiality* is used to relate a proposition to the speaker's epistemic state. In a similar vein, one might expect a category that relates an event or proposition to the speaker's emotional state. This could result in the (perhaps obligatory) marking of an event or proposition as causing *pleasure* vs. *pain* or *happiness* vs. *sadness,* as in the hypothetical example in (24), where HAPPY/SAD is meant to indicate grammatical markers of sorts.[11] (The asterisk indicates that this construction is not attested.)

(24) a. *[I live in Barcelona]-HAPPY
     b. *[I live in Barcelona]-SAD

The absence of such categories is equally unexpected from a functional typological point of view as it is from a cognitive point of view. The typological view emphasizes the vast range of language-specific grammatical categories found across the languages of the world. This makes the non-existence of categories that express emotions surprising. It raises the question of what

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[11] See Cinque (2013) for a similar argument regarding the non-existence of categories expressing worry, fear, shame, etc.

determines what grammatical categories can and cannot encode. Why is it that we frequently find tense, person, and number categories, but not anger, fear, or happiness? According to a common view within functional typology, the development of grammatical categories is rooted in language use. For example, according to Mithun (2014, p. 131), "[I]t is now generally recognized that grammatical categories develop in languages through use. Distinctions made most often by speakers as they speak tend to become routinized over time in grammatical markers. Many grammatical categories recur in language after language, no doubt because they reflect common human interests". If this was all there is to the sources for grammatical categories, emotions would be expected to be among them as they surely are of common human interest. Nevertheless, they do not make for grammatical categories.

As for a general cognitive approach to language, there is also no obvious reason as to why categories dedicated to expressing emotions are missing. If grammatical forms reflect, "pre-verbal core knowledge" (as argued in Strickland, 2017, p. 72), then one might expect emotions to be in the mix. As for the generative tradition, here the question regarding the universal building blocks (features and categories) is still unresolved (Berwick & Chomsky, 2016, p. 90). Hence, the question regarding the reason for the absence of categories dedicated to expressing emotions does not receive a straightforward answer either. To my knowledge, the only explicit attempt to answer the question regarding the origins of concepts underlying grammatical categories is that of Golston (2018), who takes an evolutionary perspective. He argues that the content of grammatical categories is not uniquely human but is already present in the biological systems of primates, most vertebrates, and some even in plants. For example, a relevant pre-human precursor for the grammatical category *person* is a notion of *self-referencing*, which is already present in bacteria (Golston, 2018). The core logic of this argument is that the content that is recruited for grammatical categories must pre-date the emergence of homo sapiens (see also Emonds, 2011). If this is indeed so, then again, there is no reason why emotions are excluded from lending content to grammatical categories: At least some emotions (like for example fear) are present in primates and other mammals (Panksepp, 1982, 1988; Panksepp & Watt, 2011). Thus, on this view, the absence of categories dedicated to the expression of emotions appears inexplicable.

In sum, no matter whether we take grammatical categories to reflect common human interests, pre-verbal core knowledge, or content that was already available before homo sapiens evolved, the absence of grammatical categories dedicated to expressing basic emotions is unexpected. This is because according to the theory of basic emotions, these would indeed fit the bill as they are considered hardwired and thus universal. Now, one might hypothesize that emotion categories are absent in language because language and emotions are completely disconnected and hence emotions cannot enter grammar. This is the view held by those who hold the theory of basic emotions. For example, Ekman & Cordaro (2011, p. 369) state that: "Language and emotion are independent of each other; both can evolve independently without the presence of the other". In the next subsection, I present evidence to the effect that language and emotion are connected.

4.2. Language and emotion are connected

We have already seen some aspects of language and emotions that suggest that they are connected. According to the theory of constructed emotions, the availability of words for

emotion concepts plays a significant role in our experience of individual emotions (Lindquist, 2017, 2021). Moreover, we have also seen that the expression of emotions is among the universal functions of language (Bühler, 1934) and this expressive function pervades language at all levels (Besnier, 1990; Majid, 2012). This already suggests that there is a significant connection between language and emotion. Note that this type of connection concerns the description and expression of emotions and hence concerns the relation between particular emotions and individual languages. In what follows, I will give an overview of arguments that speak to the relation between linguisticality and emotionality coming from phylogenetic, ontogenetic, and neurological considerations.

Consider the evolutionary perspective. Two lines of research suggest that linguisticality and emotionality are connected. According to one – dating back to Darwin (1872) – the expression of emotions served as a precursor for language and thus may have played a vital role in its evolution (see Trotzke, 2019 for a recent instantiation within the generative tradition). Research falling into this tradition typically aims to show that the expression of emotions in animals can have a communicative function (Marler, 2004; Bar-on, 2013; Arnold & Bar-on, 2020).[12] Related to this argument is the view that language evolved as a system to express emotions and hence emotions would have been essential in developing the capacity to symbolize (Shanahan, 2008).

According to a second line of research, language and emotions *co-evolved* (Jablonka et al., 2012). If so, this supports a tight connection between linguisticality and emotionality. That is, for language to evolve, certain emotional preconditions must have been in place; and at the same time, the evolution of language enhanced inhibitory control of emotions and enabled the development of novel emotions and emotional capacities (see also Barrett, 2017b; LeDoux, 2020; Lindquist, 2021).

Similar considerations also hold for the development of emotion and language in infants. For example, early on infants show a sensitivity to language in that they prefer to listen to their mother tongue (Moon et al., 1993). Similarly, young infants can also discriminate emotional vocalizations (Walker-Andrews & Lennon, 1991); for example, emotional content (especially sadness) has been shown to modulate brain activity in areas that, in the adult brain, are involved in processing affective stimuli (Blasi et al., 2011). Thus, from the beginning of life, the voice serves as an important tool in the acquisition of both language and emotions.

Taken together these ontogenetic and phylogenetic considerations suggest a deeply rooted connection between our linguisticality and our emotionality. Or as Lindquist (2021, p. 91) puts it: "the relationship between language and emotion may be as deep as the origin of our species".

Further support for this conclusion comes from neurodiversity. That is, in the quest to understand the nature of the human mind, it is instructive to explore minds that are different from those of typically developed adults. Significantly, the characteristic profile of many neuro-diversities typically implicates both language and emotions. Again, this is suggestive of a close connection between linguisticality and emotionality. Consider for example, the case of *alexithymia*, a condition that is defined by the inability to find appropriate words to describe one's feelings (Sifneos, 1973), which in turn correlates with difficulty identifying emotions in the first place (Nemiah et al., 1976; Taylor et al., 1991). What is important for our purpose is the hypo-

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[12] Critics of this view argue that expressive vocalizations are intrinsically linked to the affective and motivational states of animals and can thus not be viewed as (intended for) communicative purposes (Tomasello, 2008; Fitch, 2010).

thesis that (at least in some individuals) alexithymia is the result of an impairment in multiple language domains, including structural language, pragmatics, and the propensity to use emotional language (Lee et al., 2022). It has been shown that alexithymia often coincides with other neuro-diversities and has been argued to be responsible (at least partly) for their characteristic emotional profile. Crucially, in individuals with these profiles, language is affected as well. Consider, for example, autism spectrum disorder (ASD). Ever since its first mention in the literature (Kanner, 1943), ASD has been described as including impairment of behavioural, affective, communicative, and social skills. The emotional profile includes poor emotion recognition (Hobson, 1986; Hobson et al., 1988; Heerey et al., 2003), amplified emotional responses, and poor emotional control (Mazefsky et al., 2013), as well as reduced empathy (Lombardo et al., 2007) and impaired recognition of emotion in others (American Psychological Association, 2022; Lord et al., 2000). In addition, alexithymia has been implicated in ASD (Bird & Cook, 2013). Significantly, language dysfunction has been one of the most significant criteria for ASD (Frith, 1989) and it appears to be more than a communication problem. As ASD is a spectrum, so is the language dysfunction that comes with it. It ranges from purely pragmatic aspects in high-functioning individuals (Noterdaeme et al., 2010; Boucher, 2012) to a complete lack of language in non- or minimally verbal populations (Tager-Flusberg & Kasari, 2013; Norrelgen et al., 2015). In sum, ASD presents us with a mental profile that implicates both language and emotion.

Similar considerations hold for other neuro-diversities. Schizophrenia has been linked to a language problem (Hinzen, 2017) but has also been shown to be correlated with heightened alexithymia (Kumar et al., 2018). Similarly, aphasia is typically described as an acquired language disorder, which comes in several variants, and is also associated with an impairment involving emotion recognition (Multani et al., 2017; Hobson et al., 2018; Hobson et al. 2019).

In sum, what emerges from even a cursory overview of the literature is that when language is affected, so are emotions, though, the nature of this link is still unclear. What is crucial for our purpose is the fact that there is such a link. Hence, the lack of grammatical categories dedicated to the expression of emotions cannot be explained (away) by hypothesizing that there is no connection between the two systems.

Finally, the assumption that linguisticality and emotionality are connected comes from the brain itself. For example, in a meta-analytic review of the brain basis of emotion, Lindquist et al. (2012) discuss evidence that networks supporting language (along with regions associated with other task domains) show increased activity during instances of experiencing emotions. Additionally, Van Berkum (2019) argues that language processing is affected by emotions.

4.3. Interim conclusion

We have now seen that there is no straightforward reason why basic emotions, if they exist, would not enter grammar in the form of dedicated grammatical categories. Such categories are logically possible and plausible from an evolutionary perspective. Moreover, we saw that a potential explanation, namely that language and emotions are not connected, cannot be upheld.

I conclude that the absence of dedicated emotion categories is expected if emotions are constructed. Under the theory of constructed emotions, we do not expect there to be grammatical categories dedicated to expressing particular emotions. This would be like having categories dedicated to the expression of complex mental representations, like propositional thoughts. In other words, if emotions, like propositions, are constructed, we do not expect language to treat

them as primitives. This conclusion is further supported by the fact that there are grammatical categories dedicated to expressing components that play a role in the construction of emotions including epistemic states, bouletic states, evaluation, and attitudes. While these categories are compatible with contexts where emotions arise, they cannot be identified as emotions.

If properties of language(s) reflect core concepts essential in the mental reality of humans (Strickland, 2017), we would expect them to reflect basic emotions if they were indeed part of our mental reality, but the language system does not appear to be configured in this way. I thus conclude that the properties of grammar reviewed here constitute evidence in favor of the theory of constructed emotions.

5. Grammar constructs emotions: Towards an architecture for emotionality

Taking for granted that emotions are indeed constructed, I now turn to the question of how they are constructed (section 5.1). I explore this question from a decidedly linguistic perspective. Specifically, I show that emotions share some of the hallmark properties associated with the compositional properties of language. This invites the conclusion that the same architecture, a grammar of sorts, is responsible for the compositional nature of both, language and emotions. I first show that the core diagnostics for hierarchical structure in language equally apply to emotions (section 5.2). Moreover, in language, hierarchical structure is not only a formal property, it is also associated with a particular substance that restricts composition. I thus proceed to a more detailed exploration of the substance of this hierarchy in section 5.3, where I present some preliminary evidence that the same substantive hierarchy underlies the construction of emotions.

A note of caution is in order. What follows is not intended to present a definitive argument or conclusion; rather, in the spirit of this being a target article, it is meant to inspire future research across disciplines. Specifically, I wish to introduce a research question along with a preliminary proposal that makes empirical predictions. I hope that the commentaries will offer suggestions as to how it may be tested within different disciplines.

5.1. Emotions are constructed, but how?

Theories of constructed emotions come in different guises. While they all have in common that they view emotions as constructed, they differ as to how they model this construction. For example, according to the body of work reviewed in section 2.1.2, emotions are constructed based on the following ingredients: physiological change, arousal, appraisal, conceptualization, and language. Other components that have been argued to play a role include core affect, exteroception, and executive function (MacCormack & Lindquist, 2017). What these approaches have in common is that they typically list the relevant components, without explicitly providing an architecture that regulates how these components interact with each other. Moreover, it is not immediately clear how differences in the complexity of emotions can be modelled. Note that this question equally arises on the theory of basic emotions, as the crucial assumption here is that only a small set of emotions are basic, whereas complex emotions are constructed via these basic emotions. As a result of this possibility for composition, the number of possible emotions that humans can experience is limitless (Kemper, 1987).

Evidence that emotions are indeed constructed, and thus can be complex to a greater or lesser degree, comes from phylogenetic and ontogenetic considerations. For example, some

emotions are available earlier, both in terms of child development (Barret & Campos, 1987; Fischer et al., 1990) and in terms of evolution (Darwin, 1872; Plutchik, 1980). It stands to reason that this is because they are less complex than those that develop later. Moreover, some emotions (e.g., disgust) involve much less cognitive processing and structure than others (e.g., shame, Ortony et al., 1988, p. 4), which in turn suggests that they differ in complexity. Thus, we need a model that allows for a differentiation in complexity across different emotions, and preferably one that can predict the level of complexity of individual emotions (Scherer, 1984; Ortony & Turner, 1990).

A hierarchical organization of emotions (or of their components) has been proposed by various scholars. For example, according to Tellegen et al. (1999), affect is hierarchically structured, and Shuman et al. (2013) argue for different levels of valence. Most recently, Cochrane (2019) develops an architecture of emotions, where higher-order representations are built on top and serve in the construction of more and more sophisticated emotions. Here, I explore the idea that the construction of emotions is hierarchically organized from a linguistic perspective. That is, it is well established that the construction of linguistic output (e.g., phrases, sentences, and utterances) is hierarchically organized, a property typically equated with knowledge of grammar, or *Grammar* for short. If indeed Grammar is the property of our linguisticality that is responsible for hierarchical composition, then we might reasonably propose that this architecture is also utilized for our emotionality. It is the most economical hypothesis. If this is indeed so, it immediately allows us to understand the close connection between language and emotion. The development of both language and emotion depends on the development of this architecture and when minds are configured differently in ways that Grammar is affected, then we expect both language and the emotions to be affected.

In the next subsection, I turn to classic properties of Grammar that underlie the hierarchical nature of language and I show that emotions show similar properties, thus supporting the proposal that the same Grammar underlies both systems.

5.2. The hierarchical organization of language and emotions

While the linguistic reality of hierarchical organization enjoys broad support, the similarity between language and emotions in this respect has, thus far, been overlooked. If Grammar underlies both systems, this would immediately derive the parallelism between the two systems and thus constitute preliminary evidence.[13] In contrast, if each system were regulated by its own architecture, the parallelism would remain coincidental.

To begin with, consider Humboldt's famous dictum: "Language is a system that makes infinite use of finite means". This is a intrinsic property of our linguisticality: The finite means correspond to the ingredients of language (words, morphemes, features, intonational tunes, etc.), and with these, we can construct an infinite number of sentences, and thus express an infinite number of thoughts. As mentioned above, our emotionality shares this property: It is a system that makes infinite use of finite means and the number of emotions humans can experience is limitless (Scherer, 1984, 2001; Kemper, 1987; Ortony & Turner, 1990). Moreover, just like in language, the means that produce these emotions are finite. To the best of my knowledge,

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[13] The notion of grammar has previously been suggested to be relevant in the realm of emotions (e.g., Sloman, 1982; Keltner et al., 2019), however, to the best of my knowledge the proposal that the grammar of language and the grammar of emotions are governed by the same architecture is new.

emotion theorists have not considered the question regarding the source of infinity in emotions to the same extent as linguists have for language.

What is at the root of infinity in language is *compositionality* and *recursion*. According to the principle of compositionality (attributed to Gottlob Frege) the meaning of a complex expression is determined by the meanings of its constituent expressions and the rules used to combine them. Compositionality goes a long way toward understanding infinity, as it implies the possibility of generating novel sentences. As for *recursion*, it refers to the property of structure being repeated again and again within itself, without a set limit. In language, this comes about, for example, by embedding a clause (S) inside another clause, as in (25).

(25) a. [s I believe [s emotions are constructed]]
     b. [s I believe [s Hannah thinks [s emotions are constructed]]]
     c. [s I believe [s Hannah thinks [s Liv suspects [s emotions are constructed]]]]

Since clauses can be contained in other clauses, there is potential for infinity. While for practical reasons humans will never be able to utter an infinitely long sentence, the crucial fact is that it would – in principle – be possible. Abstracting away from the label associated with the embedded constituent (S in (25)), recursion may be viewed as a function that references itself. In language, this means that we can combine two elements to derive a complex element, a process sometimes referred to as *merge* (Chomsky et al., 2023). The newly formed complex element may in turn be combined with another element. In this way, recursive structure building generates hierarchical structure, which is another essential trait of human language. Notably, recursion in this general sense of merge has been argued to be at the core of the human language faculty: It is what differentiates human language from other communication systems found in non-human animals (Hauser et al., 2002; Fitch et al., 2005). However, this claim remains controversial, and if the discussion below is on the right track, it would imply that merge is not language-specific but is also found in the construction of emotions. In what follows I argue that compositionality, recursion, and hierarchy are indeed properties of human emotionality. Hence, I propose that merge does indeed underlie the infinity of human emotions.

I start the discussion with compositionality and recursion in complex emotions. At the outset, we need to distinguish between different notions of complexity in emotions (see Berrios, 2019 for a recent overview). What matters for our purpose is the distinction between two types of complexity. On the one hand, emotional complexity depends on the number and type of ingredients that make up a particular emotion. On the other hand, complexity may also arise via the co-activation of more than one emotion (e.g., mixed emotions).

Consider first complex emotions of the latter type. According to Berrios (2019, p. 1): "Affective experiences can fluctuate, be combined, and fused, resulting in various phenomena labelled as being emotionally complex". I argue that complexity of this sort has the property of compositionality such that the nature of the complex emotion depends on its constituent emotions and the rules used to combine them. To see this, consider the following instances of complex emotions.

(26) **Context**: Philomena is an environmental scientist who has for decades been trying to advocate for the reduction of carbon emissions, without much success. In light of recent reports on the state of the climate, Philomena realizes that it might be too late

to do anything.

Emotion: Philomena is sad and afraid.

(27) **Context**: Lev spent a significant amount of money on therapy to cure himself of arachnophobia. However, the first time after therapy he sees a spider, he feels fear again.

Emotion: Lev is sad because he is afraid.

(28) **Context**: Prius has been struggling with depression for many years, but he finally seems to have gotten better as he hasn't had an episode of depression in a while. When his cat dies Prius feels very sad and he worries that he might get depressed again.

Emotion: Prius is afraid because he is sad.

Arguably, the three types of complex emotions in (26)–(28) consist of the same ingredients: fear and sadness (abstracting away from the compositional nature of each of these two emotions). Yet, the resulting emotions are distinct in all three cases. The source of this distinction is twofold. First, it involves the nature of the relation between the two emotions. In (26) the two emotions occur simultaneously as reactions to the same event. In contrast, in (27) and (28) there is a causal relation that holds between these emotions such that one emotion is a reaction to an event (seeing a spider, death of the cat), while the other is a reaction to the emotion triggered by this event (sadness due to fear vs. fear due to sadness). Thus, when there is a causal relation between the two emotions involved, the causal ordering of the emotion matters.

These differences echo the principle of compositionality in that the quality of the complex emotions depends on its ingredients as well as the rules of composition: Different combinatorial properties give rise to different emotional experiences (Pugmire, 2005; Mendonça, 2013). The examples above also show the effects of recursion in the realm of emotions. An emotion can itself be the input for another emotion and in principle, this could lead to an infinite loop of emotional reactions (again barring practical constraints). Interestingly, just as the recursive property of language has been identified as specific to humans so has the recursive property of human emotions been argued to set them apart from animal emotions (Rosenberg, 1990, p. 11).

Next, we turn to the second source of complexity in emotions, the one that concerns differences in the complexity of individual emotions, based on the number and type of ingredients that are involved in their composition. If indeed linguistic and emotional composition are parallel, we might expect that the composition of emotions, too, involves some kind of hierarchy. In other words, I propose that the construction of any given emotion is not simply an agglomeration of psychological components but that it is hierarchically organized. This is precisely what Cochrane (2019) proposes: the psychological components of emotions are hierarchically organized. Accordingly, we would expect that differences in processing, as well as in ontogenetic and phylogenetic development, are determined by this hierarchy. What I wish to add here is the proposal that the system responsible for this hierarchical organization is the same in language and the emotions. Given that we have evidence for an architecture that generates hierarchical complexity in language, we can consider it *prima facie* plausible that emotions make use of the same system. This conclusion receives support from a proposal put forth in Popescu & Fitch (2020), according to which hierarchical processing is not limited to

language but is relevant in music, as well. In fact, according to Fitch (2014, 2017), hierarchical organization is an intrinsic property of human cognition in general (see also Badcock et al., 2019) and might be reducible to the hierarchical organization of the brain itself (Deco et al., 2021). What I add here is the claim that emotions, too, are organized in this way.

5.3. A contentful hierarchy for language and emotions

That language is hierarchically organized is widely accepted by linguists across different frameworks. However, assumptions regarding the nature of this hierarchy differ vastly. On the one hand, according to minimalist versions of the generative tradition, merge is all there is to hierarchy (Chomsky et al., 2023). On the other hand, there are also approaches according to which the hierarchical organization of grammar comes with some built-in substance. For example, generative *cartographic* approaches assume that syntactic hierarchy pertains to functional categories, which in turn come with labels that correspond to grammatical categories, such as *aspect, tense, modality, mood*, etc. (Cinque, 1999). Evidence for the assumption that some substantive content is intrinsic to the hierarchy comes from the generalization that all languages follow similar patterns in the construction of sentences. For example, the lowest part of the hierarchy is concerned with the construction of events and the assignment of event roles (such as *agent* and *patient*). This event-related structure is then embedded in a structure concerned with the construction of propositions, which can be deictically anchored (to the place, time, and setting of the utterance) and where grammatical roles are assigned (*subject* and *object*). Finally, the highest domain in the construction of sentences is responsible for composing different clause types (declarative, interrogative, imperative) as well as assigning discourse roles (*topic* and *focus*). While details differ across languages, the crucial fact is that no language assigns discourse roles or grammatical roles in a lower level of the hierarchy than event roles, and so forth (Ramchand & Svenonius 2014, Wiltschko 2014).

To capture these universal generalizations, while still leaving room for language-specific variation, Wiltschko (2014) proposes that grammatical categories are constructed on a language-specific basis, even though their construction is constrained by a universal structure, which captures the generalizations introduced above. This is referred to as *the universal spine hypothesis*,
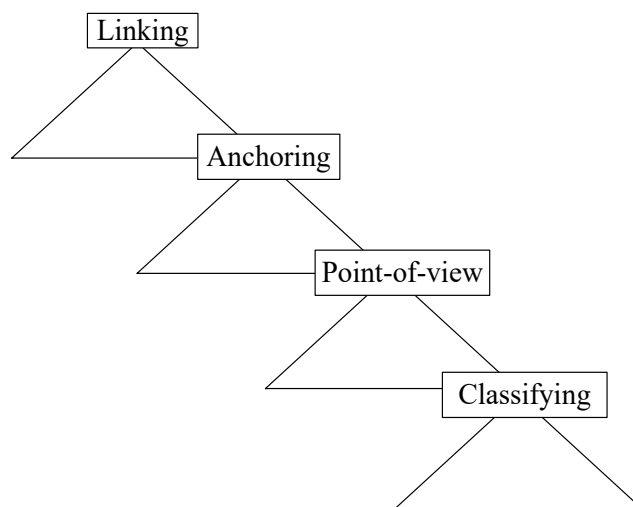

Figure 4. The universal spine

which I adopt here. The universal restrictions on the construction of sentences introduced above are captured by assuming that syntactic structure is universally built based on a universal spine. The spine consists of several layers, each of which is defined by abstract functions, as schematized in Figure 4. The relevant spinal functions consist of *Classifying, Point-of-view, Anchoring*, and *Linking.*

These functions lend content to the hierarchical organization of sentences and restrict the kinds of grammatical categories that may occupy the individual domains thus defined. At the core of each sentence is a verbal predicate that denotes a state or event, and which is classified in the lowest layer of structure. This classification can be based on temporal properties, yielding the aspectual event types (*Aktionsarten*) found in many languages (e.g., telic vs. atelic events). But events may also be classified based on the animacy of the event participants (animate vs. inanimate), as in Blackfoot (Louie, 2008; Wiltschko, 2014). The next layer on the spine introduces a point of view relative to which the event is interpreted. Again, the precise content of this point of view is determined on a language-specific basis. It may be temporal, yielding what is known as grammatical aspect in English (perfective vs. imperfective). But it may also be participant-oriented, yielding the so-called direct-inverse system of Algonquian languages, which allows the event to be viewed from the perspective of one of the event's participants. The next layer of structure anchors the event to the deictic centre, i.e., the *here-and-now* of the utterance situation. Deictic anchoring may be based on temporal properties, yielding the tense systems of many languages (including English), but may also be based on spatial properties (*here* vs. *there*, as in Halkomelem Salish) or the participants involved (speaker, addressee, or non-participant 3rd person) as in Blackfoot (see Ritter & Wiltschko, 2014, for a detailed discussion). Finally, the deictically situated event may be linked to the larger discourse structure in which the sentence is embedded. This yields ways to embed sentences (e.g., via the complementizer *that*), ways to typify clauses relative to their communicative intention, as well as ways to classify the utterance according to the flow of information in the ongoing discourse. Thus, through the intrinsic functional specification of each layer of structure, the spine restricts the construction of sentences. As such, its substance adds meaning to the units of language that it serves to combine.

This addition of meaning is readily observed if we consider the fact that the status of topic or focus is, in many languages, not marked by a unit of language, but instead derives from its position in the clause. Similarly, many units of language are interpreted differently depending on their position in the sentence. For example, English *that* serves as a complementizer in the sentence-initial linking position but as a demonstrative determiner when it precedes nominal phrases. The universal spine hypothesis straightforwardly derives the emergence of meaning even in the absence of dedicated lexical content.

Another way in which the spine adds substance to the construction of sentences is through the make-up of the layers of structure, which is identical across all spinal functions. Specifically, Wiltschko (2014) assumes that each layer is introduced by a transitive syntactic head (labelled as X in Figure 5), which relates two arguments (arg), one provided by the lower structure the other serves as a placeholder for contextual content (arg_{Cx}). Each head comes with an unvalued coincidence feature [+/-coin], which is valued as positive or negative by the units of language that occupy it.
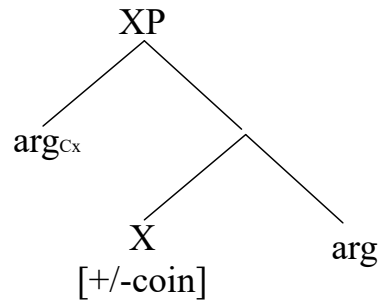
Figure 5. The architecture of structure

In this way, the spine specifies an ordering relation between two arguments, which in turn are restricted by the spinal function. For example, in the anchoring layer, this head encodes whether or not the event situation (denoted by the verb) coincides with the utterance situation it introduces. Thus, in English, present tense morphology indicates that the two situations do coincide, while past tense morphology indicates that they do not.

In addition to capturing the content of the structural hierarchy observed across the languages of the world, the universal spine hypothesis captures two more properties that define natural languages: contrast and contextuality. First, consider contrast, a characteristic that has long been viewed as a core property that pervades all domains of language (Cowper & Hall, 2014). We observe binarity of feature specifications in sounds (e.g., voiced or unvoiced which is designated in standard notation as [±voiced]) as well as grammatical categories (e.g., [±past]). Arguably, this notion of contrast, precisely since it is so pervasive, is built into the system itself rather than being associated with individual units of language. Since the coincidence feature must be valued as either positive or negative, the spine includes this built-in source of contrast.

Next, consider contextuality. It is a well-known fact that language allows for the integration of contextual information in interpretation. The phenomenon of *deixis* serves well to illustrate this property (Kaplan, 1999). In the examples in (29), we have the same ingredients in both examples, but in (29a) the sentence refers to a situation where Liv is tired, while in (29b) it refers to one where Philomena is tired.

(29) a. Liv: I am tired. (I = Liv)
  b. Philomena: I am tired. (I = Philomena)

This establishes that the interpretation of these sentences depends in part on contextual information (i.e., who is talking). Crucially, context-dependence is not simply a property of the words in these examples (the personal pronoun *I* in (29)) but rather of the complex expression in which it is embedded. This is evident from the fact that 1st person pronouns are not always interpreted indexically. For example, in the context of a compound, as in (30), the interpretation of the 1st person pronoun (in this case realized as *me*) does not depend on who is speaking. Rather, it can roughly be paraphrased as 'self-centred'.

(30) a. Liv: Kids today have become a me-generation.
  b. Philomena: Kids today have become a me-generation.

What this means is that the phenomenon of deixis, and contextuality more generally, is, at least in part, a characteristic of the system that combines linguistic expressions and not only of

the words themselves. Thus, the system responsible for linguistic composition allows for contextual information to be systematically integrated. The spine does exactly that, namely through the integration of a contextually determined argument in each layer of structure (arg_{Cx}). Moreover, the type of content permissible for each of these contextual variables is systematically restricted via the spinal functions. For example, arg_{Cx} in the anchoring domain must be determined by the utterance situation and hence this is the source of deictic information.

For completeness, note that language does not only allow us to construe propositional content, but we can also communicate this content and in the process, linguistic expressions take on particular forms. These forms include units of language that serve to regulate interaction. For example, all languages have means to manage the common ground between the interactants, as in (31).

(31) Anjali: I have a new dog, eh?
     Tenoch: Oh! That's great!

With the use of *eh*, Anjali wishes to confirm that Tenoch knows about the propositional content; by prefacing his response with *oh*, Tenoch indicates that this is news to him but that he is ready to update the common ground to include this proposition (Bolden, 2006).

In addition, all languages have means to manage turn-taking in conversations. For example, with the rising intonation in (32), orthographically indicated by the question mark, Sangyup requests a response from Lovisa (in addition to indicating inquisitiveness in the sense of Ciardelli et al. 2019); by prefacing her response with *well* Lovisa indicates that her utterance is a response, even though it is not the response expected by Sangyup (Sacks, 2020).

(32) Sangyup: You have a new dog?
     Lovisa: Well, I wish I did. But he's not mine.

Crucially, the interactional aspects of language are also regulated by the spine, according to Wiltschko (2021). That is, Wiltschko argues that the propositional spine is extended to include layers of structure that regulate linguistic interaction: the *interactional spine*, schematized in Figure 6. The layers of the interactional spine are characterized by the same architecture as the propositional spine (a function relating two arguments via a coincidence feature), but it introdu-
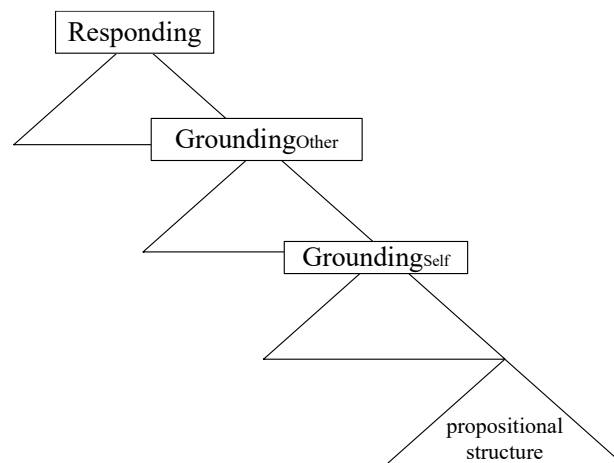

Figure 6. The interactional Spine

ces three new layers of structure with their functions dedicated to regulating interaction: i) *speaker-oriented grounding*, which relates the propositional content to one's epistemic state; ii) *addressee-oriented grounding*, which relates the proposition to the addressee's epistemic state (by necessity this will have to be from the point of view of the speaker); iii) a *response* function, which relates the present move to the ongoing conversational structure (initiation or response) and in this way serves to synchronize turn-taking.

A few remarks about the relation between the propositional spine and the interactional spine are in order. In its fully developed state (i.e., in typically developed human adults) the interactional spine dominates the propositional structure in that the latter is embedded in the former. This is reflected in the fact that most interactional units of language are realized at the edges of an utterance, i.e., in sentence-peripheral position (Wiltschko 2021). However, during child-language development, children start by using units of language from the lowest layer of the propositional spine (nouns and verbs that name individuals and events) as well as units of language from the highest layer of the interactional spine (e.g., requesting response). This suggests that the spine develops inwardly (Heim & Wiltschko, 2021, 2024). In turn, this is consistent with the conceptualization of the spine proposed in Hinzen & Wiltschko (2023), according to which human linguisticality bridges two pre-linguistic cognitive abilities, namely perceptual categorization and social interaction, the outer layers of the spine, respectively.

In the next subsection, I show that the extended universal spine hypothesis (including the interactional spine) allows for a novel approach to understanding the hierarchical construction of emotions. Specifically, it allows us to formulate an interdisciplinary research agenda with testable predictions. To the best of my knowledge, no other account for the hierarchical organization of linguistic structure would be straightforwardly applicable to the construction of emotions.

5.4. The emotional spine hypothesis

Above, I have suggested that the most economical hypothesis to account for hierarchical composition in both language and emotion is to assume that the same system, namely Grammar, underlies both, our linguisticality and our emotionality. In this subsection, I wish to take this proposal one step further. Suppose that the extended universal spine is indeed at the core of this Grammar that organizes both language and emotion. We then expect that emotions, too, are constructed by the spine. I refer to this proposal as *the emotional spine hypothesis.* It leads us to expect that complex emotions are constructed by systematically integrating contextual information, according to the spinal functions, and that emotional experiences are contrastive. Within the emotions, this roughly corresponds to the fact that emotions typically come in contrastive pairs: pleasure vs. aversion, happiness vs. sadness, etc. Thus, I propose that each layer of the spine would correspond to a valent representation of the emotion-triggering situation, adding another dimension of contextual information. In what follows, I briefly outline what type of information each layer might add to the construction of an emotion. By way of example, I consider the event of a severe allergic reaction as the emotion-triggering event.

The first layer of the spine, dedicated to classification, would serve to classify the event as positive or negative relative to the experiencer's homeostatic state. If one is experiencing an allergic reaction, the corresponding homeostatic evaluation is negative: it threatens one's well-being. This could be considered the most basic emotion. However, the emotional experience can

become more and more complex by integrating contextual information into the evaluation of the triggering event. For example, the event can be evaluated from a particular viewpoint, introduced in the next spinal layer (*Point-of-view*). Specifically, one's emotional experience will depend on whether the event is viewed as bounded (it is known to come to an end) or whether it is experienced as unbounded. As is reflected in the common encouragement "*Keep the end in sight*", knowing that a negative experience has an endpoint typically eases the emotional intensity and the opposite is the case for a positive experience.

In the next layer (*Anchoring*), the emotional experience can be anchored relative to the here and now. For example, the emotional experience that comes with an allergic reaction will differ depending on whether it is experienced alone on a hike far away from civilization or whether one is close to a hospital. The current situation to which the experience is anchored can either increase or decrease the negative experience leading to either severe panic or mild worry. Finally, the emotional experience can be influenced by being linked to the larger situation, including one's future goals. This would be the contribution of the *Linking* layer. For example, if one has plans for a trip to Kenya to hike Mount Kilimanjaro, an allergic reaction will likely interfere with these plans, thus leading to additional emotional complexity.

Next, consider how the interactional dimension might play a role in the construction of the emotional experience. The self-oriented grounding layer serves to relate the current emotional experience to past experiences. If the experiencer had allergic reactions before, they will be able to draw on their past experience to know what to expect and hence allow them to integrate the experience into their emotional ground. This might affect the intensity of the emotional experience depending on the nature of the past experience. The other-oriented grounding layer serves to relate one's emotional state to that of someone else. Thus, the emotional experience triggered by the allergic reaction may be affected by the presence of another person and their emotional state. That is, the emotional state of the other person (e.g., calm vs. panicked) will likely affect one's own emotional experience. Finally, consider what the topmost spinal layer (*Responding*) might add to the composition of emotional complexity. Notably, emotional interaction is not constrained in the same way as linguistic interaction: there is no requirement to take turns. Rather, emotional reactions can occur simultaneously via emotional contagion and collective emotions (Le Bon, 1895; Goldenberg et al. 2020) and this is what might be regulated by the response layer on the emotional spine. According to Hatfield et al. (1992, p. 153ff) emotional contagion is the "tendency to automatically mimic and synchronize facial expressions, vocalizations, postures, and movements with those of another person and, consequently, to converge emotionally".

Thus, the functions of the extended universal spine are amenable to an initially plausible analysis of the complexity of emotional experience. The way these functions play out in both language and emotions is summarized in Table 2.

In sum, the emotional spine hypothesis is a promising model of human emotions. It satisfies Cochrane's (2019) desideratum for a hierarchical architecture that allows for multiple mental states to be integrated via a simple system that mirrors the binary on/off activation of a neuron and where the information stemming from different systems is reduced to a common format. The emotional spine hypothesis does precisely that. It integrates different types of contextual information, and it does so by relating it to the content of the emotion via a bivalent coincidence feature. As such it allows us to capture the ingredients of Cochrane's (2019, p.10) basic definition

Table 2. The role of the spinal functions in language and the emotions

SPINAL FUNCTION	EFFECT IN LANGUAGE	EFFECT IN EMOTION
RESPONSE	synchronizing turn-taking	synchronizing emotional experience
GROUND-OTHER	relating utterance to other's epistemic state (cognitive empathy)	relating emotional experience to other's emotional state (emotional empathy)
GROUND-SELF	relating utterance to self's epistemic state	integration of experience into (prior) emotional states
LINKING	relating proposition to larger discourse	evaluating experience based on larger goals
ANCHORING	relating event to here and now	evaluating experience based on relation to here and now
POINT-OF-VIEW	introducing a perspective on event	evaluating experience based on a particular perspective
CLASSIFYING	classifying event	evaluating experience based on homeostasis

of emotions as valent representations of situated concerns. In the following concluding section, I lay out in more detail some of its predictions and implications.

6. Conclusion

The goal of this paper was to explore the relation between language and emotions, and more specifically to answer the two questions introduced in section 1, repeated below for convenience.

Q1   How are emotions expressed in the languages of the world?

Q2   What is the cognitive architecture that regulates the relation between language and emotions?

The answers I have presented are as follows. Regarding the first question, we have seen that emotions can be expressed across all levels of language, though not with dedicated grammatical means. Particularly striking is the fact that languages do not possess grammatical categories that are exclusively dedicated to the expression of emotions. Establishing this novel generalization and its significance comprised the first part of the paper. The conclusion we were led to was to take the absence of dedicated grammatical categories for emotions as a (novel) argument for the theory of constructed emotions. Taking this result at face value, I then proceeded to attempt an answer to the second question. I have proposed that there is a profound relation between our linguisticality and our emotionality in that the same system is responsible for the construction of linguistic output (individual utterances) and emotional output (individual emotions). In what follows, I lay out some of the avenues of research the emotional spine hypothesis invites (section 6.1), as well as some general conclusions for the affective sciences (section 6.2) and for the language sciences (section 6.3).

6.1. The emotional spine hypothesis as a research agenda

The emotional spine hypothesis is a specific proposal to model the nature of emotions and how they are embedded within our cognitive architecture. At its core is the assumption that the same system responsible for the construction of linguistic utterances (the extended universal spine) is

also responsible for the construction of emotions. I discussed preliminary evidence to the effect that the core properties of the spine are indeed manifest in the construction of complex emotions. This concerns the hierarchical organization of dedicated layers of structure, each associated with a particular function. Each of these functions constrains the contextual information accessible within each layer and thus contributes to the construction of emotions. In this way, the construction of emotions is hypothesized to parallel the construction of complex linguistic expressions.

The emotional spine hypothesis makes possible a new approach to emotion research, one that does not rely on words denoting emotions. That is, emotion words available in the languages of the world merely correspond to the folk-psychological conceptions of individual emotions and consequently there are significant cross-linguistic differences (Wierzbicka, 1999). Thus, any approach that seeks to identify universal physiological, psychological, and cognitive correlates of a particular emotion as named by a word is bound to fail. Such words (typically English-based) are – at best – approximations of a common human experience and – at worst – utterly misleading. Natural language words do not correspond to scientifically definable natural classes. Significantly, the emotional spine hypothesis does not predict any specific mapping between emotion words on the one hand and particular constellations on the spine that arise in the construction of an emotion on the other.[14]

I take this to be a virtue of the emotional spine hypothesis, as indeed, there does not seem to be a straightforward correlation between emotion words and specific physiological, psychological, and cognitive experiences. To see this, consider *fear*, which has been argued to come in different guises based on its trigger: fear of injury, fear of anxiety, and fear of negative evaluation (Reiss & McNally, 1985; Reiss, 1991). Relatedly, the experience of fear also differs depending on one's behavioural reaction. That is, fear is classically considered the underlying emotion for several extreme-stress survival responses to an inescapable threat, including fight, flight (Cannon, 1927, 1929), and freeze (Barlow, 2002). Yet, whether an individual fights, flees, or freezes is dependent on various factors having to do with the nature of the threat as well as properties of the individual experiencing the threat. In other words, the reaction is in part determined by contextual information, which in turn affects the nature of the emotion. For example, fear can promote *anger* (e.g., Zhan et al., 2018), which might be necessary to engage in fighting. So, if we are indeed dealing with different types of fear depending on the trigger and the response, then how do we differentiate them? Words cannot be trusted to lead us to a unique emotional experience. This problem generalizes across all emotional experiences. In turn, this implies that we should not rely on words to identify them, at least not exclusively – but most studies do, no matter whether they take emotions to be basic or constructed. In such studies, human participants are often presented with a particular emotion stimulus and are then asked to classify and/or rate these stimuli. These emotion stimuli often consist of particular expressions of emotions (typically produced by professional actors), such as facial expression (Ekman & Friesen, 1971; Langner et al., 2010; Krumhuber et al., 2023; Wingenbach et al., 2016), vocalizations (Belin et al., 2008), or various modalities (Bänziger et al., 2009, 2012; Dyck, 2012). More recently, emotion stimulus sets have been developed which consist of verbal descriptions

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[14] As such, the emotional spine hypothesis departs from the use of lexical semantic analysis as an indirect method for determining conceptual structure, as in Wierzbicka (1985, 1999) or Lakoff and Johnson (1980).

of emotion-triggering contexts (so-called *vignettes*), which aim to invite the participant to imagine the emotion that they would experience (Wingenbach et al., 2019). The latter methodology addresses the problem that emotion experiences are highly context-dependent. Nevertheless, what all these tests have in common is the inclusion of words for emotion concepts (fear, anger, etc.) as the target categorizers, sometimes accompanied by scales for evaluating the degree of valence, arousal, and intensity of the targeted emotions.

If the emotional spine hypothesis is on the right track, experiments that rely on emotion words for the classification of emotions are bound to produce misleading results. This is because they presuppose a direct correspondence between the expression of an emotion experience and the corresponding word for the emotion concept. While this constitutes one of the core criticisms that led to the theory of constructed emotions, words denoting emotion concepts still play an important role in the methodologies used to support this approach.

However, if we are not looking for a direct mapping of emotion experiences onto words for emotion concepts, and if we cannot rely on words in our methodologies designed to explore emotions, then what is the alternative? And how do we test the emotional spine hypothesis empirically? For example, how can we support or falsify the hierarchical organization of emotion construction? While my goal here is to introduce the emotional spine hypothesis as a hypothesis – based on linguistic and conceptual considerations – developing research protocols to this effect lies outside the scope of this article. In what follows, I outline a few avenues of research that I consider promising.

6.2. Avenues of future research

For reasons of space, in this section I focus on possible predictions of one aspect of the emotional spine hypothesis, namely the hypothesis that the spine bridges two cognitive capacities, perceptual categorization and social interaction. These capacities define the outer layers of the spine, with the inner layers providing the cognitive architecture that allows for the systematic integration of contextual information. According to the emotional spine hypothesis, the spine contributes to the properties of our linguisticality and emotionality. These assumptions lead to predictions relevant to different fields of emotion research, including the following.

If the spine bridges two independent cognitive capacities in the creation of emotions, we predict that experiences based on interoception (i.e., the perception of the state of the body) will differ depending on whether or not contextual information (other than the triggering event) is integrated in the construction of the emotion. Specifically, emotional experiences that come about without the contextual information regulated by the spine are predicted to be universal, automatic, and without cognitive processing (and maybe they are better classified as pure physiological experiences or feelings). This should correlate with differences in processing speed as well as differences in brain activity. Note that on this view some of the classic basic emotions (such as some instances of fear) would be considered purely interoceptive experiences, automatically triggered by hormones, for example. These will then serve as the basis for the construction of emotions that involve cognitive components and hence lead to various guises of fear, which may or may not be distinguished by natural language words.

Another prediction pertains to neurological patterns. If the same architecture underlies language and emotions, we predict the co-activation of language regions in the brain during

emotion experience, and this should be independent of the use of words denoting emotion concepts (evidence for the latter is discussed in Lindquist et al., 2012).

Finally, I turn to predictions regarding the expression of emotions. Thus far, I have abstracted away from a glaring difference between the construction of sentences and the construction of emotions. Sentences are overt expressions of a mental construct (i.e., a thought)[15] while emotions are experiences, which are often accompanied by an expression of sorts (including facial and bodily expressions, as well as non-linguistic vocalizations). The question thus arises as to whether there is a parallel between the expressive aspect of language and the expressive aspect of emotions. A crucial difference between linguistic and emotion expression is of course that the relation between form and meaning in words is typically arbitrary, which in turn is one of the reasons why the languages of the world appear so different, at least on the surface. Non-linguistic expressions of emotions are different, in that the relation between the form they take and the emotion they express is typically not arbitrary, which therefore leads to much less cross-cultural variation. The emotional spine hypothesis makes specific predictions about the type of emotion-expression pairings that are expected to be universal and those that are expected to vary. Again, we predict those experiences that are purely based on interoception, without the mediation of contextual variables supplied by the spine to be automatic and hence universal, whereas those that are constructed should display culture-specific and individual variation. The fact that facial expressions can be difficult to recognize when shown without contextual information (Aviezer et al., 2008; Kret et al., 2020) may be related to the fact that emotion experiences are typically embedded in a rich context, which in turn affects their expressions. Significantly, it appears that the expression of constructed emotions does display some parallels to linguistic expressions. For example, by contracting or relaxing the muscles in different degrees and combinations, they can produce thousands of different messages (Ekman & Friesen, 1971; Kret et al., 2020). This means that not only are the emotions we can experience potentially infinite, but so are their expressions. For completeness, note that words denoting emotion concepts are not predicted to be sensitive to this distinction between purely interoceptive experiences and emotion experiences that integrate contextual variables.

Next, consider what the emotional spine hypothesis predicts regarding the phylogenetic development of emotions. If the same architecture underlies both our linguisticality and our emotionality, we predict a correlation between the evolutionary development of the two systems. As mentioned above, Jablonka et al. (2012), do indeed suggest that language and emotions have co-evolved. The present hypothesis makes predictions regarding the trajectory of this evolution. If indeed the spine bridges between two pillars that exist independently, then those emotional experiences that are based on these pillars alone should be available in animals, whereas the systematic integration of contextual information available to humans should not play a role in the construction of their emotions. Significantly, according to Damasio (1999, p. 35), while "nonhuman creatures have emotions it is also clear that there is something quite distinctive about the way in which emotions have become connected to the complex ideas, values, principles, and judgments that only humans can have, and in that connection lies our legitimate sense

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[15] I follow the Uncartesian point of view (Hinzen & Sheehan, 2015), according to which our linguisticality is responsible for the construction of thoughts, where sentences are merely the overt expression of these thoughts. For ease of exposition, I abstract away from this basic question regarding the relation between language and thought.

that human emotion is special" (see also Paul & Mendl, 2018). The emotional spine hypothesis allows for a way to explore these differences in emotional experiences in a new light.

Similar considerations hold for the ontogenetic development of emotional experiences. We predict that the development of language will correlate with the development of emotional complexity. Again, the assumption that the spine bridges categorization and social interaction predicts that the spine will develop in an inward-growing trajectory. In language, this is made explicit in Heim & Wiltschko (2021, 2024). They discuss evidence from the acquisition of *huh*, which is consistent with the inward-growing spine hypothesis. Specifically, they propose that children start by linking between categorization and social interaction. The spine then unfolds to include a generalized anchoring and grounding layer. The anchoring layer further unfolds to differentiate between anchoring to the utterance and other possible viewpoints; the grounding layer further unfolds to differentiate between one's own ground and that of others. This predicts not only a particular developmental path for emotional complexity but also that this path will correlate with the development of language. This view differs from other constructionist approaches, which predict a correlation with the acquisition of particular words for emotion concepts. By contrast, according to the emotional spine hypothesis, there is no correlation between particular emotion words and the spine, rather, it predicts a correlation between the ability to acquire certain aspects of language with the ability to experience (and express) particular types of emotions.

Finally, the emotional spine hypothesis can be explored relative to different profiles of neuro-diversely configured minds. Specifically, we predict the existence of neurodiverse profiles where particular aspects of the spine are affected. When these aspects of the spine are affected, they should equally manifest themselves in their linguisticality and their emotionality. For example, Hinzen & Wiltschko (2023) argue that the autism spectrum is characterized by differences in the size of the spine that configures language. In high-functioning autism, only the topmost interactional layer is affected, while in extreme cases of (non-verbal) autism the spine is missing altogether, making it impossible to create or express propositional thoughts. The emotional spine hypothesis predicts that the autism spectrum is equally characterized by a spectrum of emotional complexity.

6.3. Final words

To conclude, I wish to reaffirm the core goal of this article: to emphasize the value of interdisciplinarity, especially when considering the interplay between two capacities, such as language and emotions, which are traditionally studied in different fields. For researchers in the affective sciences, I hope to have shown that it is pertinent to explore the role of language beyond words. This affects not only the way language and emotions interact but also the methodologies used to explore emotion experiences. Words can be misleading, and the exploration of linguisticality more generally, including grammatical knowledge, can shed new and unexpected light on the relation between language and emotions.

Similarly, for researchers in the language sciences, I hope to have shown the importance of an informed understanding of emotions in the exploration of emotive meaning, one that goes beyond the common-sense use of the term. This much I consider to be firmly established by means of the preceding discussion. In addition, by exploring the relation between language and emotions in this way, I was led to propose the emotional spine hypothesis. At this point, the

emotional spine hypothesis is meant as a research agenda, a way to proceed in further explorations. If it turns out to be on the right track, there are crucial implications for our thinking regarding the way language is embedded in cognition. Specifically, if the spine not only underlies our linguisticality but also our emotionality, this means that language is (in part) regulated by a cognitive architecture that is not language-specific. In turn, this invites the question as to whether other faculties, too, are regulated by the spine. In other words, could the spine be considered a more general architecture that governs cognition? This would be an extension of Fitch's (2014) proposal according to which several unrelated capacities are defined by hierarchical processing (see also Fitch 2017). What I add here is the possibility that it is not just hierarchy, but instead a contentful hierarchy (the spine) that defines human cognition. In this manner, the emotional spine hypothesis offers a new way to think about language and cognition, one where the seemingly unsurmountable differences between generative and cognitive linguistics dissolve. On the one hand, language reflects a general cognitive architecture (in line with cognitive linguistics). On the other hand, language is special as it integrates into this architecture, the capacities that define it, which differ from those that define other human faculties, like for example our emotionality.

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