Apples and oranges: Three criteria for positive emotion typologies

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Apples and oranges: three criteria for positive emotion typologies☆

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Positive emotion typologies, that is, classifications of positive emotions into conceptually distinct categories or 'types' according to their properties, can clarify and simplify the complex structure of positive emotion space. In this review, we introduce three key evaluative criteria for such typologies: comprehensiveness, distinctiveness, and granularity. Comprehensiveness is the degree to which the typology accurately represents the boundaries of positive emotion space; distinctiveness is whether emotional states are clustered on the basis of a consistent aspect of emotion; and granularity is the level of nuance and detail in categorization. These criteria provide standards by which the quality of existing typologies can be judged, as well as guiding the development of new typologies. Multiple valid and useful positive emotion typologies can be described; these criteria can guide scholars in selecting the typology that best suits their needs.

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Introduction

In 1869, Russian chemist Dmitri Mendeleev published the original version of his periodic table of chemical elements. Although other typologies of known elements had been proposed, Mendeleev was the first to leave gaps in his table for elements that had not yet been discovered at the time. One example is Germanium (32 GE)—a glistering, brittle metalloid, which was discovered in an abandoned mine in Germany two decades after he predicted its existence. Mendeleev's periodic table remains one of the most influential and widely used typologies in science.

Categorization is one of the most central human conceptual abilities [1]. We categorize in all facets of our lives, including diseases (e.g. infectious, deficiency, hereditary), jobs (e.g. education, hospitality, science)—and positive emotions (e.g. pride, relief, joy). Like the periodic table, such categorizations bring about *typologies*: Organized systems that sort phenomena into meaningful categories or 'types' according to their properties, and articulate those categories' relations to each other [2,3].[4] In science, a good typology can reduce complexity and provide conceptual clarity about the structure of a given domain. Moreover, as illustrated by Mendeleev's Germanium prediction, typologies can yield predictions about yet-to-be-discovered phenomena [see Ref. [4]].

In emotion research, typologies can serve several essential purposes. They can guide theorizing and hypothesis development; help determine which emotional states to include in a given study; and support selection of appropriate experimental manipulations and operational measures [5•]. Emotion typologies can thereby provide a framework for studies that investigate the impact of emotions on a multitude of outcomes, including moral judgment, social status, altruism, and close relationships [for an overview, see Ref. [6]]. Typologies can also inform studies that investigate associations among different components of emotional responding, such as experiential, physiological, and behavioral features [e.g. Refs. [7–10]].

In contemporary emotion research, however, typologies are structurally underutilized. The majority of reported studies instead use emotion *lists*, which lack an explicit account of the structure of positive emotion space [11••]. These lists are typically too narrow to capture the rich variety of actual positive emotional experiences [12]. Moreover, authors using emotion lists rarely report the criteria that guide their selection of some constructs

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☆ Given her role as Guest Editor, Disa Sauter had no involvement in the peer-review of this article and has no access to information regarding its peer-review. Full responsibility for the editorial process for this article was delegated to Blair Saunders.
[4] The words typology and taxonomy are often used interchangeably. Bailey [2] proposed that they represent two different classification approaches: A typology is primary conceptual, and a taxonomy is empirical. The term taxonomy is more generally used in the biological sciences while typology is used in the social sciences. In this manuscript we do not make this distinction; we take the view that a typology can be conceptual, empirical, or combinations of the two.

rather than others, and new lists are readily assembled, combined or adjusted. Because different studies rely on different emotion lists, it is often difficult to articulate the implications of new empirical findings in terms of prior theory—much like comparing apples to oranges. This fragmentation can be reduced by working with a priori typologies, which offer an effective form of standardization by reflecting the full range of human positive emotions. Like Mendeleev's periodic table, a good typology enjoys consensus, and is widely applicable for all kinds of research purposes [7].

In recent years, several typologies of positive emotions have been proposed that aim to provide conceptual clarity about the structure of positive emotion space. For example, Shiota *et al.* [13••] introduced a typology of nine positive emotions, each representing a theorized adaptive, specialized response to different fitness-critical resources (such as food, social support, and information); Desmet [14] introduced a typology of 25 positive emotions based on appraisal-focused componential analysis of 350 positive emotion words; and Weidman and Tracy [11••] developed a typology of nine positive emotions based on factor analysis of 5939 emotional experiences reported by participants. Our goal here is not to arbitrate among existing typologies or to propose a new one, but rather to outline the key criteria by which typologies can be evaluated: comprehensiveness, distinctiveness, and granularity. These features provide standards by which the quality of existing typologies can be judged, as well as guiding the development of new typologies. In addition, these criteria can guide scholars in selecting the emotion typology that best suits their research needs, and provide them with insights about issues to be aware of when combining typologies.

Three criteria for positive emotion typologies

Positive emotion typologies are built on the premise that positive emotional states occupy a complex space that can be carved into meaningful discrete clusters. Each cluster contains closely related types of emotional states, each of which is a distinct variety of emotional experience [12]. For example, one cluster labeled as 'self-transcending' positive emotions may contain the emotional states of awe, wonder, elevation, and inspiration [15]. This does not mean that typologies necessarily adhere to the 'natural kinds' view on emotions, which considers emotions to be categories with firm boundaries that can be observed in nature—like the periodic table of chemical elements. Typologies can also be useful for classifying categories that are more ambiguous and emergent. For example, typologies of clouds are helpful for describing meteorological conditions and making weather predictions, despite cloud categories being much less discrete and clear-cut than those of chemical elements. Typologies of emotion can likewise serve useful purposes regardless of whether emotions are viewed as natural kinds or as emergent phenomena that are constructed by the human mind.

The nine panels in Figure 1 offer visual representations of positive emotion typologies. White rectangles with black borders represent the emotion *space*, dots or shapes represent particular emotional *states*, and bounded grey regions represent emotion *clusters*. Panel A1 displays a prototypical typology that meets all three evaluative criteria. The panels on the right side of the image (A2, A3, B3 and C3) each exemplify a lower-quality typology that is deficient on one of the criteria.

First criterion: comprehensiveness
The primary evaluative standard for a typology is its comprehensiveness: the degree to which it is an accurate representation of positive emotion space—it should cover all of this space but no more. This standard is measured with two subcriteria. The first is inclusion: the degree to which the clusters cover the full spectrum of states in positive emotion space. Panel A2 visualizes a typology that falls short on inclusion: Some positive emotions are left out (e.g. happiness and pride are included, but gratitude is left out). The second subcriterion is focus: the degree to which the clusters stay within the boundaries of positive emotion space. Panel A3 visualizes a typology that lacks focus: Some grey regions include positive emotions that fall outside of the boundaries (e.g. happiness, pride, and gratitude are included, but so is sleepiness).

This first evaluative standard reveals that a high-quality typology relies on a definition of positive emotion space that enables clear differentiation between states that fall within versus those that fall outside that space. Importantly, a given typology's comprehensiveness can only be assessed if that definition of the space is provided. The only reason why we can see that Panels A2 and A3 are flawed is because the rectangles clearly show which dots should (and should not) be included. Lack of inclusion is an often-voiced critique of emotion typologies. For example, Keltner [5, p.16] mentioned that the 'Basic Six' emotions (anger, disgust, fear, happiness, sadness, and surprise) 'only capture 15–20% of the variety of emotions that are now known to be signaled across modalities of expressive behavior'.

Second criterion: distinctiveness
There are multiple possible ways to carve up positive emotion space, depending on what aspect or feature of the emotional states (e.g. non-verbal expression, neural activity, cognitive appraisal) is focal.[5] The second

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[5] A distinct category is semantic typologies, in which emotion words 'as such' are the phenomenon of inquiry [25–30]. While non-semantic typologies also rely on the use of emotion words, these are used as labels or placeholders to represent emotion types.

Figure 1
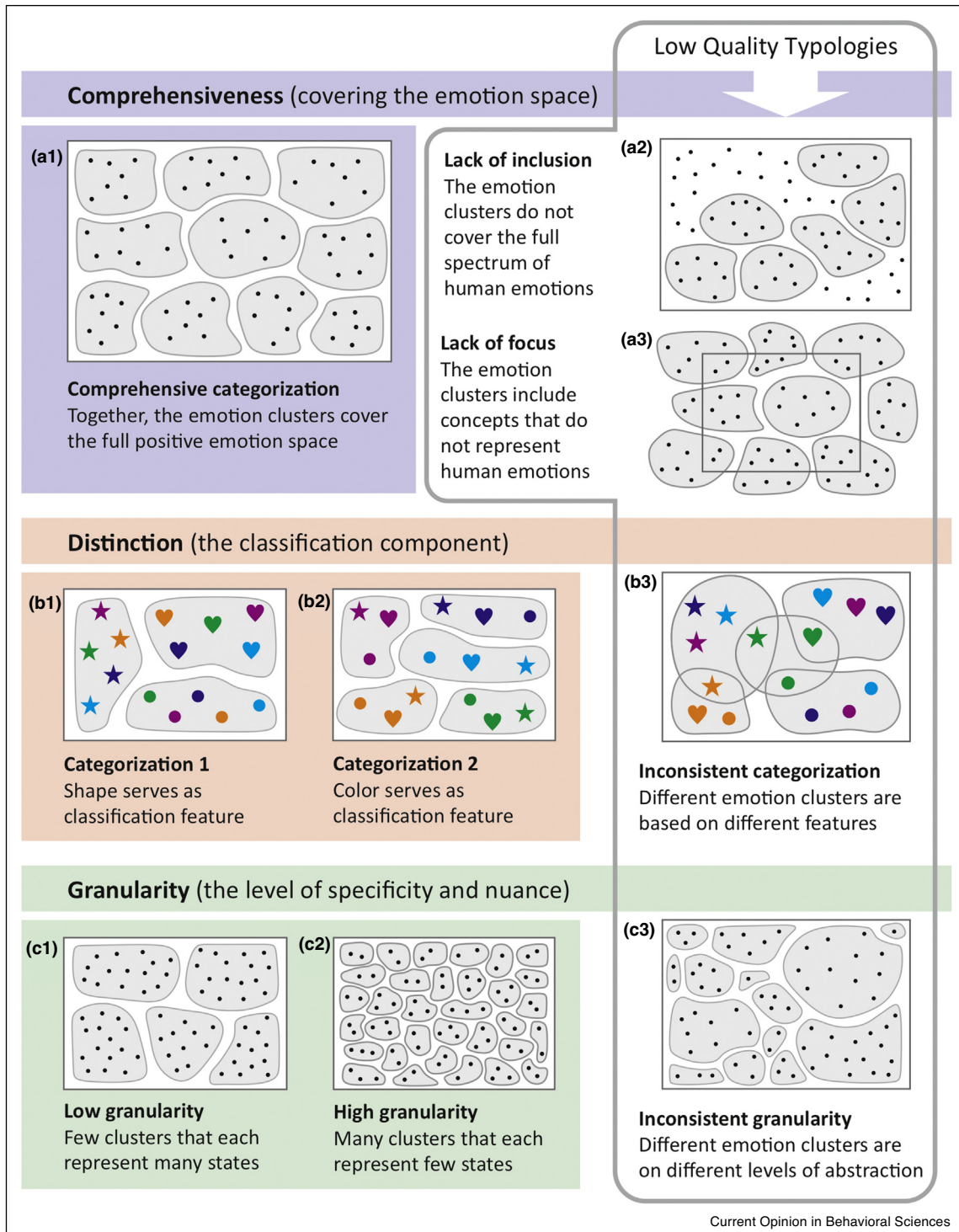
Three criteria for accessing the quality of positive emotion typologies: **(a)** comprehensiveness, **(b)** distinction, and **(c)** granularity. White rectangles with black borders represent the total emotion space; dots particular emotional states; and bounded grey regions emotion clusters. The panels on the right side (A2, A3, B3 and C3) represent deficient typologies.

evaluative standard for typologies is distinctiveness: the degree to which the emotional states are consistently clustered on the basis of the same emotion feature. This criterion is visualized in Panels B1–3. In these panels, the dots' colors and shapes express two different clustering features. Panel B1 shows a typology in which states are clustered by dot shape. In the context of positive emotion research, dot shapes might correspond to appraisal profiles. Panel B2 shows a typology in which states are clustered by dot color, which might correspond to the facial expressions of different positive emotions. These panels illustrate that the way positive emotion space is partitioned depends on the clustering feature; either approach is valid, and has the potential to be useful. Panel B3 visualizes what happens when clusters are made on the basis of inconsistent features. The resulting typology is conceptually indistinct; some positive emotions are clustered together because they are similar terms of appraisal profiles, while others form a category based on similarity in facial expressions. Notably, bounded grey regions overlap because some positive emotions can be included in multiple categories, depending on the clustering feature.

The typology suggested by one aspect of emotional process or responding (e.g. eliciting situation, physiological response, non-verbal expression) may be different from the typology suggested by another aspect, and at this point there is no inherent reason to prioritize one aspect over the others. At the same time, the second evaluative standard illustrates why the often-used practice to combine emotion lists for research purposes comes with a risk. Lists may be drawn from different typologies, and while these typologies may each be highly distinctive on its own, combining them can introduce unwanted indistinctiveness. Because different theoretical frameworks provide different clustering criteria, we should be cautious to combine typologies that were based on different theories of emotion.

Third criterion: granularity
The third evaluative standard for typologies is that they should maximize their internal granularity consistency. In its simplest form, a typology sorts entities into clusters on the basis of similarity. When creating a positive emotion typology, we aim to cluster emotional states so that each cluster is as different as possible from all other clusters (maximizing between-cluster heterogeneity), while each cluster is internally as homogeneous as possible (maximizing within-cluster homogeneity). The balance between these two intentions determines the typology's granularity—the level of detail and nuance of clusters [16,17].[6] Typologies with low granularity include few clusters that each represent many emotional states (Panel C1). In such a typology, love might constitute one category that is contrasted with other categories like relief and amusement. Conversely, typologies with high granularity

include many clusters that each represent few emotional states (Panel C2). For example, a typology with separate clusters of 'nurturant love' (which includes feelings of caring, kindness, compassion), 'attachment love' (which includes feelings of affection, dependence, and trust), and 'sexual desire' (which includes feelings of attraction and arousal) has higher granularity than a typology that combines these feeling states into a single 'love' cluster [see Ref. [13••]].

Panel C3 visualizes a typology that falls short on internal granularity consistency; there is no consistent balance between within-cluster homogeneity and between-cluster heterogeneity, which hinders between-cluster comparison. While consistency is desirable, it is not the case that higher granularity is always better. The 'granularity sweet spot' of any typology depends on the categorizing feature [18]. Some features may enable more fine-grained distinctions between positive emotions states than others. Like the previous two criteria, granularity represents a potential source of incompatibility between typologies, and thus combining typologies can introduce unwanted granularity inconsistency.

Inconsistent granularity is an often-voiced critique of Ekman's basic emotion typology, which includes only one positive affect cluster (happiness) to encompass all positive emotional states, as compared to four categories of negative affect [19]. 'But just like there are different ways of feeling bad, there are also many different ways of feeling good' [20, p.36]. While traditional emotional typologies tended to represent negative emotions with higher granularity than positive emotions [13••], recent accounts are better matched [e.g. Ref. [21••]], or focus specifically on positive emotion space [e.g. Refs. [11••,13••,14,22]].

Recommendations for developing and selecting positive emotion typologies
The three key criteria discussed here are not specific to the evaluation of positive emotion typologies; they apply to emotion typologies more broadly—and to typologies in general. Even so, the objective to develop them was motivated by the observation that the field of positive emotions is in urgent need of a good set of guidelines. Typologies are fundamental in emotion research because 'Theory cannot explain much if it is based on an inadequate system of classification' [2, p.15]. As outlined above, good typologies specify the phenomenological space they aim to cover; which aspect of emotion is used

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[6] In emotion research, the term 'emotional granularity' is often used to represent individual differences in the ability to make fine-grained, nuanced distinctions between similar subjective emotional experiences (in folk theory emotion typologies). In the current manuscript, the term is used to refer to conceptual knowledge (in scientific typologies) rather than to the individual's ability to make distinctions (see Ref. [32] for a discussion about the distinction).

as the basis of categorization; and what steps were taken to maximize focus, inclusion, distinction, and to determine granularity.

The consistent application of a typology in the study of positive emotions is hindered by the fact that there is presently no single, widely accepted definition of positive emotion space. Different theories imply different boundaries, and thus the emotional states to be represented by the typology differ among theoretical traditions. Moreover, positive emotion space is multi-componential; each component can be used as the 'carving knife' to partition the space. Some components result in a space with high granularity with many different clusters, whereas others yield low granularity with few clusters. The applicability of a typology depends on the relevant phenomenological space and emotion aspect(s) of interest. Selecting a typology thus involves some considerations: It should effectively represent positive emotion space as defined by your theory and research interests (focus and inclusion); the granularity should be adequate for the purpose at hand; and it should be based on a categorization criterion that is relevant to its intended use.

Concluding remarks

Mendeleev's periodic table of chemical elements is a remarkable scientific accomplishment—but it is not the *only* typology of chemical elements. In fact, various alternative versions are available that emphasize chemical or physical properties not clearly distinguished in Mendeleev's periodic system [23]. Scientists use different typologies for different research purposes: Organic chemists use versions in which elements are categorized on the basis of chemical properties, while scholars of quantum mechanics use versions that focus more on the elements' physical qualities. This diversity of typologies is not a conceptual weakness, but evidence of scientific rigor. Our hope is that this approach will also come to apply to positive emotion typologies. Aiming to develop a single, generic typology that fits all theories and research purposes may not be the ultimate aim. Instead, we should seek to establish a range of typologies that fit particular theoretical and/or application goals. Any field that works with typologies requires a set of clear criteria that can be used to develop, test, and select typologies. We hope that the explicit consideration of the three criteria outlined above will support a more systematic approach in the development and use of positive emotion typologies. It is encouraging to consider that after Mendeleev first introduced his periodic table, it required more than a century of refinement before reaching its current form; in fact, refinements are still being made today [24]. A typology is thus work in progress, a pragmatic and imperfect representation of a complex phenomenon. Thereby, positive emotion typologies serve to both follow and stimulate the progression of our understanding of this conceptual space.

Author contributions

All authors conceived and developed the presented ideas and helped shape the manuscript. Pieter Desmet made the visualization in Figure 1 and took the lead in writing.

Conflict of interest statement

Nothing declared.

Acknowledgements

References and recommended reading

Papers of particular interest, published within the period of review, have been highlighted as:

- of special interest
- • of outstanding interest

1. Rips LJ: **Inductive judgments about natural categories**. *J Verb Learning Verb Behav* 1975, **14**:665-681.

2. Bailey KD: *Typologies and Taxonomies: An Introduction to Classification Techniques*. Thousand Oaks, CA: Sage; 1994.

3. Collier D, Laporte J, Seawright J: **Putting typologies to work: concept-formation, measurement, and analytic rigor**. *Polit Res Q* 2012, **65**:217-232.

4. Gregor S: **The nature of theory in information systems**. *MIS Q* 2006, **30**:611-642.

5. Keltner D: **Toward a consensual taxonomy of emotions**. *Cogn*
• *Emot* 2019, **33**:14-19.
This paper provides a clear rationale for the development of a conceptual taxonomy of emotions. It presents an initial proposal to include 20–25 emotions, and a plea to rely on open-ended, data driven methods that transcend *a priori* conceptions about the nature of emotions.

6. Weidman AC, Steckler CM, Tracy JL: **The jingle and jangle of emotion assessment: imprecise measurement, casual scale usage, and conceptual fuzziness in emotion research**. *Emotion* 2017, **17**:267-295.

7. Kamiloglu RG, Fischer AH, Sauter DA: **Good vibrations: a review of vocal expressions of positive emotions**. *Psychon Bull Rev* 2020, **27**:237-265.

8. Shuman V, Clark-Polner E, Meuleman B, Sander D, Scherer KR: **Emotion perception from a componential perspective**. *Cogn Emot* 2017, **31**:47-56.

9. Campos B, Shiota MN, Keltner D, Gonzaga GC, Goetz JL: **What is shared, what is different? Core relational themes and expressive displays of eight positive emotions**. *Cogn Emot* 2013, **27**:37-52.

10. Fontaine JRJ, Scherer KR, Soriano C: *Components of Emotional Meaning: A Sourcebook*. Oxford: Oxford University Press; 2013.

11. Weidman AC, Tracy JL: **A provisional taxonomy of subjectively**
•• **experienced positive emotions**. *Affect Sci* 2020:1-30.
This paper reports a series of four studies that examined how many, and which, positive emotions cohere as distinct subjective experiences, at both the state and trait levels. The result is a comprehensive portrait of the taxonomic structure of subjectively experience positive emotions.

12. Cowen AS, Keltner D: **Self-report captures 27 distinct categories of emotion bridged by continuous gradients**. *Proc Natl Acad Sci U S A* 2017, **114**:E7900-E7909.

13. Shiota MN, Campos B, Oveis C, Hertenstein MJ, Simon-
•• Thomas E, Keltner D: **Beyond happiness: building a science of discrete positive emotions**. *Am Psychol* 2017, **72**:617.

This paper proposes a total of 10 distinct positive emotion states across two comprehensive reviews rooted in functionality and biology, including amusement, attachment love, awe, contentment, enthusiasm, gratitude, liking/pleasure, nurturant love, pride, and sexual desire.

14. Desmet PMA: **Faces of product pleasure: 25 positive emotions in human-product interactions**. *Int J Des* 2012, **6**:1-29.

15. Shiota MN, Thrash TM, Danvers AF, Dombrowski JT: **Transcending the self: awe, elevation, and inspiration**. In *Handbook of Positive Emotions.* Edited by Tugade MM, Shiota MN, Kirby LD. The Guilford Press; 2014:362-377.

16. Smidt KE, Suvak MK: **A brief, but nuanced, review of emotional granularity and emotion differentiation research**. *Curr Opin Psychol* 2015, **3**:48-51.

17. Kirby LD, Tugade MM, Morrow J, Ahrens AH, Smith CA: **Vive la différence: the ability to differentiate positive emotional experience and well-being**. In *Handbook of Positive Emotions.* Edited by Tugade MM, Shiota MN, Kirby LD. The Guilford Press; 2014:241-255.

18. Bailey KD: **Constructing monothetic and polythetic typologies by the heuristic method**. *Sociol Q* 1973, **14**:291-308.

19. Ekman P: *Emotions Revealed: Recognizing Faces and Feelings to Improve Communication and Emotional Life*. London: Weidenfeld and Nicolson; 2003.

20. Sauter DA: **More than happy: the need for disentangling positive emotions**. *Curr Dir Psychol Sci* 2010, **19**:36-40.

21. Cowen AS, Sauter DA, Tracy JL, Keltner D: **Mapping the**
•• **passions: toward a high-dimensional taxonomy of emotional experience and expression**. *Psychol Sci Public Interest* 2019, **20**:69-90.
Building on empirical findings and methodologies, this paper offers an alternative conceptual and methodological approach to the categorization of emotions. This results in a high-dimensional taxonomy of emotion, which is richer than the traditional 'basic six' and affective circumplex-model of emotions.

22. Shiota MN, Neufeld SL, Danvers AF, Osborne EA, Sng O, Yee CI: **Positive emotion differentiation: a functional approach**. *Soc Personal Psychol Compass* 2014, **8**:104-117.

23. Scerri E: *The Periodic Table: Its Story and its Significance*. Oxford: Oxford University Press; 2019.

24. Scerri E: **Recent attempt to change the periodic table**. *Philos Trans R Soc A* 2020, **378**:1-17.

25. Averill JR: **A semantic atlas of emotional concepts**. *JSAS Catalogue of Selected Documents in Psychology* 1975, **vol 3**.

26. Gillioz C, Fontaine JRJ, Soriano C, Scherer KR: **Mapping emotion terms into affective space**. *Swiss J Psychol* 2016, **75**:141-148.

27. Johnson-Laird PN, Oatley K: **The language of emotions: an analysis of a semantic field**. *Cogn Emot* 1989, **3**:81-123.

28. Ortony A, Clore GL, Foss MJ: **The referential structure of the affective lexicon**. *Cogn Sci* 1987, **11**:341-364.

29. Storm C, Storm T: **A taxonomic study of the vocabulary of emotions**. *J Pers Soc Psychol* 1987, **53**:805-816.

30. Van Goozen S, Frijda NH: **Emotion words used in six European countries**. *Eur J Soc Psychol* 1993, **23**:89-95.

31. Desmet PMA, Fokkinga SF: **Beyond Maslow's pyramid: introducing a typology of thirteen fundamental needs for human-centered design**. *Multimodal Technol Interact* 2020, **4**:1-22.

32. Scarantino A, Griffiths P: **Don't give up on basic emotions**. *Emot Rev* 2011, **3**:444-454.