You are the Colour of My Life: Impact of the Positivity Bias on Figurativity in English

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Abstract
The objective of this paper is to clarify what types of embodied linguistic mechanisms are activated when we elaborate figurative speech about COLOUR/SEEING. Embodied theories of "negativity" and "positivity" biases have been posited in relation to language. According to behavioural and evolutionary studies a 'negativity bias' modifies the way humans react and process surrounding events, and has been tested in different realms of cognition, including corpus linguistics. The positivity bias – the Pollyanna hypothesis – affirms that humans tend to talk about the bright side of life. Good "positive" words are more prevalent, more meaningful, more diversely used, and more readily learned than "negative" words. I discuss possible conceptual underpinnings that explain the impact of positivity and negativity biases in processing visual figurativity in linguistic tasks.
Key-words: negativity bias, Pollyanna hypothesis, COLOUR/SEEING figurativity.

1. Introduction to negativity vs. positivity

The objective of this paper is to investigate what type of embodied linguistic bias is activated when we elaborate figurative speech that involves colour. There seems to be a combination of two biases in act, both positivity and negativity. Possibly the positive bias of colour makes it hard to recognise its associations as negative, yet the negative bias seems activated in the cool desaturated colour categories. In my explanation I refer to two different empirical methodologies of colour semantics analysis. Moreover, this paper represents a comprehensive analysis regarding embodied conceptualisation of linguistic COLOUR/SEEING[1] term use and its entrenchment in English.

[1] I follow the convention of using small caps for concepts and conceptual domains.

I refer to my previous work published on this topic as the foundation for the more general affirmations presented here.

Embodied bias theories of "negativity" and "positivity" have been posited in relation to language. Originally the negativity bias was studied in relation to the speed with which humans react to a negative stimulus (snakes, fire) in contrast to neutral (buildings, geometric figures) or positive stimuli (smiling faces, naked bodies). According to behavioural and evolutionary studies, a 'negativity bias' modifies the way humans react and process surrounding events; negative events elicit rapid responses, a rise in blood pressure, and heart rate (Orians 2014: 58; Carretiè et al. 2001: 75). The negativity bias has been tested in different realms of cognition and psychology, including emotion processing, social behaviours, and corpus linguistics (see for example, Dodds et al. 2014; Jing-Schmidt 2007; Kloumann et al. 2012; Öhman et al. 1993; Rozin and Royzman 2001). Generally, the negativity bias states that in responding to a given situation we can recognise that it is negative and protect ourselves, or we can 'not recognise' it as negative, and risk our lives. Hence, this bias affirms that we pay more attention to and respond faster to threats and unpleasant events than to positive opportunities and pleasurable situations (Haselton and Nettle 2006; Jing-Schmidt 2007).

At the same time, there is the Pollyanna hypothesis, or the positivity bias, that affirms that humans tend to talk about the bright side of life, that we prefer positive events over negative (Boucher and Osgood 1969). Good "positive" words are more prevalent, more meaningful, more diversely used, and more readily learned than "negative" words; Dodds et al. (2014) found the most commonly used words across human languages exhibit a clear positive bias independent of frequency of use. Kloumann et al. (2012: 5) show that positive words outnumber negative words.

Robin and Royzman (2010) specify, on the other hand, that linguistic description of physical pain is far richer and more varied than that employed to delineate physical pleasure. A greater lexicon for unpleasant emotions has evolved than for pleasurable emotions;

I also differentiate between the two experimental protocols by using capital letters for the categories of the IAT tests, whereas only the first letter is capitalised for the categories of the RT tests.

the same seems to be true in the lexicalisation of negative events. Jing-Schmidt (2007) found that the negativity bias is pervasive on cognitive affective patterns, and emotive intensifiers. Sandford (2016a) found that a robust majority of Manner-of-Speaking verbs trigger a negative effect on the hearer.

After laying down the basic theoretical premises of the research in §2, in §3 I examine the use of positive/negative assessment of metonymic and metaphoric linguistic expressions using the basic colour categories, with reaction time latencies as a marker of the degree of explicit processing facility and the use of Implicit Attitude Test (IAT) responses that measure the degree (speed) of compatibility between two categories to understand a predominant implicit assessment. The IAT categories regard metonymic and metaphoric colour associates with PLEASANTNESS and UNPLEASANTNESS and lightness associates with spatial targets (Sandford 2016b). §4 discusses possible conceptual underpinnings that explain a predominance of a negative or positive bias in processing figurativity in these linguistic tasks, and draws some conclusions.

2. Underlying theoretical aspects

To analyse the processing of COLOUR/SEEING figurativity in linguistic tasks it is first necessary to outline the basic concepts that I understand to be the foundation of this cognitive semantic approach to language conceptualisation. These concepts include: Embodied Cognition, Semantic Primitives, Conceptual Metaphor and Conceptual Metonymy Theory, and Implicit Attitudes.

2.1. Embodied Cognition

Embodiment, embodied cognition, and experiential grounding of language are fundamental to Cognitive Linguistics and Cognitive Semantics. Barsalou (2008: 618) gives a good overview of the multiple areas of research in grounded cognition. He also quotes Lakoff and Johnson (1980, 1999) and Gibbs (1994, 2005) as proponents of abstract concepts being grounded metaphorically or metonymically in embodied experience. They sustain, and I endorse, that *reason* cannot be seen as happening in a "disembodied mind", but must be understood in terms of the recurring experiences of our

everyday functions that leave specific neural traces in our brains. Our experience provides fundamental grounding for language and thought. Cognition and conceptualisation happen when we interact with the world and with people. The constraints of our cognitive abilities dictate the recurring patterns that in turn result in behaviour (*e.g.* see Gibbs 2005; and Boroditsky and Ramscar 2002). Embodied experience implies that our view of the world is construed by our species-specific interaction with the environment that is mediated by the nature of our body (Evans 2007: 67). Grounded concepts, such as path, spatial relations, processes, and forces, are employed in the conceptualisation of COLOUR/SEEING (see for example, Johnson 1999; and Sandford 2010; 2011a, b, c, d; 2012; 2016b).

2.2. Semantic primitives COLOUR/SEEING

Wierzbicka developed the theory of Natural Semantic Metalanguage (NSM) and established a summary of semantic prime categories (1996, and Table 1, 2006: 5). She reveals that not all languages actually have "colour terms" per se, but all languages have "seeing" terms. Thus, it seems relevant to refer specifically to the basic primary experience of seeing and how humans construct meaning starting from this prime. Nonetheless, COLOUR is a fundamental semantic module in English, duly I refer to the concept of COLOUR/SEEING as departure point for the metalinguistic categorisation of the metaphoric and metonymic associations with the visual terms.

The semantic prime of SEEING lends itself to an explanation of the basic conceptualisation processes that are employed in the elaboration of linguistic references to vision and colour. The full set of "semantic atoms" or universal human concepts include a series of categories (for the English version see Goddard and Wierzbicka 2002; and Wierzbicka 2006: 5). The semantic atom Mental Predicate of SEEING naturally implies a series of other concepts, such as NOT SEEING. Furthermore, the other semantic atoms that are pertinent to our case are Attributes: GOOD (SEEING) VS. BAD (NOT SEEING) experienced through day-night, light-dark, colour-lack of colour; Taxonomy, partonomy: KIND OF, PART OF, and Similarity: LIKE (HOW, AS); and Determiners: THIS, THE SAME, OTHER. We use all of these to distinguish colour associates and the appropriate meaning in

context. Especially the atom of Similarity expressed in colour categorisation, and through the processes of deciding when something looks like something else, and something is similar or different; when something is a specific colour, whether conceptually "part of a whole" or a "whole". These conceptual atoms are the same that emerge in the basic conceptual mechanisms of conceptual metaphor and metonymy discussed next.

2.3. Conceptual metaphor and metonymy

The theories of conceptual metaphor and metonymy together with embodiment are relevant tools for a cognitive semantic analysis of SEEING in natural language. Conceptual metaphor phrasing is indicated as: A IS B — TARGET DOMAIN 'A' IS SOURCE DOMAIN 'B' —, generally projecting from the more concrete source onto the more abstract target (Gibbs 2005; Kövecses 2010; Lakoff 1990; Lakoff and Johnson 1999). Conceptual metaphor operates a construal of similarity of aspects across different domains, they infer metaphorical mappings or relations between those domains. Conceptual metonymy on the other hand may be said to operate within one domain and understood as a referencing one concept that is conceptually contiguous with another. A similar phrasing to conceptual metaphor is used to describe metonymy, A FOR B, in which there are three possibilities: WHOLE FOR PART, PART FOR PART, and PART FOR WHOLE. In the phrasing of conceptual metonymy "FOR" is generally taken to be an abbreviation of "stands for". However, metonymy as a conceptual mechanism that: "provides mental access to" or "is access for" seems more comprehensive (Barcelona 2003b, 32–33; see also Sandford 2014a, b).

2.4. Implicit attitudes

The Implicit Association Test (IAT) paradigm establishes a double discrimination task that maps four categories onto two response keys in a computerised test environment. Greenwald, McGhee, and Schwartz (1998) initially developed the IAT to study the strength of concept associations in memory, and to explore the unconscious default construals of thinking and feeling. The IAT is a method to reveal implicit attitudes or judgements that are not under the control

of the performer's awareness of the causation. Greenwald and Banaji define: "Implicit attitudes are introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects" (1995: 8)[2]. The IAT test works through categorising target category stimuli and attribute category stimuli. The participant views the stimuli, the instructions, and the seven task blocks (trial and critical blocks) on screen. The compatible vs. incompatible blocks are alternated per participant, and the block stimuli are randomised every time they are presented. To function properly it is necessary that no alternate interpretations of category stimuli be possible. Each stimulus must be categorised with only one category.

The results I present here are from a series of experiments that represent a novel application of the IAT to *linguistic* categorisation and cognitive semantic construal of colour associates. The individual's performance result is the measure of the differential association of two concepts with an attribute: the incompatible target attribute task mean latency minus the compatible target attribute task mean latency. For example, the software is set to reflect a hypothesis *a priori*, in the BLUE vs. RED IAT, BLUE was hypothesised as compatible with PLEASANT and RED incompatible with PLEASANT when the participants had to categorise BLUE items and PLEASANT items on the same side of the screen with the same response key. If the hypothesis is correct the compatible attribute and target categories are easier, hence faster, to categorise than the opposite, i.e., when RED was with PLEASANT and BLUE with UNPLEASANT.

3. Responses to colour tasks

To clarify what type of embodied linguistic bias is activated when we elaborate linguistic items involving the concepts of COLOUR/SEEING, and to discuss possible conceptual underpinnings and mechanisms, I take into consideration negative vs. positive responses in two

[2] See Yale University. 2011. "Project Implicit" at <https://implicit.harvard.edu/implicit/> and Inquisit software at <https://millisecond.com/>; accessed 12 August 2016; for a complete bibliography <http://faculty.washington.edu/agg/>.

different experimental paradigms. They represent two approaches: explicit reaction times, and implicit attitude reaction times. I compare the results of the eight colour categories: *black, white, red, yellow, green, blue, grey,* and *brown* under both conditions. I then refer to the results of LIGHT-DARK IATs as argumentative support of the proposed conceptual colour grounding.

The first approach refers to the reaction time latencies (RTs) that emerged from positive/negative assessment of metonymic and metaphoric linguistic expressions that included basic colour categories. Each stimuli appeared on a computer screen and was evaluated by clicking the "P" key for positive and "N" key for negative. The response latencies revealed the speed of processing (Sandford 2010, 2011a, 2012).

The second approach refers to ten IATs that were configured to understand the entrenchment of the same basic colour categories in relation to pleasantness, or positivity. The COLOUR/SEEING target stimuli were categorised with PLEASANT and UNPLEASANT attribute stimuli. The target categories for each test included one of the couples: BLUE-RED, BLUE-GREEN, BLUE-YELLOW, YELLOW-GREEN, GREEN-RED, YELLOW-RED (Sandford 2016a); BROWN-GREY (Sandford 2015); and BLACK-WHITE (Sandford 2016c).

The two other IATs were constructed to verify the predominance in spatial preference of LIGHT-DARK conceptualisation, where the target stimuli were categorised with the attribute stimuli for NEAR and FAR (Sandford 2011b, d) and attribute stimuli for IN and OUT (Bagli 2016).

3.1. Colour metonymy and metaphor reaction times

Two tasks were presented in separate blocks. Each task consisted of 32 written sentences total (8 colours x 4 items). The items associated with each colour included associates for colour: object, light, person, and emotion. All of the associations existed to varying degrees in an internet Google search. Task 1 tested metonymic relations and Task 2 tested metaphoric relations. The items were randomised within each task. The experimental results presented here are from 32 native English speaker-participants, mean age 47, equally divided between male and female participants, with normal colour

vision. The reaction times were recorded through RT software (for a complete explanation of the test process see Sandford 2011a, 2012, 2016a)[3].

The results showed that it took consistently longer to assess the linguistic colour items negatively (2011a: 215, 2012). The mean reaction time (RT) in milliseconds for negative metonymy and metaphor was RT 2311, and for positive metonymy and metaphor RT 1916. Though in general it was faster to assess metonymy (RT 1663) than metaphor (RT 2575), the mean negative responses per type (metonymy RT 1812 vs. metaphor RT 2809) were longer than the positive (metonymy RT 1514 vs. metaphor RT 2324). This general tendency was true for all the colour categories individually, with the significant exception of Black and Grey. These two colour categories had faster responses for the negative metonymy and negative metaphor rather than the positive. The mean assessment for Grey was shorter than Black for metonymy (Grey RT 1725 vs. Black RT 2014), and Grey was longer than Black for metaphor (Grey RT 2404 vs. Black RT 2204).

TABLE 1
Black and Grey RT latencies in milliseconds for metonymy and metaphor

	NEGATIVE METONYMY	POSITIVE METONYMY	NEGATIVE METAPHOR	POSITIVE METAPHOR
Black	1897	2131	1748	2660
Grey	1648	1802	1964	2844

At the same time, White and Yellow items were the fastest to assess positively of all the colours for metonymy (RT 1255 and RT 1170 respectively). White negative metonymies took the longest of all colours to assess (RT 1967); very close to Green (RT 1941). Yellow negative metaphors took much longer compared to other colour mean scores to assess. In other words, the means for Yellow items were assessed the fastest and almost the slowest of all the individual colour

[3] The linguistic utterances for RED may serve here as an example of the types of items used for each colour; metonymic realisation: *The blood is red. The fire is red. The grass is red. The bread is red;* and metaphoric realisation: *We are red. He gives them the red carpet treatment. At that age she is a red-horn. They see red with anger.*

categories depending on the conceptual mechanism (Yellow positive metonymy RT 1170 vs. Yellow negative metaphor RT 3294). The only other colour category that took longer to assess negatively was Brown (RT 3412). This biased the mean sum of the total Warm colour (White, Yellow, Red, Brown RT 2125) responses making them longer than the mean sum for the total Cool colour (Green, Blue, Black, Grey RT 2099) responses. It became evident that if the item under assessment had a positive valence it took longer to assign a negative value, especially in the cases of Yellow, Brown, and White.

3.2. Implicit attitude colour associates

There was a range of 18 to 31 participants for each IAT test. The mean age per test varied between 21 and 38 years old. They were all native English speakers (for details see Sandford 2011d, 2015, 2016b, 2016c, Bagli 2016). Each linguistic colour category included eight stimuli that were carefully selected through corpus analysis of dictionaries and online databases, and verified in pre-tests as the most saliently associated lexemes in each frame. These stimuli had to be easily categorised to only ONE of the categories, because the IAT verifies the latency of target attribute association and not the speed of categorisation per se. The stimuli were selected to balance between positive and negative connotations, and metaphoric and metonymic conceptualisations within the specific category. Greenwald, McGhee, Schwarz used the same PLEASANT and UNPLEASANT attribute stimuli in the original FLOWER-INSECT IAT (1998).

All of the colour categories were tested in pairs revealing a predominant compatibility of YELLOW with PLEASANT over the other colour category in each couple (faster response latencies). Table 2 lists each latency per colour/concept with the incompatible and compatible responses in milliseconds (ms), and the IAT score.

These scores are the untreated raw scores. The IAT score, or strength of compatible associate strength, was highest for YELLOW in comparison to BLUE, less for RED, and even less for GREEN. BLUE in comparison to RED and GREEN had a higher score with PLEASANT. GREEN was higher only in comparison to RED. RED was never "more compatible" with PLEASANT in comparison to the other colours (Sandford 2016a). WHITE had a higher associative strength with PLEASANT than BLACK (Sandford 2016c), and

BROWN more than GREY (Sandford 2015). Moreover, the results of the two other LIGHT-DARK IATs, where the target stimuli were categorised with the attribute stimuli for NEAR-FAR and IN-OUT, resulted with a unanimous preference to associate LIGHT with NEAR rather than FAR, and with IN rather than OUT.

TABLE 2
The IAT latencies in milliseconds for incompatible and compatible combinations per couple with IAT score and dominant associated concept

INCOMPATIBLE	ms.	COMPATIBLE	ms.	IAT score	**Concept**
COLOUR with PLEASANT		COLOUR with PLEASANT			COLOUR
YELLOW	966	BLUE	1140	-174	YELLOW
GREEN	1064	YELLOW	1015	+49	YELLOW
RED	1159	YELLOW	1085	+104	YELLOW
RED	1190	BLUE	960	+230	BLUE
GREEN	911	BLUE	798	+113	BLUE
GREEN	1168	RED	1452	-284	GREEN
BLACK	1348	WHITE	892	+456	WHITE
GREY	1061	BROWN	898	+163	BROWN
					SPACE
LIGHT with FAR	1851	LIGHT with NEAR	1142	+709	LIGHT NEAR
LIGHT with OUT	1411	LIGHT with IN	973	+438	LIGHT IN

Summarising, in accordance with the paradigm, it took longer to respond to incompatible couples than compatible couples, mean totals 1166 ms compared to 973 ms. The implicit negative association assessment was slower than the positive association assessment. Moreover, the mean Warm colours (WHITE, YELLOW, RED, BROWN 1082 ms) took longer to categorise implicitly than the mean Cool colours (BLACK, BLUE, GREEN, GREY 1056 ms).

4. Discussion and Conclusions

Possible conceptual underpinnings that explain a predominance of a positive bias in processing visual figurativity in linguistic tasks are based on the difficulty in assessing colour as negative, essentially because colour carries a positive valence. Yet it appears that both the positivity bias and negativity bias arise from our embodied experience of colour that includes several aspects. Colour gives us information. The more colourful something is the more "alive" it is, and the easier it is to see. The more saturated the colour, the more vivid, the closer it is felt to be, and therefore the more information available to understand its meaning in the contextual association, and the easier it is to elaborate the correct construal. The darker and dimmer a colour the less we are able to see, the more danger may be hidden, and the more distant it would preferably be. This allows us to analyse linguistic colour associates and construals more quickly when they are in keeping with the default bias, which overall results as positive for COLOUR/SEEING: WHITE, YELLOW, RED, GREEN, BLUE, BROWN, and LIGHT, and negative for [NOT] COLOUR/SEEING: BLACK, GREY, and DARK.

The empirical results regarding linguistic items discussed here consider implicit and explicit elaboration processes. The participants did not respond to colour objects in the environment, which may call for a negativity bias with danger seeming imminent. In these tasks they responded to written linguistic items in English; that is, not direct bodily experience of colour manifestation, but textual representation of colour associate experience. Thus, I advance that the default construal of COLOUR/SEEING tends to be first positive, then if the connotation is negative the interpreter pays careful attention to it, and analyses it.

At first glance there seems to be a contradiction to the positivity bias, and hence possibly a negativity bias, looking at the Warm group and Cool group responses. The mean sums of the Warm colour reaction times —assessed more positively— are longer than the Cool colour reaction times —assessed more negatively— for both the RT tests and the IAT tests. This appears to be explainable nonetheless since the mean values increase when it is necessary to construe the positive warm colours as negative associates, or as incompatible.

Furthermore, the difference between implicit and explicit interpretation shows that the implicit assessment is consistently faster than the explicit, though the negative assessment still takes longer than the positive assessment. In the IAT tests the compatible categorisation pattern is faster. This positivity bias is part of the paradigm. It takes longer to categorise something when target and attribute are incompatible (*e.g.* BLUE and UNPLEASANT).

The conclusive resulting conceptual alignment discloses the weight of what is near us or in our visual field. This is in turn motivated by a combination of conceptual metaphors: KNOWING IS SEEING, INVOLVEMENT IS CLOSENESS (Kövecses 2010: 260). Therefore what is LIGHT, YELLOW, or WARM is deemed more pleasant; is preferred to be "near" us or "in" our visual or physical reach (Sandford 2014b). In keeping with current research the biases concur with COLOUR as a source domain in the entailment of the *primary* conceptual metaphor target domain of SEEING: KNOWING IS SEEING, which motivates LIGHT IS COLOUR, SEEING IS COLOUR [LIGHT]. Moreover, COLOUR is also part of a complex metaphoric system: GOOD IS THE RIGHT COLOUR, GOOD IS COLOUR, BAD IS THE WRONG COLOUR, BAD IS (COLOURLESS) LACK OF COLOUR; and a sub-systemic metaphor of the EVENT STRUCTURE METAPHOR system: ATTRIBUTES (COLOURS) ARE ENTITIES and POSSESSIONS, STATES (COLOURS) ARE LOCATIONS (as discussed in Sandford 2010; 2011a, b, c, d; 2012; 2014b, 2015; 2016b; forthcoming). SEEING and LIGHT are fundamental for human survival, as is recognition of the state of water, food, shelter, which are categorised according to assessment of visual input. The conceptual alignment is further motivated by metonymy, in the same way that we must choose what meaning we assign to a specific utterance, we must operate a selection that includes or excludes, dividing the whole and its parts. The metonymic chain of COLOUR/SEEING reference may be summarised as follows. The PART FOR WHOLE relation is manifested in COLOUR ATTRIBUTE (IS ACCESS) FOR THE THING, for example: *She has blue eyes* (blue of the iris for the whole eye). The WHOLE FOR PART relation in ATTRIBUTE CATEGORY (IS ACCESS) FOR THE MEMBER, for example: *What's that blue?* (blue the category for the specific kind of blue) (see GENERIC FOR SPECIFIC, Panther and Thornburg 2003: 224). The PART FOR PART relation, manifested in COLOUR ATTRIBUTE (IS ACCESS) FOR SPACE, for example: *He's on the green at the club* (green part of

the grass field for a specific space at the club) (for further details see Sandford 2014b).

On the other hand the negativity bias is a pervasive and instinctive human response necessary for survival even though experience is fundamentally a series of good and bad things affecting behaviour, cognition, and linguistic construal. Rozin and Royzman consider the susceptibility of the negative to control the positive when the two are together in a single configuration, reflecting a yin-yang or Gestalt-like assertion that in a "cognitive interaction" of two stimuli the outcome is difficult to "anticipate from prior knowledge of the two stimuli taken apart" (2001: 298). This would appear to explain the different kinds of responses to colour in linguistic expressions. There is an underlying conceptual construal that is adjusted each time according to the contextual elements and the relation to embodied experience. A given combination may be considered positive and good, pleasant and compatible, or negative and bad, unpleasant and incompatible. Calquing the honey and tar idiom[4], a little bit of Black can completely deaden a colour, but a little bit of colour may do nothing to change a Black, negativity may be an element of contagion. This may explain the negative effect on the WARM vs. COOL colour reaction times.

Ending on a more optimistic note, the default colour construal is more positive than negative: positive colour responses are more numerous than lack of colour, which is more negatively construed (as seen with the BLACK and GREY, and DARK responses). This is analogous to the results of Kloumann et al. (2012); positive words strongly outnumber negative words, and there is a tendency for high frequency words to be more positive than low frequency words. The same would seem to be true for colour words: the more positive (saturated warm) colours there are and the more easily the positive construal outweighs the negative (Sandford 2012). "You are the colour of my life" recalls this positivity bias, as does the definition of colour[5]: vivid or distinctive quality; character; personality; which are congruous with the conceptual underpinnings discussed herewith.

[4] A spoonful of tar can spoil a barrel of honey, but a spoonful of honey does nothing for a barrel of tar (Rozin and Royzman 2001: 296).

[5] For definitions: color. Dictionary.com. Dictionary.com Unabridged. Random House, Inc. http://www.dictionary.com/browse/color (accessed: August 21, 2016).

Future research could verify this tendency not just for colour words, but also for colour associates, and the use of SEEING words in corpus analysis. The default positivity bias of colour is likely a universal embodied response, though this paper reflects empirical work done with English, other languages should be investigated to verify this hypothesis.

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