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The Role of Defaultness in Affecting Pleasure: The Optimal Innovation Hypothesis Revisited

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ABSTRACT

The Optimal Innovation Hypothesis (Giora et al., 2004), following from the Graded Salience Hypothesis (Giora, 2003), is being reviewed and revisited. The attempt is to expand the notion of Optimal Innovation to allow it to apply to both stimuli's coded *meanings* as well as their noncoded, constructed *interpretations*. According to the Optimal Innovation Hypothesis, Optimal Innovations, when devised (*KNOW HOPE*), will be more pleasing than nonoptimally innovative counterparts (*No hope*). Unlike such competitors, Optimal Innovations (*KNOW HOPE*) deautomatize familiar coded alternatives (*No hope*), which invoke unconditional responses ("despair") alongside novel but distinct ones ("optimism"), allowing both responses to interact. Conversely, the Revised Optimal Innovation Hypothesis, introduced and tested here, follows from the Defaultness Hypothesis (Giora et al., 2015b). It posits that both **default** lexicalized *meanings* and **default** constructed *interpretations* might be qualifiable for Optimal Innovation once they are deautomatized by **nondefault**, context-dependent counterparts. Such **nondefault** Optimal Innovations (e.g., the affirmative sarcastic exclamation *The most organized student*, describing a messy student) will be pleasing, more pleasing than **default** and **nondefault** counterparts not qualifiable for Optimal Innovation (e.g., the **default** negative sarcastic exclamation *Not the most organized student*, describing a messy student). Results of two experiments support the Revised Optimal Innovation Hypothesis, while further corroborating the Defaultness Hypothesis.

Introduction

The need to revise the Optimal Innovation Hypothesis (Giora et al., 2004) emerged following the introduction of the Defaultness Hypothesis (Giora, Givoni, & Fein, 2015b) to the debate concerning factors that shape our understanding of linguistic and nonlinguistic stimuli. Defaultness, defined in terms of an unconditional automatic response to a stimulus, encompasses both *coded* (salient) *meanings*, listed in and *accessed* from the mental lexicon, as well as *novel* (nonsalient) *noncoded interpretations, constructed* on the fly.

Note that, according to the Graded Salience Hypothesis (Giora, 1997, 2003), for a response (e.g., a meaning) to be salient, it should be coded in the mental lexicon and rank high on accessibility due to, for example, experiential familiarity, frequency, conventionality, or prototypicality. Responses low on these dimensions would be less salient. Responses not coded in the mental lexicon are nonsalient. Salient and less-salient responses get activated automatically upon encounter of a familiar stimulus, regardless of contextual fit. However, their access is ordered: Salient responses are accessed faster. Interpretations also vary in this respect. Salience-based interpretations are lexicon-based; they are based on the coded meanings of their utterance components. Nonsalient interpretations, however, are context-based, relying often on

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contextual information for their derivation. Whereas salience-based interpretations are derived instantly, nonsalient interpretations are slower to derive.

Given that the Optimal Innovation Hypothesis has, so far, been limited to defamiliarizing or deautomatizing **default** (i.e., coded, salient) *meanings*, it has now been revised and enlarged its scope so as to also include and account for deautomatized **default** yet noncoded constructed *interpretations*.

Why does Defaultness matter? First, Defaultness matters because it is a response that affects processing speed significantly, in a way not envisioned before (see section titled **Degree of Defaultness and processing costs**). Indeed, testing the Defaultness Hypothesis (Giora et al., 2015b) resulted in questioning various theories, whether suggesting that Novelty matters (Giora, 1997, 2003, 2014), or that Negation matters (Horn, 1989), or that Nonliteralness matters (Grice, 1975), or that Contextual information matters (Gibbs, 1994). Instead, results showed that these various factors paled in the presence of Defaultness. As predicted, **default** interpretations were activated unconditionally, initially and directly, faster than **nondefault** counterparts, irrespective of degree of Novelty, degree of Negation, degree of Nonliteralness, or degree of strength of Contextual support. Processing-wise, then, Defaultness matters.

Defaultness also matters pleasure-wise (see Default Negative Sarcasm). It renders **nondefault** counterparts pleasurable. Given their automaticity, **default** interpretations are initially involved in processing **nondefault**, context-dependent counterparts as well. However, when retainable, they will be deautomatized by their **nondefault** counterparts and render them optimally innovative and hence likable. (On deautomatization or defamiliarization of habitual and rigid responses [termed here "default"], resulting in amusement or in "gratifying" poetic effects, see, for example, Mukařovský, 1932/1964, 1978; Shklovsky, 1917/1965, p. 22, or Bergson, 1900/1956; for a similar view, see also Berlyne, 1960; Schopenhauer, 1969; and Townsend, 1997).

Furthermore, Defaultness also matters usage-wise. It shapes the way contextual information reflects utterance default and nondefault interpretations, exhibiting a preference for **default** interpretations, even when contextually incompatible (Giora, Drucker, & Fein, 2014a; Giora, Raphaely, Fein, & Livnat, 2014b). Whereas the first two issues are the focus of this article, the latter will not be dealt with here.

Still, how can we tell the difference between **default** and **nondefault** interpretations? Degree of Defaultness has to be established experimentally, indicating preferred and nonpreferred interpretations, when items are presented in isolation. However, the following natural examples (1–4 below; targets in bold) may be illustrative of the kind of **default** and **nondefault** interpretations tested in Giora et al. (2015b) and further examined here. In (1), the target, termed Affirmative Literalness, conveys a **default** face-value interpretation (where the person in question is genius). In (2), the target, termed Affirmative Sarcasm, conveys a **nondefault** contrastive interpretation (where the person in question is stupid). In (3), the target, termed Negative Sarcasm, conveys a **default** contrastive interpretation (where the person in question is stupid). And in (4), the target, termed Negative Literalness, conveys a **nondefault** hedged interpretation (where the person in question is smart, but not the smartest):

(1) Default Affirmative Literalness

Archimedes invented so much in maths and physics, without him, Albert Einstein wouldn't have created his theories. **He's the smartest man that ever lived for sure**, born into a poor family, and made such good use of his recources [sic], I'd say he was the biggest genius, just forgotten because he was from the greek [sic] era. (Sampsons, 2016)

(2) Nondefault Affirmative Sarcasm

He's the Smartest President Ever, so give him easy words …

If the words "juvenile" and "callow" come to mind when you think of this administration, you're not far off. (Landler, 2012).

(3) Default Negative Sarcasm

Now **that's not the smartest** thing I've seen a man do. Jumpin' out to catch that scrub could get a man killed. (Luckey, 2008).

(4) Nondefault Negative Literalness

I'm not the smartest person in the room. But, I am smart enough to surround myself with incredibly talented, honest, dependable, dedicated, hardworking people that elevate this entire company together as a team. (Wise, n.d.).

Research questions

Based on such naturally occurring examples, Giora et al. (2015b) constructed (Hebrew) experimental items, controlled for degree of novelty and contextual support (see examples 5–8 below; target utterances in bold, spillover segments in italics, allowing to tap processing difficulties, spilling over from the target sentence to the next one). In (5), contextual information strongly biases an **affirmative** target (*he is the most organized student*) toward its **nondefault** sarcastic interpretation ("he is pretty messy"). In (6), similarly strong contextual support biases a **default** yet equally novel **negative** counterpart (*he is not the most organized student*) toward the same sarcastic interpretation ("he is pretty messy"). Both targets (*he is/he is not the most organized student*), then, are equally novel and evenly biased toward their sarcastic interpretation.

(a) Will they, then, be processed along the same lines, or will one be easier to process than the other?
(b) Will they be similarly enjoyable or will one be more enjoyable than the other?

(5) Affirmative Sarcasm

During the Communication Department staff meeting, the professors are discussing their students' progress. One of the students has been doing very poorly. Professor A: "Yesterday he handed in an exercise and, once again, I couldn't make any sense of the confused ideas presented in it. The answers were clumsy, unfocused, and the whole thing was hard to follow." Professor B nods in agreement and adds: "Unfortunately, the problem isn't only with his assignments. He is also always late for class, and when it was his turn to present a paper in class he got confused and prepared the wrong essay!" Professor C (chuckles): "In short, it sounds like he really has everything under control." Professor A: "What can I say, **he is the most organized student**. *I'm surprised* he didn't learn a lesson from his freshman year experience."

(6) Negative Sarcasm

During the Communication Department staff meeting, the professors are discussing their students' progress. One of the students has been doing very poorly. Professor A: "Yesterday he handed in an exercise and, once again, I couldn't make any sense of the confused ideas presented in it. The answers were clumsy, unfocused, and the whole paper was hard to follow." Professor B nods in agreement and adds: "Unfortunately, the problem isn't only with his assignments. He is also always late for class, and when it was his turn to present a paper in class he got confused and prepared the wrong essay! I was shocked. What can I say, **he is not the most organized student**. *I'm surprised* he didn't learn a lesson from his freshman year experience."

The answers to questions (a) and (b) above vary, depending on the theory one consults. Processing-wise, negation theories (e.g., Horn, 1989) will predict that affirmatives should take less time to process than negative counterparts. Given their equal strength of contextual support, context-based theories (e.g., Gibbs, 1994) will either predict that both should take equally long to process, or that the negative, being longer, will be more effortful. Given their equal degree of novelty, salience-based accounts (e.g., Giora, 2003) will also predict that the negative, being longer, will be more difficult to process. Given their equal nonliteralness, theories such as the Standard Pragmatic Model (e.g., Grice, 1975) will also predict that the negative, being longer, will be more difficult to process.

In contrast, the Defaultness Hypothesis (Giora et al., 2015b) argues that only degree of Defaultness matters. It will therefore predict that the Negative Sarcasm (Example 6 above), whose interpretation is derived by **default** (as shown by Giora et al., 2015b; see also Giora, Drucker, Fein, & Mendelson, 2015a), will be processed *faster* than its **nondefault** counterpart – Affirmative Sarcasm (Example 5 above), which will be further slowed down by the involvement in the process of its **default** literal counterpart (see also Fein, Yeari, & Giora, 2015). No other theory shares this prediction.

As for pleasurability, no theory predicts hedonic effects for highly novel items, such as the ones under discussion here. However, given the predicted involvement of **default** interpretations of Affirmative Literalness in **nondefault** Affirmative Sarcasm (Example 5 above), the only theory that might come close to predicting the latter's pleasurability is the Optimal Innovation Hypothesis (Giora et al., 2004). However, this theory will have to be revised, following the Defaultness Hypothesis (see section titled **The Defaultness Hypothesis**), according to which it is not just **default** *meanings* but also **default** *interpretations* that can be deautomatized on account of being **default**.

Consider, now, the literal counterparts—**default** Affirmative Literalness (Example 7) and **non-default** Negative Literalness (Example 8)—also taken from Giora et al. (2015b). Like the sarcastically biased targets, the literally biased counterparts are also equally novel and equally strongly supported by contextual information.

Being equally novel and equally strongly biased toward their literal interpretation,

(a) Will they be processed along the same lines or will one be easier to process than the other?
(b) Will they be similarly enjoyable or will one be more pleasing than the other?

(7) Affirmative Literalness

During the Communication Department staff meeting, the professors are discussing their students' progress. One of the student's has been doing very well. Professor A: "He is the most committed student in the class. Always on time, always updated on everything." Professor B: "I also enjoy his answers in class. He always insists on a clear argumentation structure and is very eloquent. In his last exam, not only was each answer to the point but also very clear. In my opinion, **he is the most organized student**. *I'm surprised* he asked to sit the exam again."

(8) Negative Literalness

The professors are talking about Omer, one of the department's most excellent students. Professor A: "He is a very efficient lad. Always comes to class on time with all of his papers in order and all his answers are eloquent, exhibiting a clearly structured argumentation. I think that explains his success." Professor B: "Yes, it's true. Omer is simply very consistent and almost never digresses from the heart of the matter. But there are two other students whose argumentation and focus surpass his, so I'd just say that, in comparison to those two, **he is not the most organized student**. *I'm surprised* he asked to sit the exam again."

The answers to these questions seem quite similar to those above regarding the sarcastic items. Processing-wise, negation theories (e.g., Horn, 1989) will predict that affirmatives should take less

time to process than negative counterparts. Given their equal strength of contextual support, context-based theories (e.g., Gibbs, 1994) will either predict that both should take equally long to process, or that the negatives, being longer, will take longer to interpret than the affirmatives. Given their equal degree of novelty, salience-based accounts (e.g., Giora, 2003) will also predict that the negative, being longer, will be more difficult to process. Given their equal degree of literalness, theories such as the Standard Pragmatic Model (e.g., Grice, 1975) will also predict that the negative, being longer, will be more difficult to process.

However, the Defaultness Hypothesis (Giora et al., 2015b), according to which it is degree of Defaultness that matters, has somewhat different predictions. First, like the rest of the theories mentioned here, yet for a different reason, it predicts that Negative Literalness (Example 8 above), on account of its being a **nondefault** interpretation, will take longer to process than Affirmative Literalness (Example 7 above), the latter being a **default** interpretation (as established by Giora et al., 2015b).

In addition, the Defaultness Hypothesis predicts, as do most theories, that **default** Affirmative Literalness (Example 7 above) will be easier to interpret than **nondefault** Affirmative Sarcasm (Example 5 above). Importantly, however, and unlike any other theory, it further predicts that **default** Negative Sarcasm (Example 6 above) will be faster to process compared to its additional counterpart—**nondefault** Negative Literalness—which, in addition to its Nondefaultness (Example 8) is further slowed down by the interference of its **default** negative counterpart (Negative Sarcasm; Example 6 above). No other theory shares the latter prediction (but see Giora et al., 2013; Giora et al., 2015a; Giora, Fein, Metuki, & Stern, 2010).

As for the question regarding pleasurability, as before, no theory predicts pleasing effects for highly novel items, such as the ones under discussion here, this time, not even the Optimal Innovation Hypothesis (Giora et al., 2004) or its revised version (see the section **The Revised Optimal Innovation Hypothesis**). True, the **nondefault** interpretation of Negative Literalness involves a **default** counterpart (Negative Sarcasm) in the process. However, this sarcastic interpretation is not entertainable (and therefore not deautomatizable). Instead, it has to be discarded, since it interferes with deriving the contextually appropriate literal interpretation.

The following section introduces the predictions of the Defaultness Hypothesis in more detail.

The Defaultness Hypothesis

According to the Defaultness Hypothesis (Giora et al., 2015b), but contrary to prevailing views, neither degree of **non/literalness** (as proposed by, e.g., Grice, 1975), nor degree of **affirmation** (as suggested by, e.g., Clark & Clark, 1977; Givón, 1993, 2002; Horn, 1989), nor, in fact, degree of **novelty/nonsalience** (as suggested by, e.g., Giora, 1997, 2003, 2014), nor degree of **context strength** (as suggested by, e.g., Gibbs, 1986, 1994, 2002) can account for the processing routes or degree of pleasantness of equivalent counterparts. Instead, it is degree of the Defaultness of stimuli's meanings and interpretations that affects processing speed (see the section **Degree of Defaultness and Processing Costs**) as well as pleasurability (see section titled **Pleasure effects**).

Predictions

According to the Defaultness Hypothesis (Giora et al., 2015b), **default** interpretations will be prompted unconditionally, immediately, and directly; they will not be preempted by factors presumed to shape processing, such as degree of nonliteralness (literalness vs. nonliteralness), negation (affirmation vs. negation), novelty/nonsalience (salience-based vs. nonsalient), or contextual support (weak vs. strong). Activation of **default** interpretations, then, will be seamless and speedy.

Complementarily, retrieving **nondefault** alternatives will be slower, often entailing **default** interpretations in the process.

Processing-wise, then, Defaultness affects our understanding considerably—single-handedly shaping while also misshaping the course of our interpretation. Specifically,

(i) **default** responses will be prompted instantaneously, initially and directly, faster than **nondefault** counterparts, superseding factors assumed to affect processing initially, such as degree of nonliteralness, negation, novelty, and (linguistic or nonlinguistic) contextual information.
(ii) Invoked unconditionally, **default** responses will be involved in retrieving **nondefault** counterparts, slowing them down in the process.
(iii) However, when the involvement of **default** interpretations renders **nondefault** counterparts qualifiable for Revised Optimal Innovation (see the section "The Optimal Innovation Hypothesis Revisited"), such **nondefault** interpretations will be more pleasing than **default** and **nondefault** yet nonoptimally innovative counterparts.

Degree of Defaultness and processing costs

As mentioned above, Defaultness is defined in terms of an unconditional response to a stimulus (Giora et al., 2015b). As before, the focus here is on **default** and **nondefault** *interpretations*, which, unlike *meanings*, have to be construed rather than accessed directly from the mental lexicon. (On default, i.e., salient meanings, see e.g., Giora, 1997; 2003; on **default** interpretations, see also Giora et al., 2010; 2013, 2015a, 2015b).

Indeed, when testing predictions (i–ii above), Giora et al. (2015b) were able to attest to the low costs of deriving **default** interpretations and the high costs of retrieving **nondefault** counterparts. Here, however, we test prediction (iii above), regarding the pleasing effects of the aforementioned **nondefault** interpretations, involving **default** competitors in the process (see experiments 1–2 below). Specifically, we aim to show that Defaultness, which interferes with making sense of **nondefault** interpretations, may account for the latter's rewarding effect. However, before weighing Defaultness against Nondefaultness in terms of costs and benefits, we first review how degree of Defaultness was established and how it affected processing (as reported in Giora et al., 2015b).

Degree of Defaultness

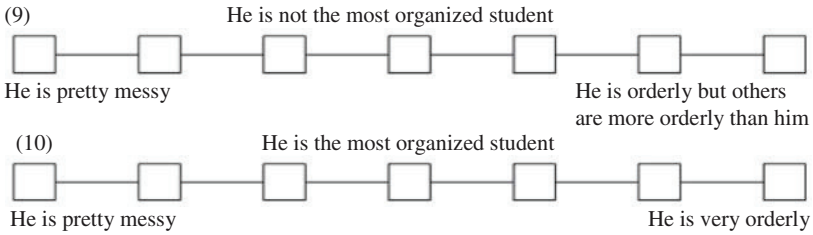
Note that for interpretations to qualify for Defaultness, stimuli should be potentially ambiguous between literal and nonliteral interpretations so that a preference is allowable; they should therefore be

- novel (noncoded),
- free of utterance internal cues (e.g., semantic anomaly or internal incongruity, see Barbe, 1993; Beardsley, 1958; Partington, 2011), and
- free of utterance external cues (e.g., contextual information, explicit cuing, see Katz & Ferretti, 2003; Schwint, Ferretti, & Katz, 2006), inviting or disinviting non/literalness (for detailed descriptions of these conditions, see, Giora et al., 2010, 2015a, 2015b, 2013).

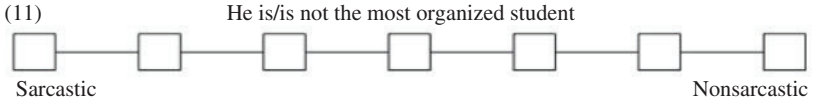
To establish degree of Defaultness, Giora et al. (2015b) presented participants with *potentially ambiguous* negative (Example 9) and affirmative (Example 10) *contextless* items, controlled for *novelty* by a pretest. Items were followed by a 7-point interpretation scale, randomly featuring a salience-based literal interpretation (here, at the right-end of the scales) and a nonsalient sarcastic interpretation (here, at the left-end of the scales). Using such scales, with a mid-point such as 4,

allows us to distinguish between contrastive readings as here, where such scales permit classifying scores, significantly lower than 4, as literal, and scores, significantly higher than 4, as sarcastic.

In two experiments, participants indicated the proximity of the interpretation of the items to any of those instantiations at the scale's ends:



Additionally, these same items, followed by a 7-point sarcasm scale (Example 11), were presented to a third group of participants who consciously rated their degree of sarcasm (made explicit by the scale):



Results showed that, when presented in isolation, the **default**, preferred interpretation of the novel negative items was sarcastic ("He is pretty messy"), scoring high on sarcasm (M = 5.55, SD = 0.65), significantly higher than 4 on a 7-point sarcasm scale $t_1(19) = 10.64$, $p < .0001$, $t_2(11) = 16.52$, $p < .0001$. In contrast, the **default**, preferred interpretation of their similarly novel affirmative counterparts was literal ("He is very orderly"), scoring low on sarcasm (M = 1.72, SD = 0.98), significantly lower than 4 on a 7-point sarcasm scale, $t_1(19) = 10.45$, $p < .0001$; $t_2(11) = 23.00$, $p < .0001$. In addition, explicitly rating sarcasm further confirmed that the novel negative items were consciously perceived as sarcastic (M = 4.98, SD = 1.23), scoring significantly higher than 4 on a 7-point sarcasm scale $t_1(39) = 5.05$, $p < .0001$, $t_2(11) = 6.89$, $p < .0001$; their novel affirmative counterparts, were perceived as literal, scoring low on sarcasm (M = 2.68, SD = 1.04), significantly lower than 4 on a 7-point sarcasm scale, $t_1(39) = 7.99$, $p < .0001$; $t_2(11) = 7.40$, $p < .0001$.

These experiments, then, singled out two **default** interpretations: Negative Sarcasm and Affirmative Literalness. They further singled out two **nondefault** counterparts: Negative Literalness and Affirmative Sarcasm.

Processing costs

In order to test predictions (i–ii above), related to processing speed, Giora et al. (2015b) embedded the negative and affirmative targets in equally highly supportive contexts (controlled for context strength by a pretest; see Giora et al., 2015b exp. 2). Equal strength of contextual support would exclude the possibility of accounting for the expected differences in terms of context effects.

How **default** interpretations were weighed against **nondefault** counterparts is illustrated in Figure 1 below.

Results indeed showed that, as predicted, **default** interpretations were processed significantly faster than **nondefault** counterparts (see Figures 2–3). Specifically, as illustrated by Figure 2, **default** Negative Sarcasm was processed faster than

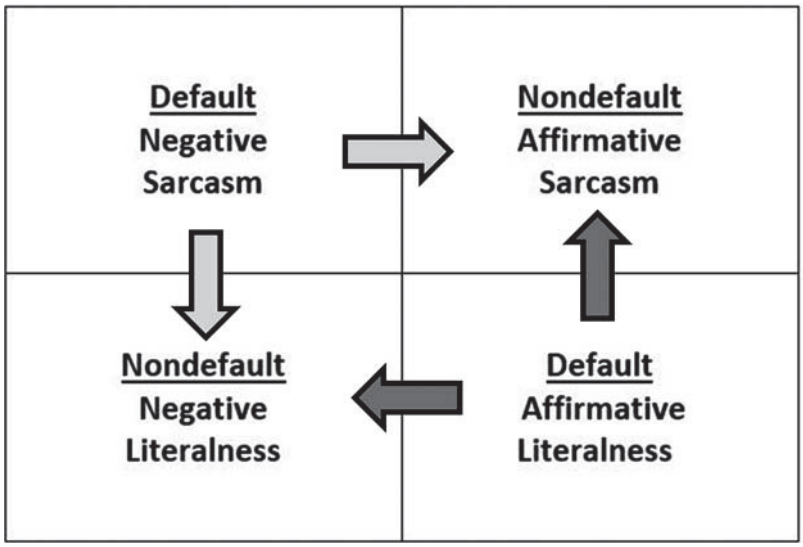


Figure 1. Weighing **default** interpretations against **nondefault** counterparts.

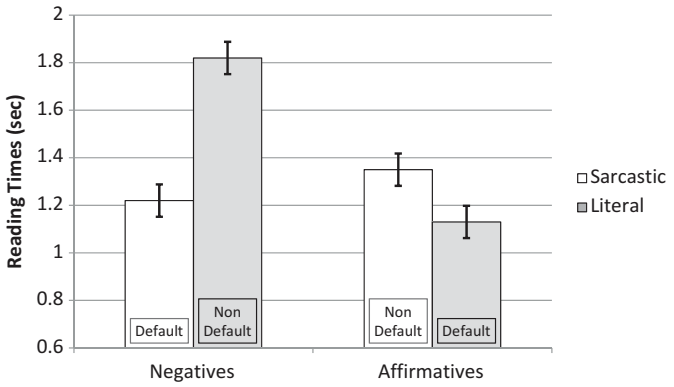


Figure 2. Mean reading times (in seconds) of target sentences. Error bars represent standard errors. Standard errors in all figures were calculated according to Loftus and Masson (1994) recommendations for within-subjects designs.

(a) **nondefault** Negative Literalness (the latter interpreted indirectly, involving activation and disposal of the **default** sarcastic interpretation), and faster yet than
(b) **nondefault** Affirmative Sarcasm (the latter interpreted indirectly, involving **default** Affirmative Literalness in the process), regardless of equal strength of contextual support.

Similarly, **default** Affirmative Literalness was processed faster than

(a) **nondefault** Affirmative Sarcasm (the latter interpreted indirectly, involving **default** Affirmative Literalness in the process), and faster than
(b) **nondefault** Negative Literalness (the latter interpreted indirectly, involving **default** Negative Sarcasm in the process, which should also be discarded), irrespective of equal strength of contextual support.

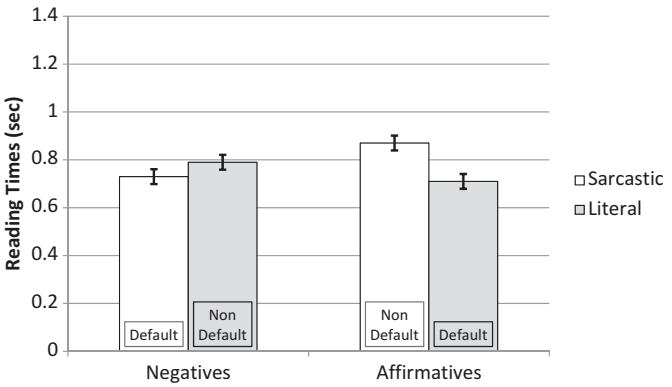


Figure 3. Mean reading times (in seconds) of two-word spillover segments. Error bars represent standard errors.

Measuring processing costs of spillover segments replicated these patterns of results. As illustrated by Figure 3, here too, **default** interpretations were processed significantly faster than **nondefault** counterparts.

Novel, yet **default** interpretations, whether negative or affirmative, literal or nonliteral, salience-based (here literal) or nonsalient (here sarcastic), are processed faster than similarly novel **non-default** counterparts, irrespective of equally strong contextual support. Processing-wise, then, Defaultness reigns; Nondefaultness lags behind. (For replication of these findings with English items using eye-tracking during reading, see Filik, Howman, Ralph-Nearman, & Giora, In progress).

Pleasure effects

Given that **default** interpretations are inevitably involved in shaping **nondefault** counterparts, would this involvement render the latter eligible for Optimal Innovativeness? Might costly **nondefault** interpretations have a rewarding effect? As mentioned earlier, and reviewed below (see the section "The Optimal Innovation Hypothesis"), the Optimal Innovation Hypothesis (Giora, Fein, Kotler, & Shuval, 2015c; Giora et al., 2004) follows from the Graded Salience Hypothesis (Giora, 1997, 2003). However, this hypothesis is somewhat limited, as it exclusively resides in deautomatizing what is termed here **default** (i.e., salient) *meanings*. In contrast, the Revised Optimal Innovation Hypothesis (see the section "The Optimal Innovation Hypothesis Revisited"), follows from the Defaultness Hypothesis (Giora et al., 2015b). Being an umbrella theory, the Defaultness Hypothesis encompasses both default *meanings* as well as **default** *interpretations*, rendering some **nondefault** interpretations eligible for Revised Optimal Innovativeness.

The optimal innovation hypothesis

According to the Optimal Innovation Hypothesis (Giora et al., 2004, 2015c), pleasurability is sensitive to Optimal Innovation. A stimulus would be optimally innovative if it involves:

(a) a *novel*, noncoded, less-salient, or non-salient response to a stimulus, which differs not only quantitatively (similarity-wise) but primarily qualitatively (conceptually-wise) from the *salient* response(s) associated with it, while
(b) allowing for the automatic recoverability of a *coded, salient* response (or responses; see Brône & Coulson, 2010) related to that stimulus, so that both responses may be weighed against each other, their similarity and differences assessable.

A case in point would be the novel, nonsalient *Know hope*[1], which allows for an insight into a **default**, salient meaning ("despair") of a familiar collocation (*No hope*), while promoting a new one ("keep up hope in the face of despair"; see Giora et al., 2015c, 2004, pp. 116–117). Another example would be the **nondefault** *Body and sole*—a name of a shoe shop—which deautomatizes the **default** *body and soul* while retaining it so as to get across the unique quality of the shoes associated with soul.

Still, is activating a **default** incompatible yet related *meaning* the only way to affect Optimal Innovations?

The optimal innovation hypothesis revisited

So far the Optimal Innovation Hypothesis has been able to account only for the interplay between deautomatized **default** *meanings* and the invited **nondefault** *interpretations*. However, the revised version proposed here extends its scope, allowing for the deautomatization of both **default** *meanings* as well as **default** *interpretations*. According to the Revised Optimal Innovation Hypothesis, then, pleasurability is sensitive to Optimal Innovation defined in terms of degree of Defaultness (rather than degree of Salience).

The revised optimal innovation hypothesis

According to the Revised Optimal Innovation Hypothesis, a stimulus would be optimally innovative if it:

(a) involves a **nondefault** response to a given stimulus, which differs from the **default** response(s) associated with it, both quantitatively and qualitatively, while
(b) allowing for the automatic recoverability of the **default** response(s) related to that stimulus, so that both the **default** and **nondefault** responses may be weighed against each other, their similarity and differences assessable.

A case in point would be **nondefault** Affirmative Sarcasm (*He is the most organized student*), whose literal interpretation ("the student is very orderly") is its **default** interpretation. However, this interpretation is deautomatized by the context in which it is embedded, inviting a **nondefault** sarcastic alternative ("the student is pretty messy"; see Example 5 above). The result is both interpretations are entertained and interact, highlighting the gap between what is said (i.e., the literal interpretation) and the situation described (inviting the opposite of what is said; see Giora, 1995).

Given the Revised Optimal Innovation Hypothesis, **default** interpretations do not qualify for optimal innovativeness, because they involve activating only one interpretation. However, **nondefault** interpretations, which also involve their **default** counterparts in the process, might be eligible for optimal innovativeness. Of the two potential **nondefault** candidates for Optimal Innovation (see Examples 5 and 8 above), singled out by Giora et al. (2015b), one (Example 8), does not qualify for Optimal Innovation. As mentioned earlier, in Example (8), whose **nondefault** interpretation is Negative Literalness, the **default** interpretation, activated unconditionally (i.e., Negative Sarcasm), will not be retainable for further processes, because it is disruptive to the recovery of the compatible literal interpretation and will have to be suppressed. Hence the highest cost of Negative Literalness (see Figures 2–3).

In contrast, as noted above, the **nondefault** interpretation of Affirmative Sarcasm (Example 5) involves activating and retaining its **default** literal interpretation. These two interpretations are conducive to the intended interpretation (as argued by Giora, 1995; demonstrated by Fein

[1]https://www.flickr.com/photos/idanska/247228762/

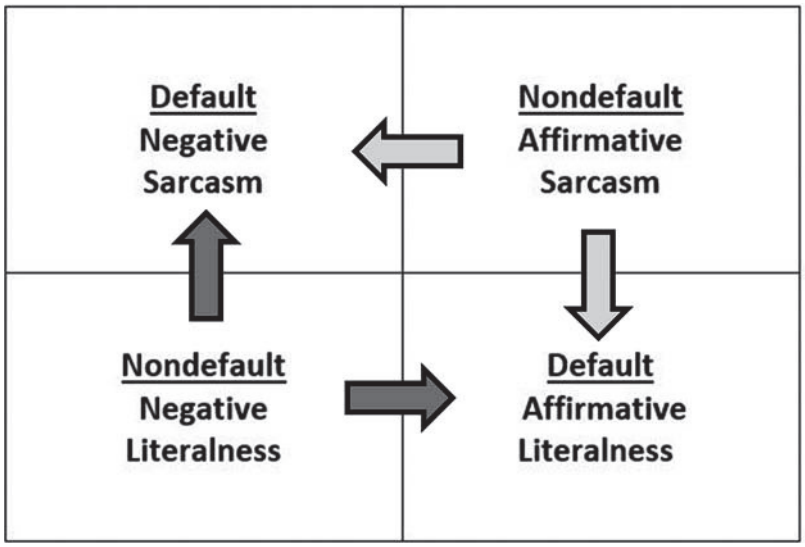


Figure 4. Weighing **nondefault** interpretations against **default** counterparts.

et al., 2015; Giora et al., 2007). They are therefore retainable, allowing for their differences and similarities to be entertained. **Nondefault** Affirmative Sarcasm, then, qualifies for Optimal Innovation.

Predictions

According to the Revised Optimal Innovation Hypothesis,

(i) **nondefault** Affirmative Sarcasm (Example 5) will be pleasing, more pleasing than **default** counterparts—**default** Affirmative Literalness (Example 7) and **default** Negative Sarcasm (Example 6).

Given that **nondefault** Negative Literalness (Example 8) does not qualify for optimal innovativeness (see the section "The Revised Optimal Innovation Hypothesis"),

(ii) **nondefault** Negative Literalness will not be more pleasing than its **default** counterparts—**default** Affirmative Literalness (Example 7) and **default** Negative Sarcasm (Example 6).

How **nondefault** interpretations will be weighed against **default** counterparts is illustrated in Figure 4. Experiments 1–2 test these predictions.

Experiment 1

The aim of Experiment 1 is to test predictions (i–ii) following from the Revised Optimal Innovation Hypothesis. Accordingly, **nondefault** Affirmative Sarcasm will be rated as more pleasing than **default** counterparts—Affirmative Literalness and Negative Sarcasm; **nondefault** Negative Literalness, however, will not be more pleasing than **default** counterparts—Affirmative Literalness and Negative Sarcasm.

Method

Participants

Forty volunteers, students of Tel Aviv University (20 females and 20 males), mean age 24.75 (*SD* = 2.34) participated in the experiment. They were all native speakers of Hebrew.

Stimuli

Stimuli, pseudo-randomly ordered, were those used in Giora et al. (2015b, Experiment 2, short of the spillover sentences; see Examples 5–8 above). They included 12 negative targets (*He is not the most organized student*) and 12 affirmative counterparts (*He is the most organized student*), in addition to 23 filler items, varying in terms of degree of affirmation, novelty, literalness, and type of construction. The 24 experimental items were embedded in sarcastically (Examples 5–6) and literally (Examples 7–8) biasing contexts, which were equally strongly supportive of their respective interpretations (see Giora et al., 2015b). Four booklets were prepared so that each participant would see only one (negative or affirmative, sarcastic or literal) version of the stimuli. The texts, ending in the target utterances, were followed by a 7-point scale, not marked for numbers. It featured a smiley ☺ emoticon at its right end, to indicate a "pleasing" effect, and a non-smiley ☹ emoticon at its left end, to indicate a "non-pleasing" effect. The "meanings" of the emoticons were explained to the participants in the instructions section of the questionnaire and were illustrated by three examples.

Procedure

Participants were asked to read the stimuli and indicate the degree of pleasure they derived from the target utterances in their respective contexts.

Results and discussion

As predicted, results showed that **nondefault** Affirmative Sarcasm was pleasing (4.07, *SD* = 1.51) —more pleasing than (a) **default** Affirmative Literalness (3.47, *SD* = 1.60), $t_1(39) = 2.30$, $p < .05$; $t_2(11) = 2.38$, $p < .05$, and (b) **default** Negative Sarcasm (3.48, *SD* = 1.39), $t_1(39) = 2.53$, $p < .01$; $t_2(11) = 3.91$, $p < .005$ (which did not differ from each other). Furthermore, as predicted, the differences between **nondefault** Negative Literalness (3.55, *SD* = 1.59) and **default** Affirmative Literalness (3.47) were insignificant, $t_1(39)<1$, *n.s.*; $t_2(11)<1$, *n.s.*, as were the differences between **nondefault** Negative Literalness and **default** Negative Sarcasm (3.48), $t_1(39)<1$, *n.s.*; $t_2(11)<1$, *n.s.* (see Figure 5). Such results support the Revised Optimal Innovation Hypothesis. They show that

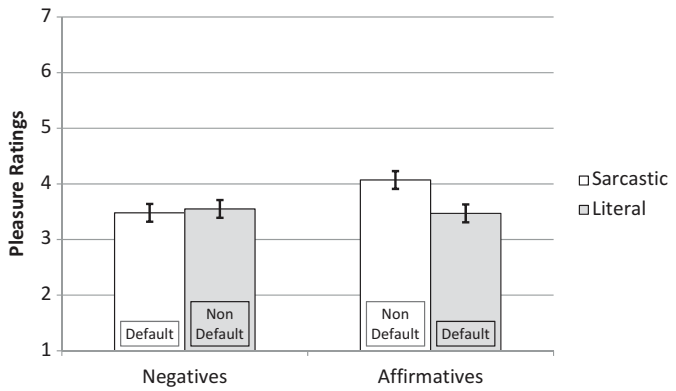


Figure 5. Mean pleasure ratings. Error bars represent standard errors.

it is Defaultness, when conducive to the interpretation process, that allows Nondefaultness to be rewarding! (On **nondefault** Affirmative Sarcasm being more pleasing than **default** Affirmative Literalness, see also Filik, Brightman, Gathercole, & Leuthold, 2017).

Will these results be replicated in the presence of pictorial contexts? (For pictorial contexts having a similarly weak effect on preempting **default**, salient meanings, see Heruti, 2015).

Experiment 2

The aim of Experiment 2 is to test prediction (i) following from the Revised Optimal Innovation Hypothesis, using, this time, nonlinguistic, pictorial contexts (see example 12 below). The attempt is to show that **nondefault** Affirmative Sarcasm is more pleasing than **default** Negative Sarcasm, given that the former, but not the latter, meets the conditions for Optimal Innovation (see the section The Revised Optimal Innovation Hypothesis).

Method

Participants

Thirty volunteers, students of Tel Aviv University (15 females and 15 males), mean age 26.2 (SD = 4.2) participated in the experiment. They were all native speakers of Hebrew.

Stimuli

Experimental stimuli, pseudo-randomly ordered, were the verbal targets taken from Giora et al. (2015b). They included 12 negative utterances (*He is not the most organized student*) and 12 affirmative counterparts (*He is the most organized student*). Each of the counterparts were preceded by the very same image (see Example 12 below), controlled for equal strength of contextual bias, supportive of the sarcastic interpretation of the linguistic targets (see Pretest below). They thus featured Negative and Affirmative Sarcasm. In addition, there were 19 filler items consisting of images followed by sentences, varying in terms of degree of affirmation, novelty, literalness, and type of construction.

Pretest

To control for equal strength of contextual bias, supportive of the targets' sarcastic interpretation, another 40 volunteers, students of Tel Aviv University, all native speakers of Hebrew, were presented the images, followed by either a negative (*He is not the most organized student*) or an affirmative (*He is the most organized student*) target, in addition to the filler items. The targets were followed by a 7-point interpretations scale, not marked for numbers, as in Giora et al. (2015b: Experiment 1; see Examples 9–10 above). Each scale featured a literal and a sarcastic interpretation, pseudorandomly presented at each side of the scale. Results attest to equal strength of contextual bias, supportive of the sarcastic interpretation. They show that negative targets scored as high on sarcasm (M = 5.49, SD = 0.94) as did their Affirmative counterparts (M = 5.70, SD = 0.88), $t_1(39) = 1.48$, $p = .15$ (two-tail), $t_2(11) = 1.49$, $p = .16$ (two-tail), scoring significantly higher than 4 on the 7-point scales (all t's > 9, p's < .0001). Using such scales, with a mid-point such as 4, is particularly essential where strength of bias is critical, as when contexts are expected to be **equally strongly** supportive of the same (e.g., sarcastic) interpretation, as here.

Having established equal strength of contextual bias, two booklets were prepared so that each participant would see only one (negative or affirmative) version of a stimulus. As in Experiment 1, the pictorial contexts, followed by the target utterances, were followed by a 7-point pleasurability scale, not marked for numbers, featuring a smiley ☺ emoticon at its right end, to indicate a "pleasing" effect, and a non-smiley ☹ emoticon at its left end, to indicate a "non-pleasing" effect. As in Experiment 1, the

"meanings" of the emoticons were explained to the participants in the instructions section of the questionnaire and were illustrated by three examples:

(12)

He is/He is not the most organized student

Procedure

Participants were asked to view the pictorial stimuli and rate the degree of pleasure they derived from the target utterances in their respective contexts.

Results and discussion

Results are illustrated by Figure 6. These show that, as predicted, it is **nondefault** Affirmative Sarcasm that is pleasing (4.25; SD = 1.41)—more pleasing than **default** Negative Sarcasm (3.65; SD = 1.30), $t_1(29) = 3.23$, $p < .005$; $t_2(11) = 3.95$, $p < .005$. Such results support the Revised Optimal Innovation Hypothesis. They evince that it is Defaultness, conducive to the interpretation process, that allows Nondefaultness to be rewarding!

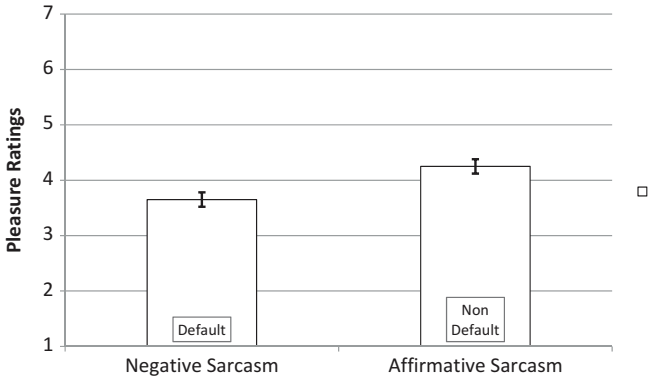


Figure 6. Mean pleasure ratings. Error bars represent standard errors.

General discussion

The first version of the Optimal Innovation Hypothesis (Giora et al., 2004) follows from the Graded Salience Hypothesis (Giora, 1997, 1999, 2003). It focuses on the role of defamiliarized, **default** (salient) meanings. This study, however, set out to test the Revised Optimal Innovation Hypothesis. Like the original Optimal Innovation Hypothesis, it also assumes that pleasurability is sensitive to Optimal Innovation.

Recall, however, that according to the original version of the hypothesis, optimally innovative stimuli (*KNOW HOPE*) are defined in terms of **nondefault**, noncoded (nonsalient) responses ("keep up hope") activating and deautomatizing **default**, coded, (salient) *meanings* of familiar stimuli (*No hope*). The revised version of the hypothesis, extending the scope of the original version, maintains that it is not degree of salience that is essential to Optimal Innovativeness but degree of Defaultness (salience, included).

Unlike the Optimal Innovation Hypothesis, the Revised Optimal Innovation Hypothesis tested here follows from the Defaultness Hypothesis (Giora et al., 2015b). Here, as earlier, Defaultness is defined in terms of an unconditional response to a stimulus. However, the revised notion of an unconditional response is now applicable to both coded salient *meanings* as well as noncoded *interpretations* constructed on the fly. Accordingly, for a stimulus to be optimally innovative, it should invoke a **nondefault** response alongside a **default** counterpart (whether coded or constructed), from which it differs significantly. Importantly, the end-product involves distinct yet entertainable responses, whose similarities and differences are crafted into a whole.

Thus, according to the Revised Optimal Innovation Hypothesis, stimuli qualifiable for Optimal Innovation, such as **nondefault** Affirmative Saracsm (*he is the most organized student*; see 5 above), which further activate a **default** yet entertainable response, such as Affirmative Literalness, will be pleasing—more pleasing than **default** counterparts—such as Affirmative Literalness (see 7 above) and Negative Sarcasm (see 6 above). However, **Nondefault** interpretations such as Negative Literalness (see 8 above), which involve a **default** but non-entertainable interpretation in the process, such as Negative Sarcasm (see 6 above), do not qualify for Optimal Innovation. The **default** interpretation they activate automatically cannot be retained, since it interferes with constructing the contextually appropriate literal interpretation. Hence, it has to be discarded.

Results indeed show that, as predicted, **nondefault** Affirmative Sarcasm is pleasing—more pleasing than its **default** counterparts—Affirmative Literalness and Negative Sarcasm; **nondefault** Negative Literalness, however, does not differ pleasure-wise from its **default** counterparts—Affirmative Literalness and Negative Sarcasm.[2]

In Experiment 1, these results were established with regard to linguistic stimuli, followed by equally strong **linguistic** contexts, supportive of their respective interpretations. In Experiment 2, these results were further replicated with regard to the same linguistic stimuli (including, however, only **nondefault** Affirmative Sarcasm and **default** Negative Sarcasm), following identical, equally strong **pictorial** contexts, supportive of the same sarcastic interpretation.

Findings here, as well as Giora et al.'s (2004, 2015c), establish that Nondefaultness, on its own, is not gratifying. Instead, creativity that hinges on Optimal Innovation—on Nondefaultness that unsettles or undermines **default** responses, whether coded or constructed—is pleasing (see also Vaid, 2014 on creative proverbs deautomatizing familiar ones). This is true regardless of whether contextual information is linguistic or nonlinguistic, as shown here for linguistic and pictorial contexts. This is also true regardless of whether the target is linguistic, as shown here and in Giora et al. (2004), or nonlinguistic, as shown for pictorial targets in Giora et al. (2004, Experiment 6). This is further true of visual patterns, as shown by Berlyne and Boudewijns (1971), who employed mixtures of differences (Nondefaultness) and similarities (Defaultness), suggesting that "uniformity in variety" (p. 195) induces likability. Similarly, this also applies to designs, where there is "unity in variety" (Hekkert, 2006, p. 157), and to works of art (e.g., Picasso's paintings) when involving "optimal" rather than high or low perceptual complexity, as shown by Ball,

[2]On the emotional impact of Affirmative Sarcasm and how emoticons increase the positivity of its emotional impact, see for example, Filik et al. (2016).

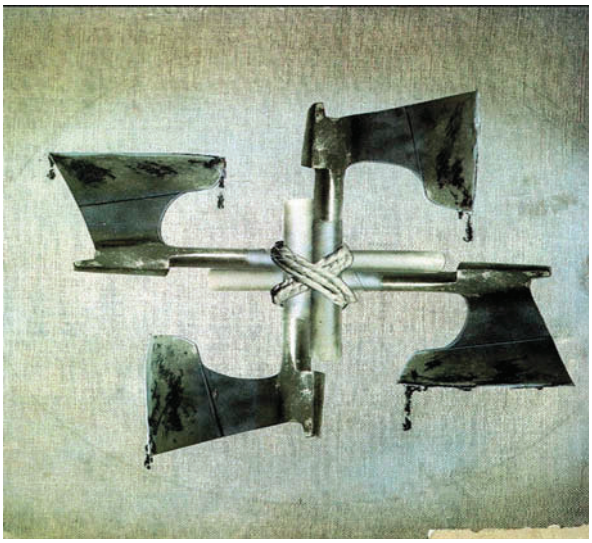


Figure 7. Iron and blood. © 2016 Artists Rights Society (ARS), New York /VG Bild-Kunst, Bonn.

Threadgold, Marsh, and Christensen (In progress). This must be further relevant to music, using musical metaphors (Johnson & Larson, 2003), or musical irony, as when one composer (Beethoven) echoes compositional strategies common in another composer's (e.g., Haydn's) music, while ridiculing them (Balter, 2009; Eitan & Rothschild, 2011), and to other forms of creativity such as choreography, directing, or architecture (e.g., The Guggenheim Museum Bilbao, Gehry, 1997), and, obviously prevalently so, to commercial advertisements (e.g., Wojtaszek, 2011). Optimal innovation may also apply to abstract structures. For instance, structuring a narrative (e.g., a movie) along the lines of categorical organization (Giora, 1988), based on similarities and differences rather than on temporal continuity (as demonstrated by Giora & Ne'eman, 1996), is also optimally innovative, and hence potentially aesthetic. Along the same lines, technology might also evolve in terms of such aesthetics (on evolutionary aesthetics, see Hekkert, 2006). In fact, as long as aesthetics is in the (mind's) eye of the beholder, the sky is not the limit.

Findings here and elsewhere, then, support the view that we enjoy it when we are allowed a new insight into the routine (as argued by, e.g., Bergson, 1900/1956; Berlyne, 1960; Mukařovský, 1932/1964, 1978; Schopenhauer, 1969; Shklovsky, 1917/1965, p. 22; Townsend, 1997). We find delight, then, in the defamiliarization of the **default**. Nondefaultness, on its own, will not do.

Note, however, that deautomatizing a stimulus' **default** response, which evokes strong negative affect, such as Heartfield's (1934) art, which deautomatizes the Swastika—a Nazi symbol (see Figure 7)—is still an Optimal Innovation. However, it might not be equally perceived as pleasing by various kinds of populations (see also Bergson, 1900/1956; Drucker, Fein, Bergerbest, & Giora, 2014). Strong emotions or attachments, whether negative but also positive, may block amusement and thus defy the Optimal Innovation Hypothesis.

In sum, it is Defaultness that matters, outshining degree of literalness, degree of novelty, degree of negation, or degree of context strength. It is Defaultness that shapes and misshapes our understanding significantly, further carving our aesthetic appreciation, when rendering **nondefault** responses optimally innovative and hence affective. It is Defaultness, and none other, that rules, both processing-wise and dis/pleasure-wise.

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