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# Telling the world's least funny jokes: On the quantification of humor as entropy

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## ABSTRACT

In assessing aphasics or conducting experiments using a lexical decision task, we have observed informally that some non-words (NWs) reliably make people laugh. In this paper, we describe a set of studies aimed at illuminating what underlies this effect, performing the first quantitative test of a 200 year old theory of humor proposed by Schopenhauer (1818). We begin with a brief overview of the history of humor theories. Schopenhauer's theory is formulated in terms of detection/violation of patterns of co-occurrence and thereby suggests a method to quantify NW humor using Shannon entropy. A survey study demonstrates that there is much more consistency than could be expected by chance in human judgments of which NWs are funny. Analysis of that survey data and two experiments all demonstrate that Shannon entropy does indeed correctly predict human judgments of NW funniness, demonstrating as well that the perceived humor is a quantifiable function of how far the NWs are from being words.

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## Introduction

In the course of rejecting both extreme sensationalism and extreme cognitivism, William James (1890/1950) wrote that: "We ought to say a feeling of *and*, a feeling of *if*, a feeling of *but*, and a feeling of *by*, quite as readily as we say a feeling of blue or a feeling of cold" (pp. 245–246). Using a word is as much a matter of *feeling* as it is of *thinking*. Words don't just have different semantic and syntactic properties; they also *feel* different. Perhaps James chose to use as examples only closed class words, with 'bleached semantics', to emphasize that this 'feeling system' might have a particularly clear role to play when cognitive semantics does not. Faced with diminished

competition from semantics, the feeling evoked by a letter string might be freed to play a stronger role. In these studies we take this idea to its limit, by focusing on the feeling evoked by *non-word strings* (NWs), which have even more bleached semantics than closed class words (for evidence that NWs do sometimes have *some* semantics, see Reilly, Westbury, Kean, & Peele, 2012; Westbury, 2005). We present evidence showing that some NWs do reliably evoke feelings of humor in readers. Based on extant models of humor, reviewed in the next section, we are able to use Shannon entropy to manipulate and predict the amount of humor evoked by novel meaningless strings. The results have implications for understanding both humor and language processing.

## How does humor function?

Although there are many theories of humor and no final consensus on what makes something funny, one clear

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thread that informs many post-Platonic theories of humor is of particular relevance here.<sup>1</sup> This is the idea that humor involves the recognition of some specific forms of incongruity, the improbable and therefore surprising co-occurrence of two or more ideas and/or events.

Although alluded to by Aristotle, this idea has its modern roots in Francis Hutcheson's (1725/1973) essays *Reflections on Laughter*, which were first printed in *The Dublin Journal* in 1725. Hutcheson argued that humor was based on "the perception of an incongruity between something dignified and something mean" (Telfer, 1995, p. 360). He would have appreciated the nattily dressed hobo made famous by Charlie Chaplin, whose juxtaposition of dignified dress and undignified behavior exactly conforms to what Hutcheson had in mind as humorous.

In his (1865/2004) discussion of this idea of 'ludicrous incongruity', the psychologist Alexander Bain pointed out the deficiencies in Hutcheson's simplistic view, noting in a much cited passage that:

"There are many incongruities that may produce anything but a laugh. A decrepit man under a heavy burden, fives loaves and two fishes among a multitude, and all unfitness and gross disproportion; an instrument out of tune, a fly in ointment, snow in May, Archimedes studying geometry in a siege, and all discordant things; a wolf in sheep's clothing, a breach of bargain, and falsehood in general; the multitude taking the law into their own hands, and everything of the nature of disorder; a corpse at a feast, parental cruelty, filial ingratitude, and whatever is unnatural; the entire catalogue of vanities given by Solomon,— are all incongruous, but they cause feelings of pain, anger, sadness, loathing, rather than mirth." (pp. 256–257).

Bain was apparently not familiar with the philosopher Arthur Schopenhauer's (1818/1883) *The World As Will and Representation* (which was not translated into English until the 1880s). In the course of writing about the limitations of reason and deliberation, Schopenhauer sharpened the notion of exactly what kind of detected incongruity would be found humorous. He stated that "The cause of laughter in every case is simply the sudden perception of the incongruity between a concept and the real objects which have been thought through it in some relation" (1818/1883, p. 76, emphasis added). Schopenhauer thereby proposed that it was not incongruity *per se*, but only incongruity that plays into an *a priori* conceptual expectation that is funny: i.e. an unexpected dissociation between an event and an idea about that event. This simple rider eliminates most of the counter-examples listed by Bain, since most of them are incongruous but not *expectation violating*. We may not often encounter instruments out of tune or a fly in our ointment, but we would not violate any conceptual expectation if we did.

<sup>1</sup> Plato (as well as Aristotle and, later, Thomas Hobbes) speculated on the origins of humor but they focused largely on derisive humor, in which a person takes pleasure in the perceived deficiencies of another person. Hutcheson pointed out that many instances of disparity between two people were not funny, and that many funny things did not involve any perceptible personal disparity.

Perhaps because his writing on the matter is somewhat turgid, it is not always fully appreciated (see, e.g. Martin, 1983, who appears to have stopped reading Schopenhauer at the sentence above) that Schopenhauer goes on to further specify that there are two particular related forms of perceived incongruity that are funny. One form involves a *conceptual bifurcation* (our own term): the realization that a concept that had been seen as belonging to a single category actually belongs to two categories simultaneously. The other involves the opposite realization, of *conceptual subsumption*: the realization that two apparently different concepts can be subsumed under a single category. Schopenhauer wrote:

"It often occurs in this way: two or more real objects are thought through one concept, and the identity of the concept is transferred to the objects; it then becomes strikingly apparent from the entire difference of the objects in other respects, that the concept was only applicable to them from a one-sided point of view. It occurs just as often, however, that the incongruity between a single real object and the concept under which, from one point of view, it has rightly been subsumed, is suddenly felt. Now the more correct the subsumption of such objects under a concept may be from one point of view, and the greater and more glaring their incongruity with it [...] the greater is the ludicrous effect which [sic] is produced by this contrast. All laughter then is occasioned by [...] unexpected subsumption." (pp. 76–77, emphasis added)

There are two important aspects to Schopenhauer's theory, one of which we have already emphasized: that Schopenhauer defines humor in terms of *patterned co-occurrence*. It is not simply the low frequency of an event that is humorous; it is the probability of co-occurrence of an event with a pre-existing inconsistent expectation. The second important claim made by Schopenhauer is that jokes are funnier the more they are they are incongruous.

Puns and other word play provide a most obvious example of Schopenhauer's point. The pun *When the clock is hungry it goes back four seconds* is funny because of the unexpected dual meanings of *four* [for] and *seconds*. Schopenhauer's theory predicts what many of us would agree with: that it would be less humorous (because it is simply confounding and therefore mildly annoying) to make a very similar statement that does not so cleanly violate a *specific* conceptual expectation (although it may still violate our expectations of lexical co-occurrence): e.g. "When the clock is hungry, it rides a horse". Schopenhauer is surely right in suggesting that the resolution inherent in recognizing *which specific expectation has been violated* by a joke is an important element in it being 'a good joke'.<sup>2</sup> Consider, for example, the generally unpleasant feeling of 'not getting a joke'. When we recognize the anomaly in knowing that a joke has been made, but fail to identify the precise expectation that has been violated, we experience the

<sup>2</sup> This may be one reason why the NW string 'jokes' that we consider in this paper are not very funny.

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