The Neurological Research on Laughter: Social Context, Joys, and Taunts

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Abstract: One theory about comedy is that the stand-up comedian is always engaged in a quest for "respectability." As the center of attention, the comedian has a unique opportunity to share specific truths with authority, but at the same time, the comedian engages in self-deprecation and being an occasional butt of their own joke. In Elmer Blistein's classic book *Comedy in Action* (1964), he relates a story about Danny Kaye. When Kaye's five-year-old daughter saw him perform in a nightclub, he noticed her crying and asked her what was wrong. She replied, "I don't like people to laugh at my Daddy" (Blistein 1964: 17). Kaye's daughter was struggling with the difference between "laughing at" and "laughing with." The comedian constantly negotiates being the butt of the joke who is the object of laughter, and being the expert who is in control of the performance and laughing with the audience. In either case, neurobiological analysis of laughter shows striking differences in types of laughter and the active locations of the brain in functional magnetic resonance imaging (fMRI) scans. One research team has documented a "laughter neural network" showing that joyous and taunting laughter each produced different connectivity patterns in parts of the brain involved in sound association, thinking and visual imagery.

The fact that laughter occurs in a social context where roles and statuses between individuals are interpreted and reinterpreted is very important. Complex social laughter is used in a conscious and goal-directed manner to influence and modify the attitudes and behaviors of those around us. "Polite laughter" as a way to acknowledge things that members of a group all find funny can reinforce social communication and cooperation. Researchers have documented this behavior among great apes and chimpanzees. Phenomenologically, the frequency and pitch of laughter produced in different social settings can vary widely in accordance with the emotional state of the laugher, with the difference in pitch between joyous laughter and taunting "schadenfreude" laughter at another's misfortune showing distinct differences. The social context of laughter and its neurobiological basis is central to the distinction between laughing at someone and laughing with someone.

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What inspires this paper is the attempt to understand different types of laughter, and whether or not there is a scientific, neurological way to understand different types of laughter. In the *Philebus* (Plato 1961: 48-50), Plato makes a distinction between humor and laughter. Laughter is something that "feels good, but is mixed with malice towards those being laughed at…it is hostile and irresponsible" (Morreall 2014: 121). This led to the well-known "Superiority Theory" of humor, with later variations by Hobbes and Scruton.

The Superiority Theory was criticized because of its close connection to pathos, and the possibility that a situation in which we seem to judge or feel superior to another person may cause us to weep as much as laugh. Other theories, specifically the Incongruity Theory and the Relief Theory, emerged and found support of philosophers (such as Aristotle, Beattie, Kant, Kierkegaard, and Schopenhauer). Perhaps the most interesting aspect of the Incongruity Theory and the Relief Theory is that they lend themselves to social situations, especially play and joking conversations. (Morreall 2014: 125) Playing with situations and things, and enjoying the incongruity of manipulating a situation for the sake of creating an amusing incongruity, is the foundation of many amusing and joking situations. It is also the foundation of trusting social relationships.

It is this example of play and incongruity that connects different kinds of laughter with neurological research into laughing behavior among both human and non-human primate groups. A research team headed by Diana Szameitat studied laughter among human males. They experienced laughter of different types, including joyful laughter, taunting laughter, and tickling laughter, while being scanned using a Siemens AVANTO scanner to gather full cerebrum MR magnetic resonance images. The results showed distinct differences between "tickling laughter" (understood as non-emotional laughter) and emotional laughter types that communicated more information about the social situation (joyful and taunting laughter) (Szameitat 2010: 1265-6). As the research in neurological scanning associated with different types of laughter has developed, evidence has emerged showing that there is a "Laughter Perception Network" in which distinct parts of the network show heightened activity, with strong contrasts between tickling laughter and "social information" laughter (Wildgruber 2013: 10).

The importance of laughter and humor in building and maintaining social connections has also been studied through chimpanzees. Humans as well as other primates have the ability to replicate emotional expressions and laughter of others even when they are not in the same

emotional state as others, as a way to build social bonds. A research group headed by Marina Davila-Ross studied four different groups of chimpanzees and their play and laughter behaviors. Two of the four groups had been together for a relatively brief amount of time, having been grouped together within the five years preceding the study. Two other groups were long-established colonies, having been grouped together more than 14 years before the study. Three categories of laughter were recorded and cataloged in each group: rapid laugh replications, delayed laugh replications, and spontaneous laughter. (Davila-Ross 2011: 1015)　Most chimpanzees laughed after the laughter of their playmates and were silent when their playmates were silent. This can be called congruent laugh behavior.

Chimpanzees also played together longer when laughter was replicated. Laughter can thus be understood as a means to promote cooperation and social communication, and empathy (Davila-Ross 2011: 1018). The laughter of chimpanzees follows a pattern similar to conversational laughter among humans. Furthermore, new colonies and long-established colonies of chimpanzees showed different use of laughter: the newly established colony groups with less familiar members were those that predominantly replicated the laughter of their playmates, showing that the less familiar the social partners are, the more important laughter as a means to social cohesion becomes (Davila-Ross. 2011: 1018).

Although laughter plays an important role in social situations, there is also evidence that laughter can be useful in a variety of educational settings for individuals. These include traditional educational settings, as well as examples of individuals seeking self-knowledge. Consider again the "incongruity theory" of humor, in which unexpected results are used to bring about laughter. In educational settings, these can also be used as a means to increase student engagement and memory of specific examples. For example, Kevin McCarron and Maggi Savin-Baden describe "strategies of omission" that are directly related to incongruity: they encourage teachers and academics to use more improvisation, rather than preparation, in lectures; they emphasize detachment rather than relationships of codependence between professors and students; and they ask that faculty challenge students in seminar style courses by engaging in direct Socratic questioning rather than merely being supportive (McCarron and Savin-Baden 2008, 359). This kind of practice, challenging while allowing room for humorous moments, encourages freedom of

thinking and encourages remembering new information in a way that builds on Kantian incongruity theory and free play of the imagination.

One possible example of this kind of "educational moment" comes from the film Roxanne (1987). Steve Martin wrote the screenplay based on the original play "Cyrano De Bergerac" (1897) by Edmond Rostand. In a scene in a bar, C. D. Bales, played by Steve Martin, is being made fun of for the size of his nose (as his character has been many times before.) Before he becomes the victim of a joke, he illustrates his expertise and "shows up" the individual who tried to mock and bully him, by giving twenty-five different jokes about his nose and their specific categories of humor:

1. Obvious: Excuse me. Is that your nose or did a bus park on your face.
2. Meteorological: Everybody take cover. She's going to blow.
3. Fashionable: You know, you could de-emphasize your nose if you wore something larger. Like ... Wyoming.
4. Personal: Well, here we are. Just the three of us.
5. Punctual: All right gentlemen. Your nose was on time but you were fifteen minutes late.
6. Envious: Oooo, I wish I were you. Gosh. To be able to smell your own ear.
7. Naughty: Pardon me, Sir. Some of the ladies have asked if you wouldn't mind putting that thing away.
8. Philosophical: You know. It's not the size of a nose that's important. It's what's in it that matters.
9. Humorous: Laugh and the world laughs with you. Sneeze and its goodbye Seattle.
10. Commercial: Hi, I'm Earl Schibe and I can paint that nose for $39.95.
11. Polite: Ah. Would you mind not bobbing your head. The orchestra keeps changing tempo.
12. Melodic: Everybody! "He's got the whole world in his nose."
13. Sympathetic: Oh, what happened? Did your parents lose a bet with God?
14. Complementary: You must love the little birdies to give them this to perch on.
15. Scientific: Say, does that thing there influence the tides.
16. Obscure: Oh, I'd hate to see the grindstone.

17. Inquiry: When you stop to smell the flowers, are they afraid?

18. French: Say, the pigs have refused to find any more truffles until you leave.

19. Pornographic: Finally, a man who can satisfy two women at once.

20. Religious: The Lord giveth and He just kept on giving, didn't He.

21. Disgusting: Say, who mows your nose hair.

22. Paranoid: Keep that guy away from my cocaine!

23. Aromatic: It must be wonderful to wake up in the morning and smell the coffee ... in Brazil.

24. Appreciative: Oooo, how original. Most people just have their teeth capped.

25. Dirty: Your name wouldn't be Dick, would it?

By the end of the scene, C. D. has won the respect of everyone in the bar, and has them laughing with him instead of at him. The shift between laughing at and laughing with can be understood as turning a perceived lack or weakness into a strength. He shows an ironic wisdom. Numerous interviews with comedians involve some aspect of their childhood involving being bullied or being made fun of, and then overcoming that situation by making the bully laugh first – taking the characteristic that they would have been made fun of for having, and then turning into a strength and showing their expertise on that characteristic by creating even better and funnier observations about that characteristic. In his work with the anti-bullying organization Films for Action, Andrew Butler notes that the most powerful form of responding to a bully through humor is to find jokes that can simultaneously win back respect for the person being mocked, and unify the audience into a common understanding in which the original bullying attack becomes moot (Butler 2017).

There is definitely an element of skill in learning how to do this. In the case of C. D. Bales, he has been made fun of because of his nose for his entire life, and he has developed a kind of expertise in how to categorize and classify the jokes. He has developed a deep understanding of the jokes about his nose from the droll to the witty. And more importantly, he has actually "educated" his bully – he has created a teachable moment, with humor.

The philosophers Hubert and Stuart Dreyfus (1995) describe five stages of expertise that can be applied to any task that one has to learn, especially tasks that involve multiple categories

and multiple actions over time. Their examples for each of the five stages are expressed in terms of learning to play chess and learning to drive a car, but I argue that we could apply these stages to learning how to do comedy, especially in the situation of stand-up comedy and learning to make an audience laugh.

The stages described are five levels or stages of skill development and expertise that relate directly to how the performer understands the natural performance process. In stage 1, the "novice" stage, one learns basic features of the game, the basic moves to use as discreet and separate tools. In stage 2, the "advanced beginner" stage, the performer gains experience in coping with real situations (like how to shift for different speed conditions, or when a king's side is weakened in chess). In stage 3, "competence," the performer has been able to reflect after an increased number of experiences and adopted a hierarchical or categorical view of decision making. In stage 4, "proficiency," the individual has experienced many emotion-laden situations, chosen plans in each situation. This enables the performer to call upon a wealth of vivid, emotional demonstrations of the adequacy or inadequacy of their plans, so that they can now make additional rapid connections to handle such situations - they are now able to "think on their feet". The performer can quickly notice certain plans, goals, or perspectives (instead of using detached conscious planning.) The final stage, stage 5 is "expertise". After experiencing a variety of situations that require different tactical decisions, the proficient performer seems gradually to decompose classes of situations into subclasses, each of which share the same decision or tactic. "This allows an immediate, intuitive response to each situation" (Dreyfus 1990: 5). One of my favorite stories about Steve Martin learning about himself happened during the filming of Roxanne. Because he was wearing makeup to show a large nose, as a Cyrano/C.D. character, people on the set would walk up to him and try to joke with him about the nose. Usually their jokes fell flat, he was busy working, in a bad mood, and he did not find their attempts at humor funny. Finally, someone hit on a line that impressed Steve and made him laugh because it simultaneously pointed out the nose and his sour demeanor: "Steve, why the long face?"

This brings us back to the different kinds of laughter discussed in humor studies as well as neurobiology. The origin of laughter is a perennial topic in philosophy as well as social sciences, as noted by Jessica Milner Davis (1996). The difference in brain activity between laughter associated with "laughing at" or taunting another person and "laughing with" others joyfully, has

been discussed by research groups from Tübingen in Germany to Newcastle in the United Kingdom. Using functional magnetic resonance imaging (fMRI) scans, a laughter neural network has been mapped showing that joyous and taunting laughter each produced different connectivity patterns in parts of the brain involved in sound association, thinking and visual imagery (Wildgruber 2013, Davila-Ross 2011, Szameitat 2011 and Szameitat 2010). The Wildgruber research team has documented the different effects of laughing with joy, and laughing in taunting others, developing a theory of "complex social laughter." Complex social laughter is used in a "conscious and goal-directed manner to influence and modify the attitudes and behaviors" of those around us (Wildgruber 2013: 1). Another research team at Portsmouth, led by Marina Davila-Ross, has evidence of specific types of "polite laughter" as a way to reinforce social communication and cooperation among great apes and chimpanzees (Davila-Ross 2011: 1013). Phenomenologically, the frequency and pitch of laughter produced in different social settings can vary widely in accordance with the emotional state of the laugher, with the difference in pitch between joyous laughter and taunting "schadenfreude" laughter at another's misfortune showing distinct differences (Szameitat 2011: 32 and Szameitat 2010: 1266).

In analyzing comedy using aesthetics and philosophy of mind, comedians like Martin and French have already understood what neuropsychology is now mapping: laughing at, or laughing with, the comedian is rooted in how the audience forms inferences about the comedian and their social status. Perhaps this is something that indicates a form of Socratic self-knowledge on the part of the comedians that we philosophers can embrace.

References

Blistein, Elmer M. *Comedy in Action.* Durham, N.C.: Duke UP, 1964.

Butler, Andrew. "How Comedy Can Disarm Bullies." *Films for Action*, February 20, 2017. Web. 12 Feb. 2017.

Campbell, Troy, et al. "Too Much Experience: A Desensitization Bias in Emotional Perspective Taking." *Journal of Personality and Social Psychology* 106, no. 2 (February 2014): 272-285.

Davila-Ross, Marina, et al. "Aping Expressions? Chimpanzees Produce Distinct Laugh Types When Responding to Laughter of Others." *Emotion* 11, no.5 (2011): 1013-1020.

Davis, Jessica Milner. "Taking Humour and Laughter Seriously." *Australian Journal of Comedy* 2, no. 1 (1996): 77-88.

Dreyfus, Hubert L. and Dreyfus, Stuart E. "What Is Moral Maturity? A Phenomenological Account of the Development of Ethical Expertise. In *Universalism vs. Communitarianism*, ed. David Rasmussen. Boston: MIT Press, 1990.

Dunbar, R., Jacques Launay, and Oliver Curry. "The Complexity of Jokes Is Limited by Cognitive Constraints on Mentalizing." *Human Nature* 27, no. 2 (June 2016): 130-140.

Hole, Anne. 2003. "Performing Identity: Dawn French and the Funny Fat Female Body." *Feminist Media Studies* 3, no. 3: 315-328.

Kant, Immanuel. *The Critique of Pure Reason*. Translated by J. M. D. Meiklejohn. London: Bell & Daldy, 1872.

Kant, Immanuel. *Kant's Critique of Judgment.* Translated by J. H. Bernard. 2nd ed. London: Macmillan, 1914.

Martin, Steve. 1979. *Comedy is Not Pretty*. Warner Brothers Records.

McCarron, Kevin, and Maggi Savin-Baden. "Compering and comparing: stand-up comedy and pedagogy." *Innovations in Education & Teaching International* 45, no. 4 (November 2008): 355-363.

Morreall, John. "Humor, Philosophy and Education." *Educational Philosophy & Theory* 46, no. 2 (February 2014): 120-131.

Plato. (1961). *Philebus*. In E. Hamilton and H. Cairns (eds.), *The Collected Dialogues of Plato* (pp. 1086-1150). New York: Pantheon.

Rostand, Edmond. *Cyrano de Bergerac. A Play in Five Acts*. (1897) Translated from the French by Gladys Thomas and Mary F. Guillemard. R. H. Russell, 1899.

Roxanne. Fred Schepisi, Columbia Pictures, 1987.

Sawahata, Yasuhito, et al. "Decoding Humor Experiences from Brain Activity of People Viewing Comedy Movies." *Plos ONE* 8 no. 12 (2013): 1-9.

Smith, Winifred. "Comedy and the Comic Experience." *Psychological Bulletin* 7, no. 3 (March 1910): 84-87.

Szameitat, Diana P., et al. "It Is Not Always Tickling: Distinct Cerebral Responses During Perception of Different Laughter Types." *Neuroimage* 53 (2010): 1264-1271.

Szameitat, Diana P., et al. "Formant Characteristics of Human Laughter." *Journal of Voice* 25 (2011): 32-37.

Tapley, Robin. "On Morreall: A Failure to Distinguish between Play and Humor." *Journal of Value Inquiry* 47, no. 1-2 (2013): 147-162.

Weisse, Allen B. "Humor in Medicine: Can laughter Help in Healing?" *Baylor University Medical Center Proceedings* 30, no. 3 (2017): 378-381.

Wildgruber, Dirk, et al. "Different Types of Laughter Modulate Connectivity Within Distinct Parts Of The Laughter Perception Network." *Plos ONE* 8.5 (2013): 1-15.

Wuster, Tracy. "Comedy Jokes: Steve Martin and the Limits of Stand-Up Comedy." *Studies in American Humor* 3, no.14 (2006): 23-45.