

SENATOR JEFF FLAKE PRESENTS

# TWENTY

# QUESTIONS

GOVERNMENT STUDIES THAT WILL LEAVE YOU SCRATCHING YOUR HEAD



AN OVERSIGHT REPORT  
MAY 2016

# TWENTY QUESTIONS:

## PROFILES IN FEDERALLY FUNDED SCIENCE

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## **METHODOLOGY**

Specific dollar amounts expended to support each study were not available for the projects profiled in this report. Most were conducted as parts of more extensive research funded with government grants or financial support. The costs provided, therefore, represent the total amount of the grant or grants from which the study was supported and not the precise amount spent on the individual studies. This is not intended to imply or suggest other research supported by these grants was wasteful, unnecessary or without merit.

The studies included were supported with federal assistance awarded during the last decade. Some, but not all, are still active.

## **RECOMMENDATIONS**

Greater access to publicly supported research would benefit all Americans and promote the advancement of scientific discovery and understanding as well as transparency and accountability.

## **ENHANCING TRANSPARENCY**

The National Institutes of Health and the National Science Foundation have led the way in supporting America's leadership role in the sciences as well as making information about research grants available to the public in searchable online databases. Other agencies, such as NASA and the U.S. Department of Agriculture also have searchable databases.

Every agency not currently doing so should provide the public access to unclassified research and development. For efficiency, those agencies that do not administer such a website can utilize Federal RePORTER, which provides a database of scientific awards from various federal agencies. "This database promotes transparency and engages the public, the research community, and federal agencies to describe federal science research investments and provide empirical data for science policy. Users can search across multiple fields in both the Smart Search and Advanced Search functions--including across agencies or fiscal years, by the award's project leader, or by a text search of a project's title, terms, or abstracts."<sup>25</sup>

## **IMPROVING TRACKING OF COSTS**

The lack of more precise accounting of how federal research grants are spent underscores the need for legislation or executive guidance requiring all recipients of federal R&D funding to disclose the total amount spent on each study and how those funds were spent.

## **PROVIDING ACCESS TO FINDINGS**

Despite being published in journals or presented at conferences and scientific meetings, many taxpayer funded studies remain unavailable to the public. Furthermore, the abstracts of the research grants listed in agency databases are often times vague. Including the text of findings either published in journals or presented at conferences and meetings along with the costs of the studies in the databases is essential for taxpayers to understand how federal research dollars are being spent to advance science.



# NEVER STOP QUESTIONING

ASKING A QUESTION IS THE FIRST STEP OF THE SCIENTIFIC METHOD.

From landing men on the moon to the invention of the Internet to the development of the polio vaccine, the United States has always been a leader in science. Our nation boasts great minds like Benjamin Franklin, Thomas Edison, the Wright brothers, Jonas Salk, George Washington Carver, and many others whose discoveries and inventions have dramatically changed the world for the better.

Even when Republicans and Democrats in Washington seem unable to agree on anything else, we share a commitment to the sciences. Both sides of the aisle applauded President Obama's call for "a new moonshot" mission to cure cancer and have long supported significant science spending. Just this year, the federal government will provide \$11 billion in tax incentives for research and experimentation<sup>1</sup> and spend more than \$146 billion on research and development.<sup>2</sup>

Despite this support, Dr. Francis Collins, the widely respected director of the prestigious National Institutes of Health (NIH), recently claimed "stagnant spending has 'slowed down' research on all items," specifically vaccines and treatments for diseases like Ebola. "Frankly, if we had not gone through our 10-year slide in research support, we probably would have had a vaccine in time for this that would've gone through clinical trials and would have been ready." Instead, NIH has had to "take dollars that would've gone to something else and redirect them to this," he says.<sup>3</sup>

Similarly, the National Aeronautics and Space Administration (NASA) can no longer launch astronauts into orbit around the Earth, much less to the moon. As a result, the space agency is "left with no other choice but to write a \$490 million check to our Russian counterparts so that we can get our own astronauts to the Space Station," explains former astronaut Charles F. Bolden Jr., the Administrator of the space agency. The U.S. has paid Russia \$1 billion over the past five years. "On a per-seat basis, it costs approximately \$81 million to send an American astronaut to the Space Station on the Russian Soyuz spacecraft."<sup>4</sup> Bolden laments "we are the country that kissed the moon. We're the country that's roving Mars. We're the country that continues to reach new horizons, including most recently, Pluto. We ought be able to get our own astronauts to space."<sup>5</sup>

How can the U.S. be falling behind at the same time we are spending so much to support science and research?

Asking a question is the first step of the scientific method.

Under closer examination, the answer to this particular question is, in part, a failure by Washington to set clear national priorities and goals --- and Congress is often to blame. NASA, for example, was forced to spend \$349 million on a rocket tower in Mississippi which was mothballed as soon as it was completed in 2014.<sup>6</sup> The agency continues to spend about \$700,000 a year to maintain the tower, which most likely will never be used.<sup>7</sup>

The lack of clearly set goals and objectives becomes evident when less consequential experiments are funded the expense of pressing needs that end up being shortchanged.

During the same period when we are told funding levels prevented the development of an Ebola vaccine, NIH was spending millions of dollars to determine why yawning is contagious, if drunk birds slur when they sing, and if cocaine makes honey bees dance.

Some recent National Science Foundation (NSF) projects stretch the definition of science. One rated the face of every member of the House of Representatives while another ranked the most popular emoticons used by college students in text messages. As part of another, a researcher forced a bee to sting him in 25 different locations on his body to determine where it stung the most. While briefly halted by Congress in 2014, NSF is once again spending millions of dollars a year on "political science." One such study supported by the agency made the case political science deserves equal footing with the traditional sciences, arguing "diseases and psychopathologies are critically important and potentially devastating to those afflicted, yet affect only a fraction of the population. Politics affects everyone."<sup>8</sup>

Wasting money also affects everyone.

As these and other projects profiled in this report demonstrate, we could have a much bigger bang for our buck by simply making better decisions about how science money is spent. Tens of millions of dollars are being squandered every year on trivial, unnecessary, or duplicative experiments that do not significantly advance our understanding of science in a meaningful way. With greater scrutiny, increased transparency, and better defined goals and priorities, millions of dollars could be redirected towards research offering greater promise to yield profound and transformative results.

The process for distributing federal grants is even coming under criticism from within the scientific community.

"The best science is not necessarily receiving support under the present system," concluded an analysis of the NIH peer review process posted on the agency's own website.<sup>9</sup> While this study found the process "has some ability to discriminate between the quality of proposals," overall the "findings contradict the notion that peer review can determine which applications are most likely to be productive."<sup>10</sup>

The President of Johns Hopkins University says the NIH peer review process disadvantages younger scientists and daring proposals.<sup>11</sup>

Steven McKnight, the president of the American Society for Biochemistry and Molecular Biology, says that as NIH spending has increased, the quality of awarding that funding has decreased. "There is no doubt that highly capable scientists currently participate in the grant-review process," but because "biomedical research is a huge enterprise now; it attracts" what he calls "riff-raff."<sup>12</sup>

The scientific journal *Nature* revealed the current review process is inefficient because it does not adequately prevent duplication. Nearly \$150 million may have been misspent by different agencies to fund the same or very similar projects.<sup>13</sup> In other words, we are paying twice for the exact same study. "The impact of double payment means there is less money

available to pay for other meritorious scientific research,” points out Harold “Skip” Garner of Virginia Tech, who led the analysis.<sup>14</sup>

The same concerns are being raised by the Government Accountability Office (GAO) which warns “because multiple federal agencies fund research on topics of common interest, there is potential for unnecessary duplication.”<sup>15 16</sup>

A lack of transparency also makes it impossible to account for how research money is spent or calculate the cost of specific studies conducted with federal grants.

“Line-by-line budget breakdowns of NSF awards are not public information,” agency spokeswoman Jessica Arriens told the *Daily Caller News Foundation*.<sup>17</sup> Yet audits of NSF grants have identified millions of dollars diverted to purposes other than research. The University of Washington, for example, misspent more than \$2 million of NSF funds, including \$1,179 for Snuggies, \$23,372 for a junket to Hawaii, and \$441 for pottery as part of “an educational outreach kit.”<sup>18</sup>

Nearly a third of the research equipment purchased by some EPA laboratories has not been used for years, with some valuable pieces sitting idle for more than a decade, according to a recent review by the agency’s Office of Inspector General.<sup>19</sup>

This absence of accountability coupled with a lack of clearly set priorities explains how millions of dollars are squandered on unnecessary projects and equipment. If curing cancer is a priority, then should we be diverting research dollars to lower priority experiments with no obvious benefits, like counting the number of hairs on a squirrel or the times a wet dog must shake to dry off?

Some argue these studies do not need to be pitted against other research if funding was simply increased regardless of the impact our national debt which now exceeds \$19 trillion. A spokesman for the Union of Concerned Scientists recently tweeted that “the absolute size of the national debt is neither important nor especially interesting,” arguing “it’s not useful at all to claim America is ‘insolvent’ or that it’s urgent or even necessary to ‘erase’ the national debt.”<sup>20</sup>

Scientists and everyone else should be concerned about the debt. In 2016, the federal government will spend \$255 billion on just the interest payments on the debt, according to the Congressional Budget Office.<sup>21</sup> By comparison, all federal agencies are spending less—about \$146 billion—on research and development.<sup>22</sup> This includes \$32.3 billion for all of NIH and \$7.5 billion for the NSF.<sup>23</sup> It doesn’t take a rocket scientist to figure out that as the cost of debt increases, fewer dollars are available to spend on everything else, including science.

This report highlights 20 recent studies financed from government grants totaling more than **\$35 million**. Admittedly, these expenditures consume a relatively small slice of overall science budget and do not represent the larger, more impressive body of work supported by NIH, NSF, and other agencies. Some are frivolous while others simply fall short of the merits that should be demonstrated to qualify for taxpayer support when measured against other priorities. In today’s budget climate, every dollar needs to count. The impact of not spending wisely is not just wasted money, but missed opportunities. We cannot afford either.

It is not the role of Congress to pick which studies should get funding. It is to set priorities and goals and provide the funding and oversight to ensure those are being met. And oversight requires asking questions about how those dollars are being spent.

“The important thing is not to stop questioning,” urged Albert Einstein, one of the greatest minds of all time.<sup>24</sup> That’s great advice for taxpayers.

Here are 20 simple questions that should be answered for taxpayers as part of the review of grant applications seeking federal funding:

1. WILL THIS RESEARCH ADVANCE SCIENCE IN A MEANINGFUL WAY?
2. DOES THIS PROPOSED PROJECT PROVIDE SUPPORT FOR OR DIVERT RESOURCES AWAY FROM A NATIONAL PRIORITY?
3. IS MORE IMPORTANT RESEARCH BEING SHORTCHANGED THAT COULD BE SUPPORTED WITH THE FUNDING REQUESTED FOR THIS STUDY?
4. WILL THIS RESEARCH SIGNIFICANTLY EXPAND OUR UNDERSTANDING OF THE UNIVERSE?
5. WILL THE PROPOSED STUDY ENHANCE TECHNOLOGY?
6. WILL THE FINDINGS ADVANCE MEDICINE?
7. WILL IT IMPROVE OUR NATIONAL DEFENSE?
8. WILL THE FINDINGS RESULT IN ANY APPLICATIONS IN INDUSTRY, EDUCATION OR OTHER FIELD?
9. DOES THE RESEARCH HAVE A CLEARLY DEFINED PURPOSE AND GOAL?
10. WHY IS THIS STUDY NECESSARY?
11. DOES IT DUPLICATE RESEARCH BEING SUPPORTED BY THE SAME OR ANOTHER FEDERAL AGENCY OR NON-GOVERNMENT ENTITY?
12. SHOULD IT BE FUNDED BY A SOURCE OTHER THAN THE FEDERAL GOVERNMENT?
13. DOES THE INSTITUTION REQUESTING FINANCIAL AID HAVE SUFFICIENT FUNDS TO CONDUCT THE RESEARCH WITHOUT FEDERAL SUBSIDIES?
14. HOW EXACTLY WILL THE FUNDING PROVIDED FOR THIS PROJECT BE SPENT?
15. WILL IT HELP MAKE THE U.S. MORE GLOBALLY COMPETITIVE?
16. WILL IT IMPROVE THE SCIENTIFIC LITERACY OF THE PUBLIC?
17. HOW IMPACTFUL HAS PAST WORK ON THIS SUBJECT BEEN?
18. DOES THIS NEED TO BE FUNDED AT THIS TIME?
19. WILL THE RESULTS OF THE STUDY BE RESTRICTED OR SHARED WITH THE PUBLIC?
20. DOES THIS REPRESENT THE TYPE OF TRANSFORMATIVE SCIENTIFIC RESEARCH NECESSARY TO PRESERVE AMERICA'S SCIENTIFIC EDGE?

Answering these simple questions within the context of a set of clearly understood national priorities will ensure dollars are better directed towards meeting research goals and supporting other transformative science while rooting out unnecessary spending on lower priority projects.

The United States won the space race because President Kennedy made the mission a priority and national goal. "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth. No single space project in this period will be more impressive to mankind, or more important for the long-range exploration of space." Just as the moon mission symbolizes the success of American science, the tower to nowhere stands as a monument to the drift that occurs when a bureaucracy is left without clearly defined goals.

Some, but not all of the studies looked at skeptically in this report or questioned in Wastebook and other oversight reports, are silly. The others conducted at respected institutions by impressive minds may have scientific merit but lack the overall national

significance to justify taxpayer funding, especially at the cost of more obvious and urgent priorities.

The tax dollars being spent studying bee stings and contagious yawning, for example, could be redirected towards research on mosquito bites and the spread of the Zika virus. Instead of examining Facebook addiction, greater attention could be given to drug dependence. And rather than looking at the Instagram accounts of supermodels and text messages of college students, those resources could be directed towards finding and decoding terrorists' communications.

Some of the other questions funded with tax dollars profiled in this report that will leave you scratching your head include: Why does walking with coffee cause it to spill? Why does the face of Jesus appear on toast? Are cheerleaders more attractive in a squad? And could you outrun a dinosaur?

With so many mysteries to explore in the universe, perhaps the greatest is how studies like this get funded in the first place. Each is likely to leave taxpayers scratching their heads

pondering one simple question: **WHY?**







## WHERE DOES IT HURT THE MOST TO BE STUNG BY A BEE?

Part of a \$1 million grant  
New York  
National Science Foundation

You won't *be*lieve the pain a researcher put himself through to determine where on the human body it hurts the most to be stung by a bee.

The idea was inspired by an unfortunate situation when a honeybee flew up Michael Smith's shorts and stung him. He says "I was really surprised that it didn't hurt as much as I thought it would." The experience got him thinking: Where is the most painful place on the body to get stung by a bee?<sup>26</sup>

With the financial support from a National Science Foundation (NSF) Graduate Research Fellowship grant to Cornell University, Smith conducted a series of stinging experiments on himself to find out. Cornell has received nearly \$32 million from NSF for the fellowship program since 2011.<sup>27</sup>

Over a series of months, Smith forced honey bees to sting more than 25 locations on his body from the face to the genitals. He then rated the pain caused by each of the stings on a scale of 1 to 10.<sup>28</sup> The greater the pain to a particular spot, the higher the number assigned.

Smith "self-administered" five stings a day.<sup>29</sup> To compel a bee to sting, it was "grabbed by the wings and pressed against the desired sting location. The bee was held against the sting location until the sting was first felt, and kept at the location for 5 seconds to ensure that the stinger would penetrate the skin. When the bee was pulled away, the stinger was left in the skin for 1 minute, then removed with forceps."<sup>30</sup>

"All the stings induced pain in the author. The pain rating for each location was averaged over the three rounds."<sup>31</sup> At least five minutes were to elapse between stings, "longer if pain from the previous sting persisted."<sup>32</sup>

The three least painful locations to be stung by a bee were the skull, middle toe tip, and upper arm.<sup>33</sup> The most painful places were the nostril, upper lip, and—not surprisingly—the genitals.<sup>34</sup>

Smith says bee stings down there are painful, "but if you're stung in the nose and penis, you're going to want more stings to the penis over the nose, if you're forced to choose."<sup>35</sup>

"Stings to the nostril were especially violent, immediately inducing sneezing, tears and a copious flow of mucus," according to Smith.<sup>36</sup> "By the time I got round to the third round, I thought: I really don't want to do my nose again," he says.<sup>37</sup>

“I had originally had the eye on the list, but when I talked to [my advisor Tom Seeley], he was concerned that I might go blind,” notes Smith, saying “I wanted to keep my eyes.”<sup>38</sup>

He concedes “this study is limited by its low sample size: one person, the author. It is possible that if other people were tested, they would not rank the painfulness of the stings in the same way, or perceive pain similarly by location. Although these findings cannot be generalized, they are still interesting.” He further notes “some locations only apply to male anatomy (i.e., scrotum and penis), and males are known to have differing pain thresholds compared to females.”<sup>39</sup>

To prepare for the study, “the author had received approximately 5 stings per day for three months before the experiment.”<sup>40</sup> In total, Smith estimates he was stung about 200 times during his honeybee study.<sup>41</sup>

As for the ethics of subjecting a human test subject to hundreds of bee stings, the study points out “Cornell University’s Human Research Protection Program does not have a policy regarding researcher self-experimentation, so this research was not subject to review from their offices. The methods do not conflict with the Helsinki Declaration,” which is a set of ethical principles for research involving human subjects developed by the World Medical Association. “The author was the only person stung, was aware of all associated risks therein, gave his consent.”<sup>42</sup>

It is this kind of spending that puts a bee in the bonnet of taxpayers.



## AVERAGE PAIN RATINGS

| BODY LOCATION                     |                       | PAIN RATING    |
|-----------------------------------|-----------------------|----------------|
| MEDICAL TERMINOLOGY               | LAYPERSON TERMINOLOGY | AVERAGE RATING |
| Anterior vertex                   | Skull                 | 2.3            |
| Third distal phalanges (foot)     | Middle toe tip        | 2.3            |
| Proximal humerus, dorsal aspect   | Upper arm             | 2.3            |
| Buttocks                          | Buttock               | 3.7            |
| Dorsal aspect of leg              | Calf                  | 3.7            |
| Posterior trunk, lumbar region    | Lower back            | 4.0            |
| Anterior aspect of proximal thigh | Upper thigh           | 4.7            |
| Anatomic wrist, ventral aspect    | Wrist                 | 4.7            |
| Foot, plantar surface             | Foot arch             | 5.0            |
| Distal arm, dorsal aspect         | Forearm               | 5.0            |
| Popliteal fossa                   | Back of the knee      | 5.0            |
| Posterior neck, cervical region   | Back of the neck      | 5.3            |
| Postauricular                     | Behind the ear        | 5.3            |
| Hand, dorsal aspect               | Top of the hand       | 5.3            |
| Foot, dorsal aspect               | Top of the foot       | 6.0            |
| Abdomen                           | Abdomen               | 6.7            |
| Third distal phalanges            | Middle finger tip     | 6.7            |
| Nipple                            | Nipple                | 6.7            |
| Axilla                            | Armpit                | 7.0            |
| Buccal aspect of face             | Cheek                 | 7.0            |
| Hand, anterior aspect             | Palm                  | 7.0            |
| Scrotum                           | Scrotum               | 7.0            |
| Body of penis, dorsal aspect      | Penis shaft           | 7.3            |
| Tubercle of superior lip          | Upper lip             | 8.7            |
| Anterior nares                    | Nostril               | 9.0            |



## WHY DOES WALKING WITH COFFEE CAUSE IT TO SPILL?

\$172,000

California

Department of Defense

The Defense Advanced Research Projects Agency (DARPA) boasts that it “explicitly reaches for transformational change instead of incremental advances” as part of its “singular and enduring mission: to make pivotal investments in breakthrough technologies for national security.”<sup>43</sup>

“Walking with coffee: Why does it spill?” is an example of a recent research project funded by DARPA as part of a \$172,283 grant to University of California at Santa Barbara (UCSB).<sup>44 45</sup>

The best way to avoid spilling your coffee “was probably to use a lid, and maybe fill your coffee cup a little less,” admits Rouslan Krechetnikov, who conducted the research for DARPA.<sup>46</sup>

While it is unclear how the Pentagon’s science agency would seek to defend American citizens against the threat of spilling hot coffee on themselves, it is certainly a challenge many confront every day.

“In our busy lives, almost all of us have to walk with a cup of coffee. While often we spill the drink, this familiar phenomenon has never been explored systematically,” the researchers state.<sup>47</sup>

After observing attendees at a scientific conference carefully trying to carry their beverages to avoid spilling, Krechetnikov, a mechanical engineer at UCSB, and Hans Mayer, then a graduate student, “decided to divert from weightier subjects” to get to the bottom of the issue.<sup>48</sup>

“I cannot say for sure if coffee spilling has been detrimental to scientific research to any significant extent,” says Krechetnikov. “But it can certainly be disruptive for a train of thought.”<sup>49</sup>

For the experiment, a volunteer walked at different speeds along a straight path while holding a mug filled with coffee.<sup>50</sup> The volunteer was first recorded walking and looking straight ahead and then a second time walking while focusing on the cup. An image analysis program examined the motion while a tiny sensor on the mug monitored the coffee level in the cup and recorded the instant a spill occurred.<sup>51</sup>

The authors explain “in the walking with coffee problem the motions of the human body, while seemingly regular, are quite complex and are coupled to a coffee cup and liquid therein, which makes it difficult to unravel the precise reasons behind coffee spilling.”<sup>52</sup>

“A closer look at the liquid motion in the cup suggests that not only back-and-forth but also swirling liquid motions can be excited by walking at typical speeds,” the authors write.<sup>53</sup>

The researchers found walking slower and focusing on the cup reduce the chance of spilling.

“We spill coffee either by accelerating too much for a given coffee level (fluid statics) or through more complicated dynamical phenomena due to the particular range of sizes of common coffee cups, which is dictated by the convenience of carrying them and the normal consumption of coffee by humans.”<sup>54</sup>

But focus is a key issue. “Time to spill generally depends on whether walking is in a focused or unfocused regime and increases with decreasing maximum acceleration (walking speed). The difference between the focused and unfocused regimes suggests that walking with coffee is a control problem.”<sup>55</sup>

The researchers suggest additional studies may be necessary to take into account other factors such as gender, temperature of the beverage, and the type of container. The authors write “future comparative studies may provide further insights into the variability of the discussed phenomena. For example, gender differences —gait velocity and step length are lower and step frequency is higher for women than for men—may lead to differences in coffee spilling.” Furthermore, they say “another relevant question to study is the influence of the degree of danger of the fluid in a cup, e.g., hot vs cold.”<sup>56</sup>

Changing the design of a coffee mug could reduce spilling, according to the study, but that is unlikely to occur. “Despite the variety of spill control options, the simplicity and convenience of a common coffee cup will likely continue to outweigh the side effect of coffee drinking studied here—occasional spilling,” they note.<sup>57</sup>

*Science* magazine says Krechetnikov and Mayer’s answers to avoiding a spill “may not come as a big surprise. Starting your walk slower—that is, accelerating less—will help. So will leaving a decent gap between the top of the coffee and the mug’s rim; this should be at least one-eighth of the mug’s diameter—for a normal mug, about a centimeter should do it. But the researchers’ ‘take home’ advice is to look at what you’re doing—so long as your mug isn’t filled too high, a watched mug almost guarantees a clean run.”<sup>58</sup>

“Most people will have worked out these tips for themselves,” points out Matthew Turner, a mathematician who specializes in liquid sloshing at the University of Surrey in Guildford, United Kingdom. He notes engineers already know of slosh-control techniques, but mug makers are unlikely to adopt these features. “I expect it is more cost-effective for manufacturers to just provide a lid for our coffee mugs, which some already do,” Turner says.<sup>59</sup>



*The best way to avoid spilling your coffee is to put a lid on your cup, according to a DARPA researcher.*

Physicist Andrzej Herczynski at Boston College said he “was personally a bit disappointed that the study is limited to cylindrical mugs ... leaving out the very common curved or conical cups, such as those used for cappuccinos and lattes in Italy.”<sup>60</sup>

“We just wanted to satisfy our curiosity,” says Krechetnikov. Quoting renowned 20th century scientist Linus Pauling, he says “satisfaction of one’s curiosity is one of the greatest sources of happiness in life.”<sup>61</sup>

It’s time for DARPA to wake up and smell the coffee and put a lid on unnecessary studies.





## DO REPUBLICANS AND DEMOCRATS LOOK DIFFERENT?

\$50,000  
California  
National Science Foundation

Can you tell if someone is a Republican or Democrat just by looking at them?

Apparently you can, according to an analysis of the faces of members of the U.S. House of Representatives supported by a \$50,000 National Science Foundation (NSF) grant to the University of California-Los Angeles (UCLA).<sup>62</sup>

The results revealed “female politicians with stereotypically feminine facial features are more likely to be Republican than Democrat, and the correlation increases the more conservative the lawmaker’s voting record.”<sup>63</sup>

“I suppose we could call it the ‘Michele Bachmann effect,’” said Kerri Johnson, the study’s senior author and an assistant professor of communication studies and psychology at UCLA.<sup>64</sup>

The study also “found the opposite to be true: Female politicians with less stereotypically feminine facial features were more likely to be Democrats, and the more liberal their voting record, the greater the distance the politician’s appearance strayed from stereotypical gender norms.”<sup>65</sup>

“The researchers expected to find that Republican representatives of both sexes would have more sex-typical faces than their counterparts across the aisle. The theory, however, did not hold for male politicians. In a finding that the researchers do not view as a particularly revealing, the faces of male Republicans, on average, scored as less masculine than the faces of their Democratic counterparts.”<sup>66</sup>

“We weren’t looking at hairstyle, jewelry or whether a person was wearing makeup or not,” explained lead author Colleen Carpinella. “We wanted to get an objective measure of how masculine or feminine a face is, based on a scientifically derived average for male or female appearance.”<sup>67</sup>

To do that, portraits of each member of the 111<sup>th</sup> Congress were imported into the FaceGen Modeler, a database of faces of hundreds of men and women. The program compared each representative’s face “to the norm on more than 100 subtle dimensions, including the shape of the jaw, the location of eyebrows, the placement of cheek bones, the shape of eyes, the contour of the forehead, the fullness of the lips and the distance between such features as the bottom of the nose and the top of the lip. Armed with these dimensions, the researchers were



*The National Science Foundation paid to rate the face of every member of the House of Representatives.*

able to arrive at an amalgamated score assessing the extent to which the face exhibited characteristics common to men or to women.”<sup>68</sup>

“A telling difference emerged among female politicians. The faces of Republican women rated, on average, twice as sex-typical — or feminine — as those of Democratic women.”<sup>69</sup>

The researchers say “we found that Republican women were highly feminine. Indeed, compared with all other politicians, Republican women exhibited the highest degree of sex-typicality. While this specific pattern was expected, the relative lack of masculinity among Republican men was not. We predicted that Republicans would be more sex-typical than Democrats, on average, but this was not the case.”<sup>70</sup>

“It may be unnecessary for Republican men to exhibit masculinity through their appearance,” Carpinella speculates because “their policy advocacy and leadership roles may already confer these characteristics on them.”<sup>71</sup>

To test the findings, 120 UCLA students were given course credit for looking at the faces of the members of the House of Representatives and then guessing the political party of each.<sup>72</sup> The students also rated some of the faces for femininity/masculinity.<sup>73</sup> The “politically uninformed undergraduates were able to determine the political affiliation of the representatives with an overall accuracy rate that exceeded chance.”<sup>74</sup> Furthermore, “when the undergraduates guessed that a politician was Republican, their judgments were 98 percent more likely to be accurate for women with the highest rankings for femininity; the accuracy of their judgments increased the more feminine the politician’s face.”<sup>75</sup>

Why would NSF spend tax dollars to rate the appearance of members of Congress? The researchers say they “focused on the House of Representatives because the body was large enough to yield statistically valid results and its members would not be as easily recognized by study subjects.”<sup>76</sup>

UCLA says “additional research is required to understand the roots of the GOP’s more feminine face when compared with the Democratic Party, but the researchers believe that branding plays a role.” The researchers speculate “party leadership may play a role in promoting and electing candidates who display physical characteristics that reflect party values, but research is needed to determine whether this is the case.”<sup>77</sup>

Whatever the reason, spending public research dollars on unnecessary studies like this is likely to leave Democrats and Republicans red in the face.





## DO DRUNK BIRDS SLUR WHEN THEY SING?

\$5 million

Oregon

National Institutes of Health

Like drunks at a karaoke bar, inebriated birds slur when they sing, according to research supported by National Institutes of Health (NIH).

The project examined the impact of alcohol on the speech impairment of birds was conducted by the Oregon Health & Science University with funding provided from three separate NIH grants totaling more than \$5 million.<sup>78</sup>

The birds in the study, zebra finches, were served and mixed drinks made of white grape juice and ethanol.<sup>79</sup> The cocktails had “about six percent alcohol concentration, similar to many commercial beers.”

“We just showed up in the morning and mixed a little bit of juice with 6 percent alcohol, and put it in their water bottles and put it in the cages,” explains Christopher Olson. “At first we were thinking that they wouldn’t drink on their own because, you know, a lot of animals just won’t touch the stuff. But they seem to tolerate it pretty well and be somewhat willing to consume it.”<sup>80</sup>

“Zebra finches will consume alcohol when it is provided to them, resulting in elevated blood ethanol content (BEC),” the researchers note.<sup>81</sup> “We found that when zebra finches drink alcohol, they can reach BECs comparable to those commonly seen in humans, which measurably affects their song.”<sup>82</sup>

The drinking habits developed by the birds could be considered “risky,” with one bird bordering on “binge drinking.”<sup>83</sup> A “binge,” according to NIH, “is a pattern of drinking alcohol that brings blood alcohol concentration (BAC) to 0.08 gram percent or above. For the typical adult, this pattern corresponds to consuming 5 or more drinks (male), or 4 or more drinks (female), in about 2 hours.”<sup>84</sup>

“Since the finches freely consumed the drinking solution the degree of intoxication was dependent on the drinking characteristics of each bird. Thus, alcohol consumption was not directly forced, but a fresh water alternative was not provided,” the researchers explain.<sup>85</sup>

Getting drunk “does not visibly affect” the birds’ “general behaviors, willingness or motivation to sing, or variability of vocal output,” according to the researchers.<sup>86</sup>

The songs of inebriated birds are “a bit quieter and just a little slurred, or as Olson puts it, ‘a bit less organized in their sound production’ — like a roommate calling from a bar to get a ride home.”<sup>87</sup>

**“The most pronounced effects were decreased amplitude and increased entropy, the latter likely reflecting a disruption in the birds’ ability to maintain the spectral structure of song under alcohol. Furthermore, specific syllables, which have distinct acoustic structures, were differentially influenced by alcohol, likely reflecting a diversity in the neural mechanisms required for their production. Remarkably, these effects on vocalizations occurred without overt effects on general behavioral measures, and importantly, they occurred within a range of BEC that can be considered risky for humans.”<sup>88</sup>**

**“To assess whether alcohol affects the motivation to sing,” the researchers “analyzed whether it affected the number of bouts sang, the numbers of motifs within each bout, or the number of lead notes prior to each bout during the 60 minutes of recording following the introduction of the target female to the recording chamber.”<sup>89</sup>**

**“In the presence of females, male zebra finches reliably produce female-directed song as part of their courtship behavior. Cages were set up for singing males to perch and sing towards a female, and into a microphone at the opposite end of the female’s cage. Cages were fit into acoustically isolated boxes.”<sup>90</sup>**

**“Overall, alcohol has clear effects on zebra finch song, researchers conclude.”<sup>91</sup>**

**So now that we know drunk birds slur when they sing, what do the researchers hope to explore next? Olson would like to study “whether alcohol affects not just how birds sing but how they learn new songs.”<sup>92</sup>**

**Spending more on these types of bird-brained studies sounds cuckoo to taxpayers.**





## WHY DOES THE FACE OF JESUS APPEAR ON TOAST?

\$3.5 million

China

National Institutes of Health

“Individuals often report seeing a face in the clouds, Jesus in toast, or the Virgin Mary in a tortilla,” acknowledges a published study supported by the National Institutes of Health (NIH).

From divine images on food to seeing a face on Mars, the likenesses of faces appearing on inanimate objects have been “well-documented” for centuries.<sup>93</sup> There is a Twitter account, <https://twitter.com/FacesPics>, dedicated to such appearances and a lucrative market on eBay. A pierogi with the likeness of Jesus sold for \$1,775,<sup>94</sup> while a toasted cheese sandwich with the resemblance of the Virgin Mary went for \$28,000.<sup>95</sup>

This phenomenon when a face is perceived within a pattern is known as “face pareidolia.”<sup>96</sup>

An NIH-sponsored study entitled “Seeing Jesus in toast: Neural and behavioral correlates of face pareidolia” scanned the brains of those who experience these sightings.<sup>97,98</sup> The project—funded in part from two separate NIH grants totaling nearly \$3.5 million—seeks to identify the parts of the brain activated when face pareidolia occurs.<sup>99</sup>

To do this, 20 right handed men with normal vision were shown pure-noise images that were nothing more than “random assortments of dots and blobs” while an MRI scanned their brain activity.<sup>100</sup> The subjects “were led to believe that 50 percent of them contained either faces or letters” and “reported seeing faces or letters illusorily 34 percent and 38 percent of the time, respectively.”<sup>101</sup>

The brain scans revealed “the right fusiform face area (rFFA) showed a specific response when participants ‘saw’ faces as opposed to letters in the pure-noise images.” This suggests “that the right FFA plays a specific role not only in processing of real faces but also in illusory face perception,” the authors write, and as a result “even the slightest suggestion of a face can result in the interpretation of a face.”<sup>102</sup>

“Our findings are highly consistent with those of several recent studies,” the researchers note. A similar response in the brain was detected, for example, when houses are mistaken as a face.<sup>103</sup>

They say “people can be led to see different images — such as faces or words or letters — depending on what they expect to see, which in turn activates specific parts of the brain that process such images. Seeing ‘Jesus in toast’ reflects our brain’s normal functioning and the active role that the frontal cortex plays in visual perception. Instead of the phrase ‘seeing is believing,’ the results suggest that ‘believing is seeing.’”<sup>104</sup>

Face pareidolia “isn’t due to a brain anomaly or imagination but is caused by the combined work of the frontal cortex which helps generate expectations and sends signals to the posterior visual cortex to enhance the interpretation stimuli from the outside world.”<sup>105</sup>

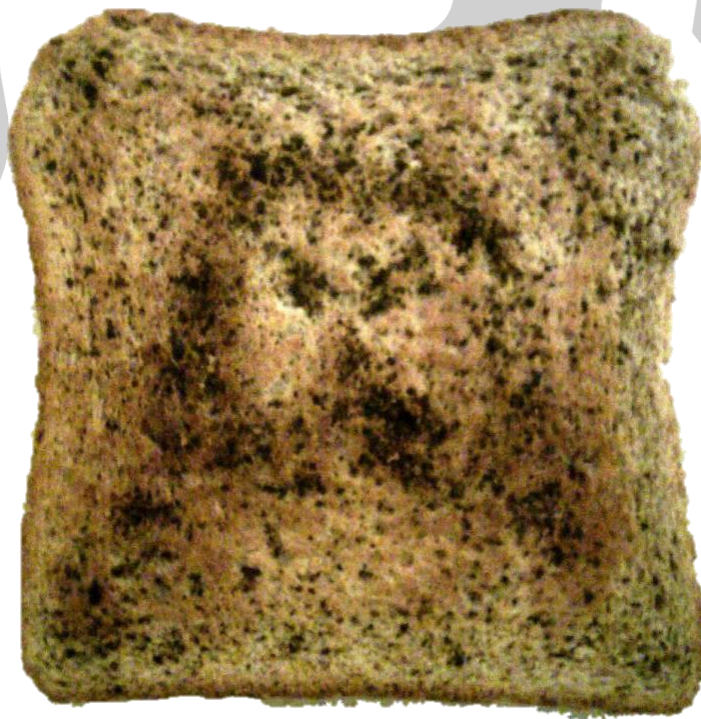
“I saw several reports in the media of people seeing Jesus, or the Virgin Mary, or Elvis. And people tended to laugh at these kinds of people,” says Kang Lee, the lead author of the study.<sup>106</sup> He confesses when he was a child, he too saw faces in his bed sheets “all the time,” jesting “if I was religious, I probably would have seen Jesus.”<sup>107</sup>

“Most people think you have to be mentally abnormal to see these types of images, so individuals reporting this phenomenon are often ridiculed,” according to Lee. “But our findings suggest that it’s common for people to see non-existent features because human brains are uniquely wired to recognize faces, so that even when there’s only a slight suggestion of facial features the brain automatically interprets it as a face.”<sup>108</sup>

Lee says “I think probably this is first time we are actually telling people: ‘This is OK for you to see Jesus on toast.’”<sup>109</sup>

“Face pareidolia suggests that our visual system is highly tuned to perceive faces, likely due to the social importance of faces and our exquisite ability to process them,” the researchers speculate.<sup>110</sup>

Regardless of such assurances, taxpayers are still likely to see little face value in this project.



*If you see the face of Jesus in a piece of toast, you may be experiencing “face pareidolia,” which is perfectly normal according to research funded by NIH.*



## ARE REPUBLICANS OR DEMOCRATS MORE DISGUSTED BY EATING WORMS?

\$855,000

Nebraska

National Science Foundation

Does the image of a man eating a mouthful of worms disgust you?

Are you startled by seeing a very large spider crawling across someone's face?

If so, you are more likely to be a Republican according to research funded with grants totaling \$855,000 from the National Science Foundation (NSF).<sup>111</sup>

“People who believe they would be bothered by a range of hypothetical disgusting situations display an increased likelihood of displaying right-of-center rather than left-of-center political orientations,” according to the political scientists who conducted the experiments.<sup>112</sup>

“Associating physiological variation with political issue preferences or political ideology may seem far-fetched,” the researchers write, but insist “we demonstrate that individuals with marked involuntary physiological responses to disgusting images, such as of a man eating a large mouthful of writhing worms, are more likely to self-identify as conservative.”<sup>113</sup>

This correlation “suggests that people’s physiological predispositions help to shape their political orientations.”<sup>114</sup>

In one study, the reactions were measured to a series of 38 pictures, ranging from a bowl of fruit to one of a screwdriver poking towards a human eye. The images included a “man in the process of eating a mouthful of writhing worms” and “a horribly emaciated but alive body.”<sup>115</sup>



Participants selected which of 12 emotions—happiness, satisfaction, surprise, anxiety, fear, disgust, grief, anger, sadness, excitement, boredom, and amusement—were evoked by each.<sup>116</sup> Electrodes measured skin conductance changes, which indicate an emotional response.<sup>117</sup>

Those who identified themselves as conservative had stronger physiological reactions to the gross pictures and registered “much more intense disgust than did liberals.”<sup>118</sup>

“This is one more piece of evidence that we, quite literally, have gut feelings about politics,” says political science professor Kevin Smith, the lead author of the study.<sup>119</sup>

Another author, John Hibbing with the University of Nebraska-Lincoln Department of Political Science, filled his mouth with worms for the photo used in project. Hibbing says the worms were “quite tasty.”<sup>[1]</sup>

Not every conservative was equally disgusted by the sight of worms crawling out of his mouth and the other images. Hibbing says the physiological response does not seem to apply to conservatives focused more on economic issues. He says “a higher than average response to disgust and threat may characterize social conservatives such as Rick Santorum but not libertarians such as Ron Paul.”<sup>120</sup>

A separate study conducted by the same group of political scientists and funded with two NSF grants totaling \$268,500, measured physical responses of those with strong political views to threatening pictures and jarring noises.<sup>121 122</sup>

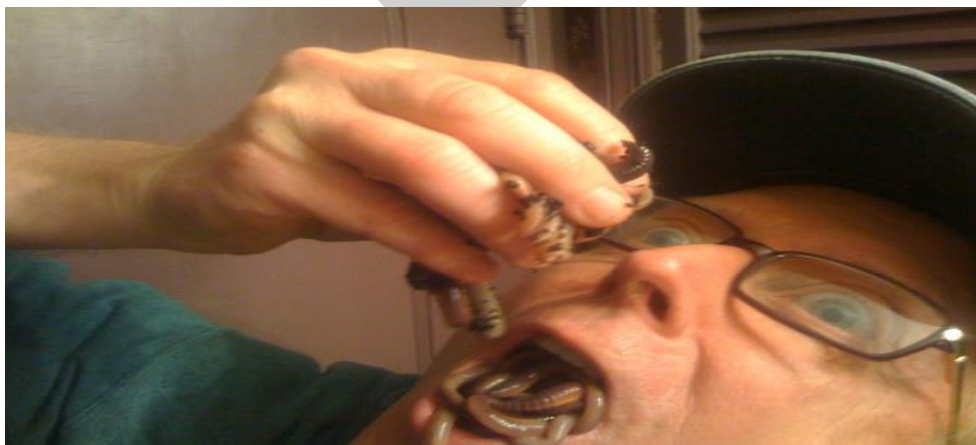
Changes in the participants’ level of skin conductance were once again measured as they were shown a sequence of images. These included a bunny, a bowl of fruit, and a happy child along with some that were more threatening, such as a very large spider on the face of a frightened person, a dazed individual with a bloody face, and an open wound with maggots in it.<sup>123</sup>

The participants’ blink responses to seven startling noises were also observed and measured as part of the study.

“Individuals with measurably lower physical sensitivities to sudden noises and threatening visual images were more likely to support foreign aid, liberal immigration policies, pacifism, and gun control, whereas individuals displaying measurably higher physiological reactions to those same stimuli were more likely to favor defense spending, capital punishment, patriotism, and the Iraq War.”<sup>124</sup>

“Though it might be tempting for liberals to use these findings to claim that there is something biologically wrong with conservatives or for conservatives to gloat that this confirms their suspicion that liberals are missing something, the truth of the matter is more complex,” says Hibbing.<sup>125</sup>

Increasing public awareness of the connection between “involuntary physiology” and politics “could in turn diminish political hostility,” the researchers claim. “After all, if political differences are traceable in part to the fact that people vary in the way they physically



*Political scientist John Hibbing puts live worms in his mouth as part of a National Science Foundation study.*

experience the world, certitude that any particular worldview is objectively correct may abate, lessening the hubris that fuels political conflict,” they conclude.<sup>126</sup>

Wasting federal research funds on projects like these, however, is likely to unite both Republicans and Democrats in disgust.



*The physical responses of a study participant to disgusting images are measured with an eye tracking device and skin conductance sensors.*



## HOW MANY SHAKES DOES IT TAKE FOR A WET DOG TO DRY OFF?

\$390,000

Georgia  
National Science Foundation

When a dog gets wet, it shakes from side to side to dry off. But how many shakes does it take for canines and other furry animals to get dry?

To find out, researchers from the Georgia Institute of Technology utilized high-speed videography and fur particle tracking to characterize the shakes of 33 wet animals, spanning 16 species and five dog breeds.<sup>127</sup> The animals included mice, a cat, an otter, a squirrel, a kangaroo, lions, tigers and bears.<sup>128</sup> X-ray cinematography was also used to observe what is happening under animals' fur when they shake.<sup>129</sup>

The project was funded with a \$390,000 grant from the National Science Foundation.<sup>130</sup>

"In this study, we investigate a mechanism used by mammals to dry quickly," the researchers write, referring to the motion as "the wet-dog shake."<sup>131</sup> The shakes "were prompted by sprinkling small animals with a spray bottle, and large animals with a hose. We found animals generally shook after the flow of water had ceased," the authors explain.<sup>132</sup>

The researchers formulated what they call the "wet-dog shake rule", an allometric relation between animal mass and shaking frequency.<sup>133</sup> The larger animals required fewer shakes to dry off whereas smaller animals needed a higher frequency of shaking.

A bear must shake from side-to-side four times per second to dry off, for example, while a mouse needs to move its body back and forth 30 times or more per second.<sup>134</sup>

A grey squirrel requires fifteen shakes, while a cat shakes about nine times and a kangaroo just five times per second.<sup>135</sup>

"The largest animals such as elephants need not shake because of a combination their large thermal mass, thickness of dermal layers and lack of hair," according to the researchers.<sup>136</sup>

Among the dogs studied, the Chihuahua shakes the most frequently to get dry, spinning about seven times a second. The poodle and Siberian husky shake about five or six times per second. The chow and the Labrador retrievers shook about five times per second to dry.<sup>137</sup>

"In this study, we demonstrated that reciprocal high-speed twisting commonly observed in dogs has a broad generality among mammals," the researchers state. Most of the animals shook on all four legs, but some rodents like rats and mice stood on their hind legs to shake.<sup>138</sup>



Dogs shake off 70 percent of the water in their fur in just four seconds.<sup>139</sup> Some “furry mammals can shake themselves 70 percent dry in just a fraction of a second.”<sup>140</sup>

The researchers “hypothesize shaking when wet is an ancient survival mechanism, dating back to the emergence of furry mammals. Many Pleistocene mammals were covered with hair. Giant beavers, similar in size to a black bear, and short-faced bears, similar in size to grizzlies, would have probably shaken similarly to their modern counterparts. Although the ability to shake probably spans generations of furry mammals, it is not a characteristic of all mammals, even of those today. The largest mammals’ thermal mass is a likely cause for its inability to shake. In addition, aquatic mammals and those covered with a hard shell, such as an armadillo, have no need to shake dry. Other animals with specialized slow lifestyles such as the giant sloths may not possess the speed to initiate a shake.”<sup>141</sup>

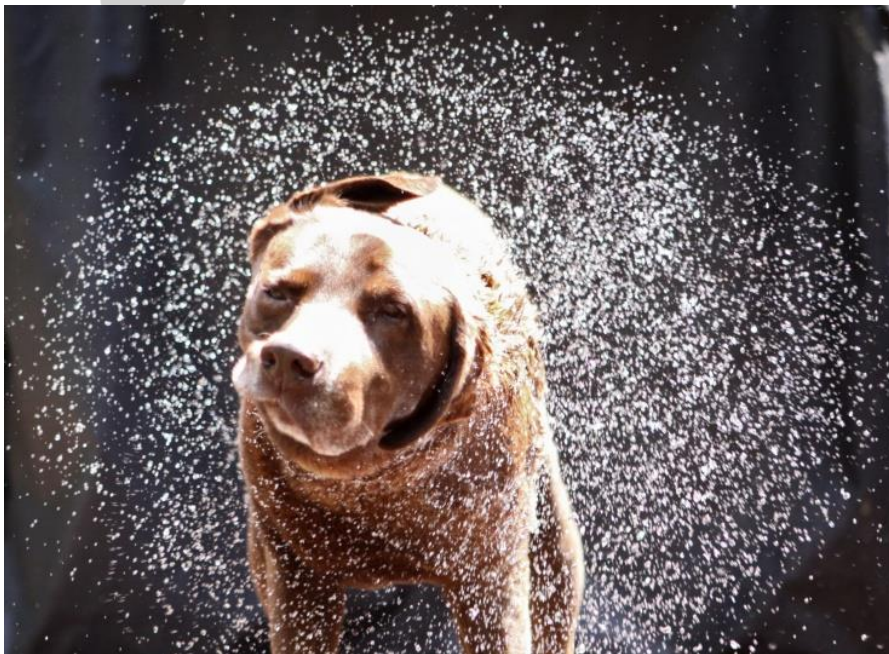
“Hairless mammals may have no shaking instinct,” the researchers write. “While filming, we observed hairless guinea pigs did not shake, but only shivered. In personal observations, some species such as the sparsely haired warthog spend their days bathing in muddy water. We expect that nearly hairless species, adapted to hot environments, have not developed the behaviour to shake when wet.”<sup>142</sup>

As part of the study, the researchers “also built a robotic wet-dog-shake simulator to further study how drops were ejected” from a shaking mammal.<sup>143</sup> White-tailed deer tanned fur was “immersed in water” for 4 hours to “ensure complete saturation” into skin and fur and then glued onto a rotating axis. The hair samples were spun for 30 seconds “on the wet-dog simulator at a radius of 2 cm at various frequencies. Between trials, samples were weighed, resaturated with water and drip-dried for 30 seconds.”<sup>144</sup>

The researchers say “understanding the physics of the wet dog shake could help engineers recreate the optimal oscillation frequency and use it to improve the efficiency of washing machines, dryers, painting devices, spin coaters and other machines.”<sup>145</sup>

“It’s surprising, but we still do not understand why washing machines work so well,” says co-author David Hu. “The equations that govern the fluid motion inside them are too complicated to solve. In this research, we decided to look to nature to ask the question: ‘How

do we dry clothes effectively and efficiently?’”<sup>146</sup>



While humans cannot shake dry because we do not have loose skin like animals, this study is likely to leave taxpayers shaking their heads regardless.

*SHAKE IT OFF: Wet Labrador retrievers shake about 4.5 times per second to dry off. A dog can shake off 70 percent of the water in its fur within four seconds.*



## ARE CHEERLEADERS MORE ATTRACTIVE IN A SQUAD?

\$1.1 million

California

National Science Foundation

In the seventh episode of the fourth season of *How I Met Your Mother*, the character Barney Stinson postulates the “cheerleader effect” is the unusual opening sentence of a federally funded study entitled “Hierarchical Encoding Makes Individuals in a Group Seem More Attractive.”<sup>147</sup>

“The Cheerleader Effect occurs when a group of women seems hot but only as a group. Just like with cheerleaders. They seem hot, but take each one of them individually” and they are not, Stinson tells his friends on the television show. “Take a good, hard look at each one of those girls,” he advises, “calling them “sled dogs.”<sup>148</sup>

Two male researchers at the University of California conducted a series of experiments to substantiate the so-called “cheerleader effect.”<sup>149</sup> It may sound like a total frat move, but the study is actually the result of research funded by a \$1.1 million grant from the National Science Foundation (NSF).<sup>150</sup>

The award abstract for the NSF grant that funded this research, while noting the published study, does not mention anything about perceived attractiveness or even cheerleaders. Instead, NSF claims “this project focuses on the formal design of semi-autonomous automotive Cyber Physical Systems.”<sup>151</sup>

“As proposed, this effect is not simply that a member of the cheerleading squad, for instance, is more attractive than a person sitting alone in the bleachers (which could be due to factors such as objective attractiveness, altered demeanor, or social signaling), but rather that any given cheerleader will seem more attractive when seen as part of the squad than in isolation,” write the authors of the study.<sup>152</sup>

“We tested this hypothesis in five experiments in which subjects rated the attractiveness of faces presented either alone or in a group with the same gender,” the researchers explain.<sup>153</sup> “In random order,



The taxpayer funded study confirms the “cheerleader effect,” postulated by Barney Stinson on the television show *How I Met Your Mother*.



*This sliding scale between “Unattractive” and “Attractive” was used to rate faces—in a group photo and alone—to confirm the “cheerleader effect,” the perceived attractiveness of a face when seen in a group.*

faces “were presented in a group photograph and in isolated portraits cropped from the group photos” or in collages.<sup>154</sup>

Over 100 undergraduate students from UCSD received partial course credit for their participation as subjects in the study.<sup>155</sup>

“For each experiment, we found 100 group photographs and cropped them to frame the faces of three people of the same gender. We then cropped each individual face to create three portrait images from each group photo. In both experiments, subjects rated the 300 unique faces twice, once in the group photo and once in an isolated portrait. Ratings were made by moving a mouse to set a marker on a continuous scale from unattractive to attractive.”<sup>156</sup>

“We found evidence of the cheerleader effect—people seem more attractive in a group than in isolation,” the researchers claim.<sup>157</sup>

“Being seen in a group confers an attractiveness benefit that’s roughly enough to bump someone from the 49th percentile to the 51st percentile of attractiveness.”<sup>158</sup>

Female faces in a group were rated “5.5 percent of a standard deviation more attractive than those same faces in isolation,” the study found. “This cheerleader effect also held (with surprising consistency in effect size) for male faces: There was an average advantage of 5.6 percent of a standard deviation for faces in a group.”<sup>159</sup>

However, “some of our results should give readers pause in accepting our interpretation,” the authors caution, but conclude “the cheerleader effect was robust: Across a wide range of settings, people in groups were rated as more attractive than the same people alone. Thus, having a few wingmen—or wingwomen—may indeed be a good dating strategy, particularly if their facial features complement, and average out, one’s unattractive idiosyncrasies.”<sup>160</sup>

“Average faces are more attractive, likely due to the averaging out of unattractive idiosyncrasies,” proposes Drew Walker, the study’s lead author. “Perhaps it’s like Tolstoy’s families: Beautiful people are all alike, but every unattractive person is unattractive in their own way.”<sup>161</sup> So the squad goals of a group of friends can be achieved simply by being seen together.

“The effect is definitely small, but some of us need all the help we can get,” jokes Edward Vul, the study’s other author.<sup>162</sup>

Let’s face it, this study is an ugly waste of tax dollars, no matter how you look at it.



## WHAT TYPE OF MUSIC DO MONKEYS AND CHIMPANZEES PREFER TO LISTEN TO?

\$1 million  
Georgia  
National Institutes of Health

Don't expect to hear Justin Bieber on the playlist of a monkey or chimpanzee.

The National Institutes of Health (NIH) has conducted numerous studies over the past decade to determine the musical preferences of non-human primates, even going so far as to have music composed specifically to suit the taste of tamarins. The studies found that most primates do not like popular Western music, with one exception – the heavy metal sounds of the rock band Metallica.

When given the option to listen to different types of music or opt for silence, chimpanzees chose Indian and African music—and even silence—over Western or Japanese music, but the monkeys went ape for the sounds composed specifically for their ears.

One of the research projects on chimps' choice of music was conducted at the Yerkes National Primate Research Center with the support of an NIH base grant, totaling about \$10 million a year, as well as the NIH fellowship program, which amounts to about \$1 million annually.<sup>163</sup>

The chimps were free to hang out in zones where they could listen to West African akan, North Indian raga, or Japanese taiko music, or no music at all. The zone in which each chimp was located was recorded. The chimps' behavior when the music was played was also videotaped and compared to their behavior with no music.<sup>164</sup> The researchers assumed the chimps' choice of location indicated a choice in musical preference.<sup>165</sup>

“When African and Indian music was played near their large outdoor enclosures, the chimps spent significantly more time in areas where they could best hear the music. When Japanese music was played, they were more likely to be found in spots where it was more difficult or impossible to hear the music.”<sup>166</sup>

The chimps' preferred types of music “had extreme ratios of strong to weak beats: The Indian music had one strong beat for every 31 weak beats, and the African music, as it is built on ostinatos, had almost all strong beats, with very few weak beats interspersed. Because of these extreme ratios of strong to weak beats, the listener does not hear an obvious pulse to the music. In contrast, the Japanese music, which was not preferred, had regular strong beats every other beat, producing a clear, percussive pulse.”<sup>167</sup>

The authors note Western music, “which primates have not shown a preference for historically, generally employs a rhythmic style similar to the Japanese music.”<sup>168</sup>

The chimpanzees “may have perceived the strong, predictable rhythmic patterns as threatening, as chimpanzee dominance displays (including those of the Yerkes chimpanzees) commonly incorporate repeated rhythmic sounds such as stomping, clapping, and banging objects.”<sup>169</sup>

Music with different rhythms was chosen for this study because previous research focused primarily on Western music. “Although Western music, such as pop, blues, and classical music, sound different to the casual listener, they all follow the same musical and acoustic patterns. Therefore, by testing only different Western music, previous research has essentially replicated itself.”<sup>170</sup>



*Tamarin monkeys are fans of the heavy metal music of the rock band Metallica.*

Like the chimps, a study of the musical preferences of tamarin monkeys also found a distaste for Western music—with one notable exception. A variety of music including Bach, Led Zeppelin and Miles Davis was played for the monkeys, but they only reacted positively to heavy metal songs by the rock band Metallica.<sup>171</sup> The monkeys did not “respond at all to Nine-Inch Nails, Tool or Samuel Barber’s ‘Adagio for Strings,’ but oddly enough, they did become slightly calmer after listening to ‘Of Wolf and Man’ by Metallica.”<sup>172</sup>

A \$2.9 million NIH grant to Charles Snowdon of the University of Wisconsin, Madison, funded the project which included composing music specifically for the ears of monkeys.<sup>173</sup>

As part of his research, Snowdon teamed up with David Teie, a cellist with the American National Symphony Orchestra, who composed music specifically for monkeys. The pitch, tone, and tempo of emotional monkey calls from fearful to soothing were used to create “rock and classical music selections with Teie’s voice and cello.”<sup>174</sup>

While the tamarins were “generally indifferent to playbacks of human music,” they had the anticipated reactions to the music composed for them.<sup>175</sup> The “fear-based track” caused the animals to become “anxious and upset, as indicated by increased activity and nervous behaviors like urination and scent marking. After hearing the calm music, the monkeys became more relaxed and social.”<sup>176</sup>

The music composed for the monkeys can be heard at <http://rsbl.royalsocietypublishing.org/content/6/1/30.figures-only>.<sup>177</sup>

While the monkeys liked the music, the sound drove the researchers bananas. Snowdon says the music “is as irritating as all get out—it’s like fingernails on a chalkboard.”<sup>178</sup>

Likewise, spending public money making music for monkeys and creating playlists for chimpanzees is not music to the ears of taxpayers.



## COULD YOU OUTRUN A DINOSAUR?

\$1.9 million

California and Utah

National Institutes of Health and National Science Foundation

Tyrannosaurus rex has a reputation as a ferocious predator that ran down its prey.

However, studies supported by three different government agencies involving alligators on treadmills and a virtual chicken the size of a dinosaur reached conflicting conclusions as to whether or not T. rex was capable of moving quickly.



So could you outrun a dinosaur?

According to one set of researchers, the answer depends largely upon how dinosaurs breathed, which is the subject of a number of studies focusing on the creatures' modern day relatives.

Lizards, for example, cannot run and breathe at the same time and must make frequent stops when running.

Alligators can run and breathe at the same time, but do not like to run. To overcome this reluctance and put them to the test, science have been training alligators to use treadmills for two decades. By studying the reptile's breathing technique and movement, the researchers hope to

gain a better understanding of the physical stamina of both alligators and dinosaurs.<sup>179</sup>

Nearly \$2 million in grants awarded by the National Science Foundation (NSF) and the National Institutes of Health (NIH) have supported such studies at the University of Utah and the University of California since 1997.<sup>180</sup>

The University of Utah is currently studying patterns of airflow and lung form in alligators with the assistance of more than \$904,000 from the NSF.<sup>181</sup> This follows previous NSF grants for similar studies at the university that totaled \$228,000.<sup>182</sup>

After several months of training, alligators walked on a treadmill at a pace of one mile per hour for three to four continuous minutes.<sup>183</sup> This is far from the terrifying swiftness dinosaurs are depicted running.

While walking on the treadmill, the alligators were fitted with masks that measure the oxygen consumed and carbon dioxide exhaled as well as “how often and how deeply the animals inhaled and exhaled.”<sup>184</sup>

The researchers discovered “alligators, unlike lizards, are able to walk and breathe at the same time by using a rocking pubic bone—part of the pelvis—to help them inhale and exhale.”<sup>185</sup>

“Along with previous findings that birds use their pelvic bones to help them breathe, the alligator studies suggest that a similar way of breathing may have given dinosaurs and prehistoric flying reptiles called pterosaurs the endurance to lead an active lifestyle.”<sup>186</sup>

But while alligators “may be capable of endurance aided by their pelvic bone structure,” they ironically choose a “less strenuous strategy of hunting.”<sup>187</sup> Alligators “don’t like to chase their victims. They would rather wait quietly, like a log beside a canal, and pounce when some unlucky animal comes along.”<sup>188</sup>

The University of California received about \$760,000 from NIH and NSF to examine the impact of exercise training on alligators with similar goals and techniques.<sup>189</sup> Vertebrate physiologist Tomasz Owerkowicz, one of the researchers, also believes observing alligators exercising could help us better understand how dinosaurs breathed.<sup>190</sup>

In this experiment, 35 juvenile female alligators were randomly assigned to three groups: run, swim, and sedentary.<sup>191</sup> The run and swim groups were exercised each Monday, Wednesday and Friday, and every other Sunday on a treadmill.<sup>192</sup> The alligators were fed “an ad libitum diet of live goldfish or ground whole chicken, 2–3 times per week.”<sup>193</sup>

To conduct the study, the researchers had to first overcome a vexing problem: When alligators “aren’t being ferocious predators they’re lazy.”<sup>194</sup> To get alligators “to walk the custom treadmill” in his lab, Owerkowicz “has to tap the base of their tails. Otherwise they’ll just lie there, and the moving belt will dump them off.”<sup>195</sup> The “reptile-fitness equipment has high walls to keep the gators from scrambling away to avoid their jog—which they take at just over half a mile per hour, for three to five minutes.”<sup>196</sup>

After 15 months of exercise training, all three groups of alligators “underwent a graded exercise test on a motorised treadmill.” The speed of the treadmill was increased every minute until the alligators were “thoroughly exhausted.”<sup>197</sup> Five minutes is the typical endurance time for alligators.<sup>198</sup>

The mouth of each of the animals was taped shut and a specially designed mask was fastened over its nostrils to measure oxygen consumption and carbon dioxide production while walking on the treadmill.<sup>199</sup>

The scientists note “it is relatively difficult for crocodylians to reach a classic stable metabolic state on a treadmill, given their lack of cooperation to locomote on a treadmill and limited ability to sustain a rigorous exercise level.”

So what has been learned about dinosaurs from two decades of studying alligators on a treadmill?

The results are paradoxical since the biological characteristics of alligators appear to be inconsistent with their behavior.<sup>200</sup> The researchers note the alligators’ locomotor and cardiac anatomy are “usually associated with high levels of sustained activity,” yet the animals “have a poor capacity for vigorous, sustained, terrestrial locomotion.”<sup>201</sup>



Despite these apparent contradictions, Colleen Farmer, who conducted some of the alligator on a treadmill studies, claims the findings do not “radically change our view of dinosaurs but it adds more evidence to idea that some dinosaurs maybe have been active animals.”<sup>202</sup> Farmer says “our hypothesis is dinosaurs were much more active and they [alligators] have reverted back to a sit-and-wait lifestyle.”<sup>203</sup>

These assumptions also run counter to the findings of another study to determine how fast dinosaurs could run funded by NSF and the Defense Advanced Research Projects Agency (DARPA) focusing on body mass rather than breather. This team examined the question by looking at alligators and another living cousin of the T.rex: the chicken.<sup>204</sup>

Researcher John Hutchinson says “we know from a lot of fossil evidence that birds actually are the descendants of dinosaurs, so we thought, we should look at one of the descendants of dinosaurs to see how it moves today. A chicken is a two-legged animal. We know how they move. We can study them in the laboratory or in the barnyard or anywhere. We can go out and buy a recently dead chicken and dissect it to understand its anatomy. So a chicken was a logical choice for many reasons in terms of limb design, evolution and anatomy.”<sup>205</sup>

Hutchinson and Mariano Garcia used a computer “model to scale up a chicken to the size of a T. rex— 13,228 pounds (6,000 kilograms)—to see if it would be able to run.” Based upon leg muscle needed to support body mass, a large dinosaur or a dinosaur sized chicken “very clearly” could not run, “no matter what,” says Hutchinson. In fact, “a giant chicken could not even walk.”<sup>206</sup> The analysis also concluded “alligators and T. rex lack the muscle mass necessary to support fast running.”<sup>207</sup>



*A computer model that scaled a chicken up to the size of a Tyrannosaurus rex concluded large dinosaurs could not run quickly. The “giant chicken” project was funded by NSF and DARPA.*



*Researchers have been training alligators to use treadmills for two decades with financial support from NSF and NIH.*

Hutchinson “recalls a high school physics teacher using a similar example to explain why Godzilla and King Kong are physical impossibilities.” He says “that really struck home to me. That was probably the first moment where I thought in [terms of] biomechanics and applied it to big things like dinosaurs.”<sup>208</sup>

But, Hutchinson notes, “we’re looking at extinct animals, which we know very little about, and we’re trying to understand their locomotion, which we have almost no evidence of directly.”<sup>209</sup>

However, a rare set of fossilized footprints reveals *Tyrannosaurus rex* “may have ambled” along at just 5 miles, meaning humans might have been able to outrun the king of the dinosaurs, reports *Science* magazine.<sup>210</sup>

The only way to know for sure may be to put a dinosaur on a treadmill. That may sound as silly as a shrimp on a treadmill, so chances are that someone somewhere at NSF is probably trying to figure out how to do it.



## WHO WILL BE AMERICA'S NEXT TOP MODEL?

\$2.9 million

Indiana

Department of Defense and National Science Foundation

While the Manhattan Project produced the nation's first super weapon, Project Runway seeks to predict America's next super model.

The Defense Advanced Research Projects Agency (DARPA) and the National Science Foundation (NSF) are both underwriting the effort which is officially entitled "Style in the Age of Instagram; Predicting Success within the Fashion Industry using Social Media."<sup>211</sup> Indiana University conducted the study with funding from a \$920,000 NSF grant<sup>212</sup> and a DARPA grant totaling nearly \$2 million.<sup>213</sup>

"Fashion is a multi-billion dollar industry with social and economic implications worldwide," the researchers point out. Models become the faces of the brands they represent, so designers seek out the most popular models.<sup>214</sup> The struggle is real for every casting director, therefore, who "is faced with a seemingly impossible task: predicting whom, out of the hundreds of new faces she may see at the go-see calls, will become the top model of the next season."<sup>215</sup>

Scientific models were designed to forecast female fashion model success based upon shapes, sizes, and social media. Statistics on 400 fashion models, including height, hip, waist, and shoe sizes were gathered along with the name of their modeling agencies from the Fashion Model Directory (FMD) website, a database of professional female fashion models.<sup>216</sup> The information was then combined with the number of followers, posts per month, "likes," and comments on each model's Instagram, a mobile image-sharing social media platform.<sup>217</sup>

The list was narrowed to 15 models labeled as "new faces." The number of runway walks in subsequent fashion shows was counted to determine the popularity of each.<sup>218</sup> "Of the eight models expected to achieve the greatest popularity, six were accurately identified. Of the seven predicted to score lowest in popularity, six were also accurately identified."<sup>219</sup>

The six most popular new models of the Fall/Winter 2015 season were Sofia Tesmenitskaya, Arina Levchenko, Renata Scheffer, Sasha Antonowskaia, Melanie Culley and Phillipa Hemphrey.<sup>220</sup>

Emilio Ferrara, one of the study's authors, says the statistical analysis developed by the researchers "is able to predict the rise to popularity of new fashion models with over 80 percent accuracy!"<sup>221</sup>

Drawing from their calculations, the researchers say "a strong social media presence may be more important than being under contract with a top agency, or than the aesthetic

standards sought after by the industry.”<sup>222</sup> They dubbed the phenomenon “the Kendall Jenner effect.”<sup>223</sup>

Some of the findings may not be quite as clear cut as the authors claim. Models with more Instagram posts did have a 15 percent higher chance of walking a runway, but the study notes “surprisingly, more likes tend to lower the chances of walking a runway” by about 10 percent.<sup>224</sup>

The other findings are far less surprising. A woman is nearly ten times more likely to walk a runway if backed by a prestigious agency.<sup>225</sup>

*New York Magazine*, which boasts following the hottest trends, disputes some of the assumptions used to determine supermodel status, pointing out “walking the most runways might make you popular, but it doesn’t necessarily make you an elite model.”<sup>226</sup> It further notes “the runway, while incredibly glamorized, isn’t necessarily essential to success as a model — Gisele, the sector’s highest-paid talent for many years running now, rarely sets foot on a runway these days, and when she does, it’s headline-making.”<sup>227</sup> Regardless, “getting paid to look at supermodels’ Instagram is indisputably not a bad gig,” exclaims *New York Magazine*.<sup>228</sup>

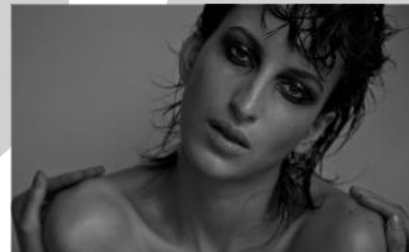
The authors themselves concede the study does have some limitations. It focuses on just Instagram and did not include other online platforms. It relies only on the number of runways walked to determine popularity while ignoring other factors such as appearances in magazines. And just a small subset of 15 fashion models is used as the basis for the final predictions.<sup>229</sup>



(a) Fashion Model 1



(b) Fashion Model 4



(c) Fashion Model 6



(d) Fashion Model 7



(e) Fashion Model 8



(f) Fashion Model 9

*Scientific models designed to forecast fashion models correctly predicted the success of these six new faces.*

The authors suggest “further research is needed,” noting “an intriguing question that follows up from it is whether Instagram and other social media are indeed changing the traditional notions of beauty.”<sup>230</sup>

Why are government agencies studying the fashion industry in the first place?

“We chose the fashion industry for this research because it represents a strong ‘winner-takes-all’ mentality,” Ferrara explains. “This aspect of survival of the fittest, plus the large

amount of statistical data on professional models, makes it a perfect subject for advancing research on ‘the science of success.’”<sup>231</sup>

While the Pentagon is patrolling the runway and keeping up with the Kardashians, taxpayers are stuck footing the bill.



kendalljenner

FOLLOW

Kendall Jenner

2,529 posts

53.8m followers

169 following



*A strong social media presence may be more important than representation by a top modeling agency or the aesthetic standards sought after by the industry, a phenomenon researchers dubbed “the Kendall Jenner effect.”*



## ARE CHIMPANZEES BETTER GAMERS THAN HUMANS?

\$340,000

Georgia

National Institutes of Health and National Science Foundation

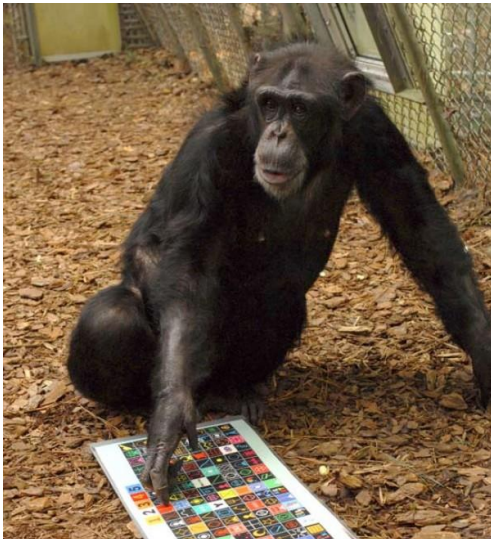
It's on like Donkey Kong!

Chimpanzees were pitted head to head with humans in a video game competition --and you will never guess who won.

The National Institutes of Health (NIH) is spending more than \$280,000 on research related to this experiment.<sup>232 233</sup>

Four adult chimps from Georgia State University and 16 humans—twelve children and four adults—were challenged to complete a video game maze.<sup>234</sup> While the chimpanzees and the kids finished the task in similar times, a female chimp named Panzee beat both the children and the adult humans on the most challenging maze.<sup>235</sup>

Panzee's amazing maze performance made a real monkey out of the competition. "Surprisingly, in the most complex maze category the humans' performance was less accurate compared to one female chimpanzee," the researchers revealed.<sup>236</sup> [Sadly, Panzee has since passed away due to complications from diabetes.<sup>237</sup>]



*In a government funded video game competition matching humans against other primates, a chimpanzee named Panzee bested the competition.*

The games require players to "search through alleys and peek around the corners of 'brick' walls, looking for the goal. Each wall had either a blue square, to let the gamer know they were on the right track, or a brown triangle to warn them away."<sup>238</sup>

Some of the human contestants even tried to cheat. When the games became more complicated, "the humans would ask me for answers, but I would tell them, 'I can't give the chimps answers,'" said one of the researchers.<sup>239</sup>

All four chimpanzees in this competition—Lana, Mercury, Panzee, and Sherman—had "extensive" experience playing video games with joysticks and gave their consent to participate in the contest.<sup>240</sup>

"Prior to testing, the chimpanzees were asked individually if they wanted to 'work.' If they agreed, they positioned themselves in front of a Plexiglas workstation

where they could see a computer monitor and reach a joystick (encased in a port hole for safety) to manipulate from their sitting position.”<sup>241</sup>

If a chimp shook its head “no,” it was allowed to “play hooky for the day. The researchers, however, were not above bribing a reluctant primate with a grape, or the universal favorite, M&Ms.”<sup>242</sup> The human adults were offered bookstore gift certificates and the kids were rewarded with pencils and stickers.<sup>243</sup>

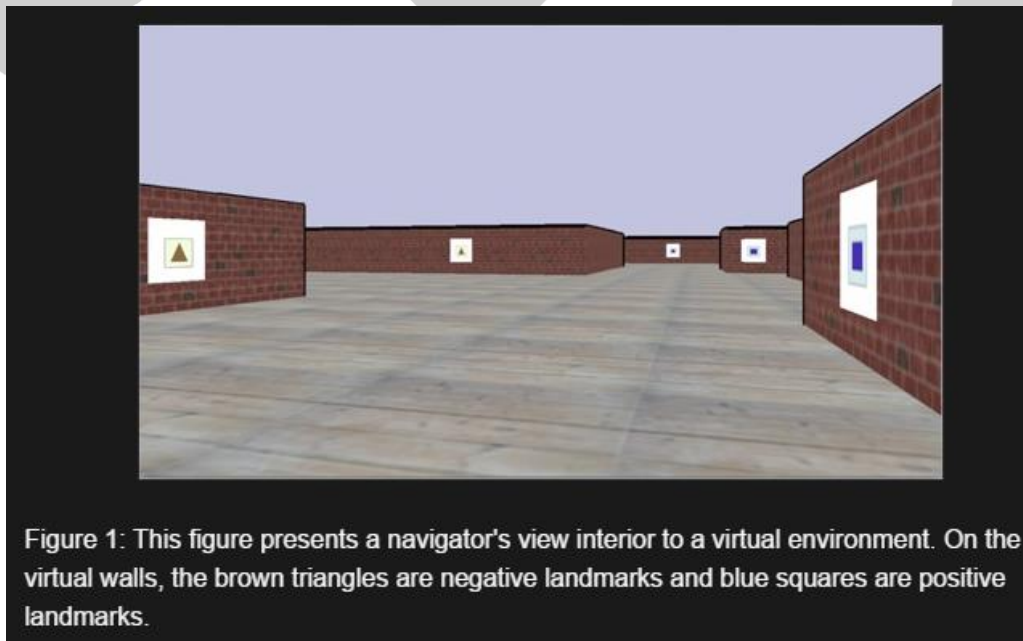
Dorothy Fragaszy, the director of the Primate Cognition and Behavior Laboratory at the University of Georgia in Athens, says in the studies she has done, female chimpanzees “do better than males” on goal-oriented maze and puzzle games.<sup>244</sup>

The video game challenges between chimps and humans and other primates have been ongoing for years, supported by grants from both NIH and the National Science Foundation (NSF).<sup>245</sup>

Another study funded by both agencies again matched chimpanzees against human children as well as two different kinds of monkey species, rhesus macaques and capuchin monkeys. The participants were presented 100 different computerized mazes to complete<sup>246</sup> by moving a cursor to reach a goal at the bottom on the screen. NIH is spending about \$80,000 on research related to this study.<sup>247</sup>

The chimpanzees performed better at the computerized maze than both species of monkeys.<sup>248</sup> Based upon their success navigating the mazes, the researchers concluded “chimpanzees are capable of some degree of planning for the future.”<sup>249</sup>

These games may be more fun than a barrel of monkeys for researchers, but they are just more of the same old monkey business from Washington that drives taxpayers totally bananas.



*A view of the monkey in a maze video game.*<sup>250</sup>



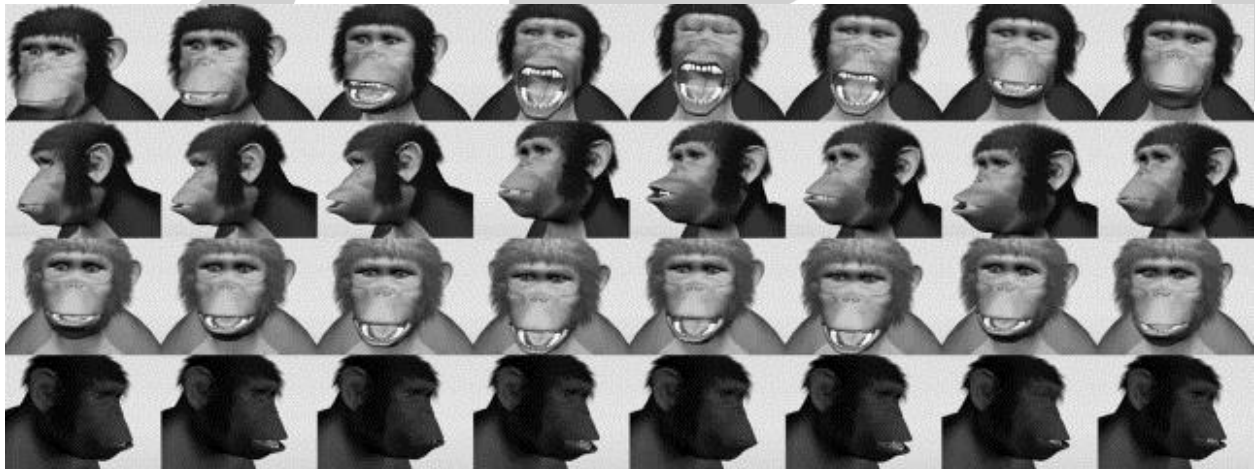
## WHY IS YAWNING CONTAGIOUS?

\$1 million  
North Carolina and Georgia  
National Institutes of Health

Seeing, hearing, reading, or even thinking about yawning causes yawning.<sup>251</sup> The National Institutes of Health (NIH) has been studying the phenomenon of contagious yawning for years.

The “most comprehensive” review of potential triggers such as empathy and tiredness found these factors “have little effect on contagious yawning.”<sup>252</sup> The study was conducted at the Duke University School of Medicine<sup>253</sup> and funded with part of a \$139,000 grant provided by NIH’s National Institute of Mental Health.<sup>254</sup>

More than two-thirds of the 328 participants in the Duke study “contagiously yawned at least once” while watching a three minute video of people yawning.<sup>255</sup> Yet the researchers could not identify any reason for the reaction.



*Chimpanzees were shown this videos of animated characters yawning to see if it triggered them to yawn as well. It did.*

Age was the only factor that might be related to contagious yawning with older study participants being less likely to yawn. “Age was the most important predictor of contagious yawning, and even age was not that important. The vast majority of variation in the contagious yawning response was just not explained,” explains study author Elizabeth Cirulli.<sup>256</sup>

The results of this study “are in contrast to previous studies, which have identified correlations between yawning susceptibility and empathic abilities, time of day, and subjective measures of intelligence,” according to the researchers.<sup>257</sup>



Empathy has long been one of the factors assumed to be associated with the reaction, but the Duke study dispels that notion. “Despite the general viewpoint that contagious yawning must be a product of empathy,” the study which had more participants than most of the previous studies did not pick up any such association, which the authors say suggests that contagious yawning is not simply a product of one’s capacity for empathy.”<sup>258</sup>

To pinpoint what parts of the brain process contagious yawning, another study supported by NIH’s Intramural Division of the National Institute of Neurological Disorders and Stroke conducted functional magnetic resonance imaging (fMRI) on human subjects as they viewed a video of yawns. While the study could not explain how or why contagious yawning occurs, the findings “suggest a role for the prefrontal cortex in the processing of contagious yawning,” according to the researchers.<sup>259</sup>

Chimpanzees also experience contagious yawning<sup>260</sup> and NIH is financing studies to understand why. The yawning chimp research is paid for by a base grant from NIH to the Yerkes National Primate Research Center’s (NPRC) Field Station<sup>261</sup> and as part of a supported fellowship program at Emory University.<sup>262</sup> The Yerkes NPRC receives about \$10 million every year from NIH for the base grant,<sup>263</sup> while Emory receives more than \$1 million annually for the fellowship program.<sup>264</sup>

Chimpanzees were shown a video of other chimps yawning and were more likely to yawn “after watching familiar chimpanzees yawn than after watching strangers yawn.”<sup>265</sup>

Another yawning chimp study came with a twist. The chimpanzees again viewed a video, but this one featured animated characters yawning. The cartoon characters even triggered contagious yawning by the chimps.<sup>266</sup>

Campbell says the computer animations used in the study “were obviously fake,” even to the chimpanzees. “I think the animations look good, but they do not look real, and I’m sure that they do not look real to the chimps either.”<sup>267</sup>

The chimps let out yawns anyway and it “was pretty dramatic, with them really stretching their jaw muscles,” describes lead author Matthew Campbell.<sup>268</sup>

“These results support the phenomenon of contagious yawning in chimpanzees,” according to the researchers, who “conclude that it was the yawns themselves, and not boredom, that produced greater yawning in response to the yawn video.”<sup>269</sup>

The findings may have implications for humans, the researchers claim. “Understanding how chimpanzees connect with animations, to both empathize and imitate, may help us to understand how humans do the same.”<sup>270</sup> The project “opens the door to future studies on animals, including humans, using animations.”<sup>271</sup>

These studies may be interesting to Washington bureaucrats and some researchers, but are more likely to elicit yawns from taxpayers.



*Tara the chimp yawns in response to viewing a video of another chimpanzee yawning.*



## IS FACEBOOK ADDICTIVE?

\$511,860

New York

National Science Foundation

Are you addicted to Facebook?

How long could you go without checking the social media site?

The National Science Foundation (NSF) is spending \$511,000 to examine “the processes and experiences of leaving” the popular online community.<sup>272</sup>

More than 5,000 individuals who accepted the challenge to stay off Facebook for 99 days, referred to as the “99 Days of Freedom,” were surveyed and Cornell University analyzed the responses.

Despite taking the pledge, many “ultimately couldn’t resist the allure of Facebook’s social network.”<sup>273</sup> The researchers tag this process of leaving and then returning to Facebook as “social media reversion.”<sup>274</sup>



*Happier people are less likely to suffer from Facebook addiction.*

Many expressed feelings of withdrawal. Others missed seeing pictures of family and friends and receiving invitations to social events.<sup>275</sup> To compound the hardship, some said their friends did not even notice they were no longer on Facebook.<sup>276</sup>

“Like I was going through withdrawal from an addiction! I had to resist the urge to check it every few minutes,” anguished one study participant.<sup>277</sup>

For another, going without Facebook was a daily struggle. “In the first 10 days, I thought about Facebook a lot. Whenever I opened up a browser, my fingers would automatically go to ‘f’. On day 9, I had a dream about accidentally logging in to Facebook—which showed that I was consciously thinking about it.”<sup>278</sup>

Others admitted lacking the willpower to stay off of the social media site.

“I was experiencing withdrawal and felt socially disconnected. The impulse [sic] to check FB was very strong, especially when I was feeling low. I caved in after about a week, and began checking FB a few times

a day for about a week. But then I decided to quit FB again, which again only last 2-3 days. For the past 4 days I have been checking FB once-twice a day, spending around 5 min per day in total.”<sup>279</sup>

Some said there was “minimal reaction from friends, in some cases that friends did not even notice” their absence from Facebook.

“They didn’t even notice that I wasn’t there. No one called or emailed to ask what was up,” lamented one. Another said “Nobody is bothered. Nobody outside fb asked me why I did I do it. On fb if anybody asked I don’t know.”<sup>280</sup>

Some study participants resorted to alternatives, “filling the time previously spent on Facebook by instead using other social media.”<sup>281</sup>

“Sadly, on other sites!,” exclaimed one study participants. “I just use other social media outlets more (instagram, pinterest, etc.),” admitted another.<sup>282</sup>

Some responses included “more reflective considerations about the role of social media.”<sup>283</sup>

“I create my own [sic] self-esteem, free and independent of ‘likeses,’” said one.<sup>284</sup>

“Freedom from social media and the obligation to keep checking and responding on useless information,” declared another.<sup>285</sup>

“Consider people for who they are and noy [not] for the mask that they wear on social network [sic],” added another respondent.<sup>286</sup>

Despite these comments, these study participants still had an “increased likelihood of reversion” to Facebook use before the end of the study period.<sup>287</sup>

Not surprisingly, those who felt addicted to Facebook were more likely to return. Those who “reported frequent use of Facebook (prior to the 99 Days pledge) predicted increased likelihood of reversion, suggesting habitual use as a key influence in reversion.”<sup>288</sup>

Those who “use Facebook largely to manage how other people think of them” were also more likely to log back on.<sup>289</sup>

Study participants who were in a good mood were less likely to revert, or return, to Facebook.

“Respondents who felt manipulated by, and perhaps who were rebelling against, Facebook were less likely to revert.”<sup>290</sup> Likewise, those who felt like their activity on the site was being monitored were also less inclined to log in.<sup>291</sup>

The four factors, therefore, that could indicate an addiction to Facebook are:

1. You believe Facebook is addictive;
2. You use Facebook to create an impression;
3. You are in a bad mood; and
4. You do not use other social media.

Eric Baumer, the study’s lead author, says “these results show just how difficult daily decisions about social media use can be” and “highlight the complexities involved in people’s ongoing decisions about how to use, or not use, social media.”<sup>292</sup>

However, the researchers concede the data used for this study “are not the result of a purposeful, designed social scientific study” and have limitations.<sup>293</sup> Therefore, they cannot conclusively declare Facebook an addiction. What the study does demonstrate is Washington’s addiction to wasting public money.

Taxpayers are likely to “unlike” the funding status of this NSF grant.

The most exciting part of our summer vacation was checking facebook for comments about our vacation photos.



your  waste cards  
wastecards.com

*Those who try to create an impression with Facebook are more likely to be addicted to the social media.*



## IS BEING LIBERAL A CHOICE OR GENETIC?

\$2.6 million

Colorado, Nebraska, and Pennsylvania

National Institutes of Health and National Science Foundation

Aristotle postulated that man is by nature a political animal. If politics are part of our biology, then should “political science” be put on equal footing for federal dollars with the traditional life sciences?

A study published with research funded by the National Science Foundation (NSF) titled “The genetics of politics: discovery, challenges, and progress” seems to make that case, arguing politics impacts the lives of far more people than any disease.<sup>294</sup>

“Diseases and psychopathologies are critically important and potentially devastating to those afflicted, yet affect only a fraction of the population. Politics affects everyone,”<sup>295</sup> the authors write, arguing there is a “natural inclination to be political” that “is ingrained in humanity.”<sup>296</sup>

Does this mean there is a liberal gene?

Like most political debates, the answer may depend upon whom you ask.

One group of social scientists who received more than \$2.2 million for studies from both NSF and the National Institutes of Health claim to be the first to identify such a gene, but with a stipulation.<sup>297 298</sup>

Social scientists believe there is an association between liberal ideology and the 7R variant of the dopamine receptor D4 gene (DRD4), but only among those who had a larger number of friendships during adolescents. “It is important to note,” the authors caution, “that the 7R allele by itself does not make a person liberal and neither does simply having a greater number of friends as a teenager. Additionally, the 7R allele does not cause an individual to have more friends, and twin studies have shown that the number of friends one names is not significantly heritable. Rather, it is the crucial interaction of two factors—the genetic predisposition of having a greater number of 7R alleles and the environmental condition of having many friends in adolescence—that is associated with being more liberal.”<sup>299</sup>

The researchers “hypothesized that people with the novelty-seeking gene variant would be more interested in learning about their friends’ points of view. As a consequence, people with this genetic predisposition who have a greater-than-average number of friends would be exposed to a wider variety of social norms and lifestyles, which might make them more liberal than average.”<sup>300</sup>

Some critics say this explanation is biased. Evan Charney, a political scientist at Duke University in Durham, “points out that conservatives sometimes embrace change, such as

proposals in the United States to alter the tax code and welfare system. He also says that he and most people in his field are liberals — an imbalance that could bias” their interpretations.<sup>301</sup>

Another group of political scientists from Pennsylvania State University and Brown University argues political views may be influenced by many genes rather than just by one single gene. “Certainly, there is not a gene for liberalism or any political trait. Rather, whatever genetic influences exist probably operate through those emotional, cognitive, or rational processes that are instigated when individuals are asked particular questions about their attitudes.”<sup>302</sup> There could be thousands of genetic markers that influence political traits.<sup>303</sup>

The authors of this study which received \$325,000 from NSF<sup>304</sup> write “historically, the life sciences have overlooked this connection and ignored politics, focusing instead on improving human health.”<sup>305</sup>

NSF is now diverting funds into the field, spending at least \$680,000 over the past decade to support political scientists’ efforts to link politics and biology.<sup>306</sup>

This includes more than \$150,000 for training workshops on politics and genetics to “open doors to funding” and “help dispel the notion” held by geneticists “that social science is anti-science.”<sup>307</sup> The “travel, lodging, and tuition” for political science professors and their assistants to these meetings is included in this cost.<sup>308</sup>

NSF also awarded \$127,000 to examine the “political orientations and behaviors of twins in the United States.”<sup>309</sup> While the principal investigator John Hibbing cautions “it is not logical that genetics directly relates to highly specific political issues such as tax codes and school prayer,”<sup>310</sup> the study did find identical twins are more likely than fraternal twins to share political beliefs.<sup>311</sup> Kevin Smith, the co-author of the study, emphatically states “the data from the twin studies is strong enough now that if you don’t believe political attitudes and behaviors are genetically inherited, you can’t believe that breast cancer is genetically inherited and you can’t believe that addictions are genetically inherited.”<sup>312</sup>

Yet biologists and even other political scientists are not convinced.

“I’m very sceptical [sic] about estimating heritability from twin studies,” says Laura Stoker, a political scientist at the University of California, Berkeley. “The entire framework is built with a tonne [sic] of assumptions.”<sup>313</sup>

The studies linking genes to politics have been largely published in political science journals rather than scientific journals, notes Jeremy Freese, a sociologist at Northwestern University in Illinois.<sup>314</sup>

A commentary published in the journal *Nature* points out “the twin studies were far from definitive, in large part because such research cannot completely control for environmental factors. Compared with fraternal twins, genetically identical twins are more likely to have the same friends and to maintain regular contact as adults. Furthermore, parents, friends and teachers often treat identical twins more equally than fraternal twins. All of that makes it hard to unpack how much genes and environment each contribute to the shared political attitudes of identical twins.”<sup>315</sup>

A study authored by Jon Beckwith, a Microbiology and Molecular Genetics professor at Harvard Medical School, finds “the empirical evidence used in support of the underlying premise of these twin studies is weak, far less certain than AFH [John Alford, Carolyn Funk, and John Hibbing] would have readers believe. In fact, many of the studies cited as supporting the validity of the twin method include data that violate predictions of the EEA [equal environments

assumption]. As a result, the conclusions drawn on the basis of classical twin studies, as those presented by AFH, are of dubious scientific value.”<sup>316</sup>

Political scientists will continue to debate if genes influence politics, but should taxpayers fund their deliberations at the expense of other research holding real promise of unlocking cures for genetic conditions afflicting millions? This question, in fact, is the very essence of politics which political scientist Harold Lasswell defined as who gets what and how.



*Political scientists claim to have identified a gene that predisposes some to be politically liberal, but only if they had a lot of friends as teenagers.*



## WHAT ARE THE MOST POPULAR EMOTICONS USED BY COLLEGE STUDENTS IN TEXT MESSAGES?

\$569,000

Texas

National Science Foundation

You won't be LOL'ing when you see how your tax \$\$\$ R being spent studying college students' use of emoticons in text MSGs.

Everybody uses emoticons in text messages from time to time. Women use them more often but men use a wider variety, according to research conducted by Rice University.<sup>317</sup> The study was funded in part by a \$569,000 grant from the National Science Foundation (NSF).<sup>318</sup>

Emoticons are graphic representations of facial expressions made with punctuation marks and letters in an electronic message to convey a person's mood. For example, the emoticon for happy is :) . Sad looks like :( . Frustrated is represented as :/. And thinking about money is \$\_\$. .

The study looked at 124,000 text messages, or short messaging service (SMS), sent and received by 21 college students over six months.<sup>319</sup> Eleven subjects were male and 10 were female.<sup>320</sup> The participants were given free iPhones to use but did not know what researchers were investigating.<sup>321</sup> Because one study subject sent and received so many text messages, he was removed from the researchers' final analysis, which means the conclusions of the study were based upon the text messaging habits of just 20 students.<sup>322</sup>

While 100 percent of the study participants sent text messages containing emoticons, the symbols were not used very frequently.<sup>323</sup> Just four percent of the texts included an emoticon.<sup>324</sup>

Of the messages containing emoticons, 96 percent included a single emoticon while three percent contained two. Just one percent of all messages contained three or more, with the maximum number of emoticons in a single message being nine.<sup>325</sup>

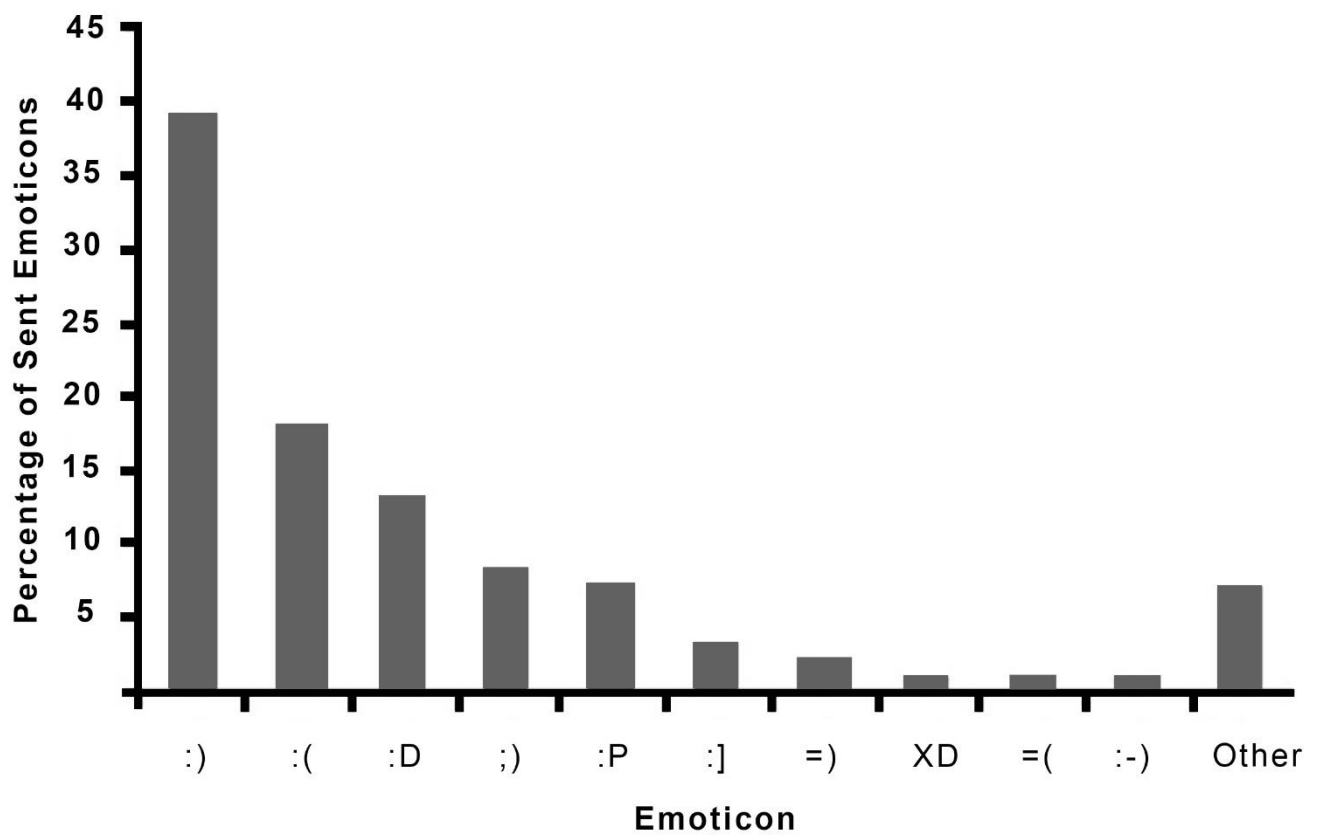
In total, 74 different emoticons were used by the participants in the study. The three most frequently used emoticons made up 70 percent of the total sent.

The most popular emoticon is the smiley face :) .

The runner up is the unhappy face :( followed by the really happy face that uses a capital D to make a bigger smile :D.<sup>326</sup>

Winking and sticking out tongue are the fourth and fifth most frequently used.<sup>327</sup>





Percentage of sent emoticons by the type of emoticon

The goal of the study is “to understand how emoticons are used in text messaging and, in particular, how genders differed in the frequency and variety of emoticons used via this medium.”<sup>328</sup>

“Surprisingly, males used a wider vocabulary of emoticons in their messages. Males appeared to use emoticons for a wider range of emotions via the SMS medium.”<sup>329</sup>

Women, however, are “twice as likely as men to use emoticons in text messages.”<sup>330</sup> But “females used a more narrow set of emoticons very frequently. Of course, the smaller set of emoticons used by females could be sent for a wider variety of purposes,” the study authors note.<sup>331</sup>

“Females had a higher emoticon-to-word ratio compared to males,” which the researchers say “confirms previous research that women are more emotionally expressive in nonverbal communication.”<sup>332</sup>

“We believe that our study represents the first naturalistic and longitudinal study that collects real emoticon use from text messages ‘in the wild,’” says Philip Kortum, one of the study authors.<sup>333</sup>

Kortum believes “this study and others like it may be used to design better smartphones.” He says “it might be advantageous to build the top one or two emoticons into a keyboard. If the device knew that I was in text message mode, it might provide me with two more keys, the top two emoticons used, so that I could include those into my messages in the least painful way.”<sup>334</sup>

Of course, for many years now smartphones *have* already included more detailed pictures known as emojis on keyboards to express emotions and just about any other thought.

In fact, emojis have largely replaced emoticons.

“In addition to better phones, Kortum wants to learn more about how humans communicate emotionally in the digital age.”<sup>335</sup>

“Our data cannot be used to understand the intent behind the messages or the meanings of the interpretation; however, this seems like one fruitful area for future research,” the authors proposes.<sup>336</sup>

None of these topics are mentioned in the description of the study provided in the NSF’s public database. The abstract, entitled “Understanding and Optimizing Wireless Mobile Computing for Underserved Urban Communities,” instead claims “the intent of this research is to develop a wireless mobile computing paradigm consisting of cost-effective wireless broadband network, mobile phones, and relevant applications for underserved urban communities.”<sup>337</sup>

The use of emoticons is noticeably absent. That is not surprising since spending federal research dollars to examine the use of emoticons by college students is likely to make taxpayers very >: ( .



## WHICH HAS MORE HAIRS, A SQUIRREL OR A BUMBLE BEE?

\$753,000

Georgia  
National Science Foundation

A grey squirrel has just over three million hairs.<sup>338</sup>

Despite their size difference, honey bees are just as hairy.<sup>339</sup>

Butterflies and moths may be the hairiest creatures on Earth. Each is covered in about 100 billion hairs! That is ten times more hair than a beaver.<sup>340</sup>

Humans, by comparison, have 100,000 hairs on the top of our heads.<sup>341</sup>

The hairs on these and other mammals and insects were counted by researchers at the Georgia Institute of Technology, with funds for the project provided from two separate National Science Foundation grants totaling \$753,000.<sup>342</sup>

The scientists originally planned to study “the function of the hairs between the eyes of insects,” but “found that no one had quantified how much hair insects actually have, and how it compares with mammals.”<sup>343</sup>

“The first result we stumbled on is that these animals, especially insects, have a lot of hair,” says Guillermo Amador, the study’s principal researcher.<sup>344</sup>

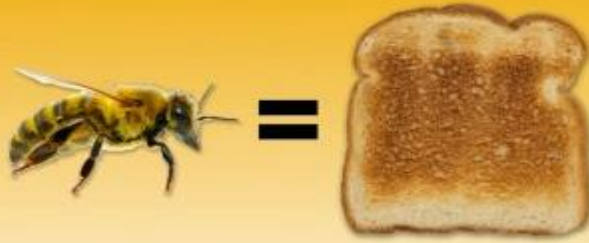
“We looked at microscope images to count the number and sizes of hairs across hundreds of animals,” the authors write.<sup>345</sup>

The more hairs an animal or insect has, the more surface area it must keep clean. The researchers “combed through” dozens of studies and “did surface measurements for 27 mammals and insects to better understand how animals are able to clean themselves.”<sup>346</sup>

A creature’s true surface area can be 100 times greater than its skin surface area.<sup>347</sup> “A honeybee’s true surface area is the size of a piece of toast,” says David Hu, a Georgia Tech associate professor who co-led the study.<sup>348</sup> “A cat has a surface area of a ping-pong table. (This explains why its so hard to get pets clean.) A chinchilla has the surface area of an SUV. And a sea otter has the surface area of a hockey rink.”<sup>349</sup>

The authors note “cleaning an animal is not as simple as wiping a tabletop.”<sup>350</sup>

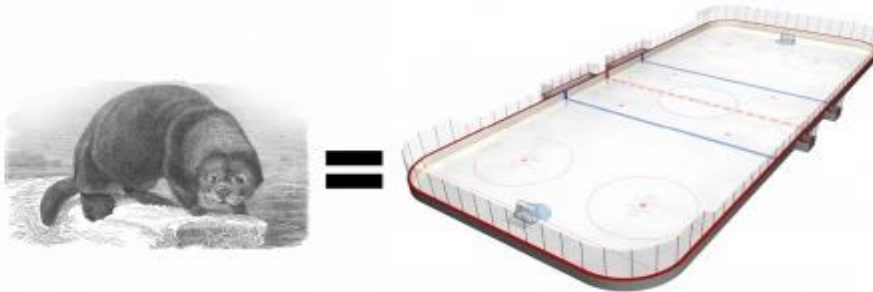
# Surface Area Comparisons



The total surface area of a **honey bee** is about equal to that of a slice of **toast**.



The total surface area of a **chinchilla** is about equal to that of an **SUV**.



The total surface area of a **sea otter** is about equal to that of a typical **hockey rink**.

## Hairs Compared to Geographic Population



300 million hairs



Approximately 300 million people

The number of hairs on a **beaver** is approximately the same as the **population of the USA**.

*Georgia Institute of Technology researchers counted the hairs on hundreds of animals and insects and then calculated the true surface area of each.<sup>351</sup>*

Animals and insects get clean in a variety of ways, including brushing, licking, flicking, fluttering, shaking, spinning, and secreting fluids. Wet dogs spin at high speeds “like a washing machine in its spin cycle.”<sup>352</sup> Bees “use bristled appendages to brush pollen off their eyes and bodies. Fruit flies use hairs on their head and thorax to catapult dust off of them at accelerations of up to 500 times Earth’s gravity.”<sup>353</sup> Most insects have hairy legs resembling feather dusters they use to clean themselves.<sup>354</sup>

Others “don’t do anything extra to stay clean. It just happens,” notes Amador.<sup>355</sup> Hair can even help animals stay clean.<sup>356</sup> “Eyelashes, for example, protect mammals by minimizing airflow and funneling particles away from eyes. Cicadas have sharp points on their wings that act as pincushions, essentially popping airborne bacteria like water balloons.”<sup>357</sup>

The findings may have future use for designing self-cleaning technology, the researchers suggest. “How animals get clean is an interplay between the surface of animal, its behaviors, and the energy of its environment. An animal gets clean for free if it has the right kind of surface. If we have this mindset, perhaps we can design new devices that get clean for free too.”<sup>358</sup> For example, “the eyes of robots could be rimmed with eyelashes to reduce deposition.” They note “we typically envision future robots covered in smooth shiny surfaces, like a chrome-buffed automobile. But in nature, smooth surfaces are hardly the norm.” Robots, therefore, “may be covered with hairs that sense their environments, suspend particles and enable easy cleaning.” Indeed, the future may be looking rather hairy.<sup>359</sup>



*A squirrel has three million hairs.*

The researchers, whose NSF funding continues through 2018,<sup>360</sup> say more questions remain, such as “how often should an animal clean itself” and how other animals such as birds and fish keep clean.<sup>361</sup>

It is this type of hair-raising spending that has taxpayers pulling their hair out.



## HOW LONG DOES IT TAKE TO PEE LIKE A RACE HORSE?

\$331,000

Georgia

National Science Foundation

When someone says they have to pee like a race horse, they usually mean they have a very full bladder. So how long does it actually take for a race horse to relieve itself?

A team lead from the Georgia Institute of Technology clocked it at approximately 27 seconds.<sup>362</sup>

The study, funded as part of a \$331,000 grant from the National Science Foundation,<sup>363</sup> timed how long it took more than 30 animals to empty their bladders and captured the urine to measure how much each animal's bladder held.

The researchers took a trip to the zoo and with high-speed videography filmed 16 animals urinating.

"While timing each pee session was easy, measuring the flow rate was hard, because they had to collect the urine. That's no easy task," notes David Hu, one of the study's co-authors. "First off, it's hard to catch an animal in the act. Second, you have to catch all the urine in order to get an accurate measurement of how much liquid is coming out per second. And you have to do it by hand. It was unavoidable: The high-speed camera was occasionally splattered by urine."<sup>364</sup>

"Figuring out how to collect the urine at all was a conundrum in itself," Hu says. "We ended up cutting sections of soda bottles, because it has to be something you can hold by hand, and just at a second's notice go on your hands and knees and hold it in the right position," explains Hu. "Everything else we tried failed. We tried pans— they don't like pans, they think it's weird. We tried pads— they don't like pads, they think it's weird."<sup>365</sup>

Additionally, 28 videos of animals peeing posted on YouTube were viewed and analyzed.<sup>366</sup>

The results revealed what the researchers dub the "Law of Urination," which states duration of urination does not change with body size with most animals emptying their bladders in about 21 seconds (give or take 13 seconds).<sup>367</sup> For example, the bladder of an elephant is 3,600 times larger than a cat's (18 liters vs. 5 milliliters), yet it takes the same amount of time for both animals to empty it—about 18 seconds.<sup>368369</sup>

"This feat is possible," the researchers explain, "because larger animals have longer urethras and thus, higher gravitational force and higher flow speed."<sup>370</sup> As a result, "greater pressures lead to higher flow rates, enabling the substantial bladders of larger animals to be emptied in the same duration as those of their much smaller counterparts."<sup>371</sup>

Table S1. Duration of urination.

| Animal              | Sex | Mass (kg) | Duration (s) | Source                                    |
|---------------------|-----|-----------|--------------|---|
| Mouse (N=5)         | F   | 0.03      | 1.50         | Experiment at Georgia Tech                |
| Bat                 | F   | 0.03      | 0.32         | K. Breuer and S. Swartz, Brown University |
| Rat (N=5)           | F   | 0.20      | 0.10         | Experiment at Georgia Tech                |
| Applehead Chihuahua | M   | 3         | 4            | Experiment at local park                  |
| Cat                 | F   | 5         | 18           | Youtube, Mattern (2000)                   |
| Goat                | F   | 18        | 8            | Experiment at Zoo Atlanta                 |
| Goat                | M   | 67.8      | 9            | Experiment at Zoo Atlanta                 |
| Great Dane          | M   | 71        | 24           | Youtube, Wilcox (1997)                    |
| Great Dane          | M   | 71        | 17           | Youtube, Wilcox (1997)                    |
| Great Dane          | M   | 71        | 17           | Youtube, Wilcox (1997)                    |
| Jaguar              | F   | 76        | 15           | Youtube, Wilson (2001)                    |
| Gorilla             | F   | 100       | 20           | Youtube, Miller (1997)                    |
| Panda               | F   | 125       | 11           | Youtube, Brown (1996)                     |
| Donkey              | M   | 140       | 8            | Youtube, Starkey (1992)                   |
| Lion                | M   | 200       | 36           | Youtube, Nowak (1999)                     |
| Tapir               | F   | 318       | 9            | Youtube, Lynette (2013)                   |
| Tapir               | M   | 318       | 59           | Youtube, Lynette (2013)                   |
| Elk                 | M   | 331       | 46           | Youtube, Linnaeus (1758)                  |
| Zebra               | M   | 430       | 8            | Youtube, Kingdon (1988)                   |
| White horse         | F   | 470       | 10           | Youtube, Marvin (1992)                    |
| Horse               | M   | 470       | 17           | Youtube, Marvin (1992)                    |
| Race Horse          | M   | 600       | 27           | Youtube, Marvin (1992)                    |
| Horse               | M   | 850       | 19           | Youtube, Bonglianni (1988)                |
| Bison               | M   | 907       | 20           | Youtube, Potts (1997)                     |
| Indian Rhinoceros   | M   | 2150      | 20           | Youtube, Toon (2002)                      |
| Rhino               | F   | 2200      | 49           | Youtube, Toon (2002)                      |
| Rhino               | F   | 2200      | 12           | Youtube, Toon (2002)                      |
| Rhino               | M   | 2200      | 17           | Youtube, Toon (2002)                      |
| Elephant            | F   | 3538      | 28           | Experiment at Zoo Atlanta                 |
| Elephant            | F   | 5000      | 17           | Youtube, Shoshani (1982)                  |
| Elephant            | F   | 5000      | 17           | Youtube, Shoshani (1982)                  |
| Elephant            | F   | 5000      | 15           | Youtube, Shoshani (1982)                  |
| Elephant            | M   | 8000      | 35           | Youtube, Shoshani (1982)                  |
| Elephant            | M   | 8000      | 29           | Youtube, Shoshani (1982)                  |
| Elephant            | M   | 8000      | 22           | Youtube, Shoshani (1982)                  |

Dogs, elephants, and other larger animals produce jets and sheets of urine. An elephant “urinates four meters per second, or the same volume per second as five showerheads,”<sup>372</sup> releasing enough urine to fill a kitchen garbage can.<sup>373</sup>

Smaller creatures, such as “rodents, bats, and juveniles of many mammalian species, cannot generate jets” and “urinate using a series of drops”<sup>374</sup> that look like little “gumballs.”<sup>375</sup>

Nearly all of the animals weighing over six pounds required a similar amount of time to relieve themselves.<sup>376</sup> A gorilla goes for about 20 seconds, the same amount of time as a rhinoceros and a bison.<sup>377</sup>

The smallest animals were the exception to the rule. Rats took the least amount of time, less than a second, while the tapir took the longest, almost a full minute.<sup>378</sup>

Mammals urinate five or six times per day. Because the time to urinate once is 21 seconds, the total daily urination time is two minutes, the researchers estimate.<sup>379</sup>

The findings “may be useful for the design of drainage systems that have different sizes but need to empty at equal rates,” according to the researchers,<sup>380</sup> but most Americans probably think it’s just another example of the government sending tax dollars down the toilet.



*Researchers observing a goat urinating, which takes between 8 and 9 seconds.*<sup>381</sup>





## WHAT MAKES GOLDFISH FEEL SEXY?

\$3.9 Million

Maine

National Science Foundation and National Institutes of Health



*What makes goldfish feel sexy?*

“What makes goldfish feel sexy?,” ponder researchers at Bowdoin College of Maine.<sup>382</sup>

The National Science Foundation provided a \$340,400 grant to find out by studying the courtship behavior of goldfish.<sup>383</sup> The National Institutes of Health also supported the study with backing from two grants totaling more than \$3.6 million<sup>384</sup>

Goldfish “are a highly social species that congregate in mixed-sex groups.” The researchers “demonstrated that goldfish can make sexual discriminations using only visual cues, although males and females do not obviously differ in appearance to the

human eye.”<sup>385</sup> In other words, a male goldfish knows if another goldfish is male or female even if you don’t.

The male goldfish in the study serving as test subjects were fitted with a white, pointed cap. “Not a fashion statement, the cap is essential to Richmond Thompson’s research into brain chemicals and social behavior. With a nod to a Clint Eastwood western, Thompson, assistant professor of psychology and neuroscience, began his tale of ‘The Good the Bad and the Sexy: How Brain Chemistry Affects Social Judgments.’”<sup>386</sup>

Lab technician James Walton “developed a method of surgically attaching the cap to the fish. The cap is attached to a tube that goes directly into its brain, so that Thompson and Walton can apply different peptides to the brain and observe the results.”<sup>387</sup>

The male goldfish was then injected with two sex steroids, testosterone and estradiol, and then put into the middle of a tank separated into three divisions—one holding another male the other with a female in the other.<sup>388</sup>

“Clear Plexiglas partitions between the chambers allowed animals to see each other but prevented chemical exchange between chambers.”<sup>389</sup> The fish could, however, still “interact socially across a Plexiglas barrier.”<sup>390</sup>

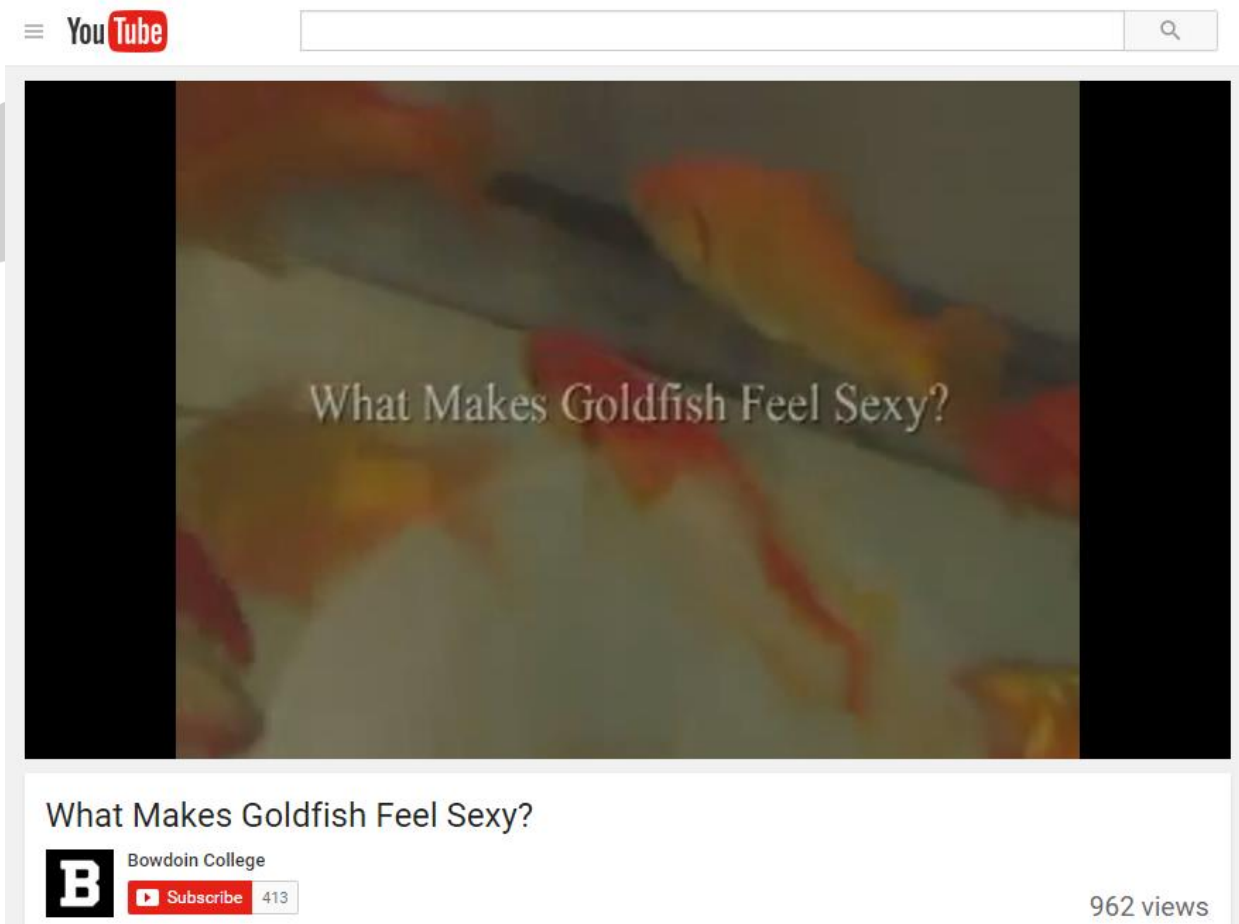
Black and white video cameras recorded the “social approach” of the subject fish to the other fish.<sup>391</sup>

The findings: When infused with steroids, the male goldfish spent more time swimming close to the female. He spent less time by the female when no steroids were administered.<sup>392</sup>

“We see changes in sexual behavior within 10 to 20 minutes,” notes Thompson. “We’re trying to figure out how that happens in the brain so quickly. They use visual cues to make sexual decisions and steroids seems [sic] to be affecting this process.”<sup>393</sup>

There is another factor to consider with injecting chemicals into a fish’s brain, Thompson points out. “Are we just whacking the fish out?” he asks.<sup>394</sup>

Spending taxpayer money to study the impact of hormones on the courtship of goldfish smells a little fishy.



YouTube

What Makes Goldfish Feel Sexy?

Bowdoin College

Subscribe 413

962 views

*Well hello hello there beautiful...*

*After being injected with two sex steroids, male goldfish spent more time swimming close to the female water tank*



## DOES COCAINE MAKE HONEY BEES DANCE?

\$243,000

Australia

National Institutes of Health

Honey bees in Australia are flying high, dancing under the influence of cocaine.

Gene Robinson, a researcher at the University of Illinois at Urbana–Champaign, received more than \$242,600 from the National Institutes of Health to examine the impact of cocaine on the dancing behavior of bees.<sup>395</sup> Robinson teamed up with Andrew Barron from Macquarie University in Australia and others to conduct studies at The Australian National University Research School of Biological Sciences, Canberra.<sup>396</sup>

Cocaine did increase bee dancing. The bees under the influence “were about twice as likely to dance” and circled “about 25 percent faster.”<sup>397</sup>

The bees, however, “only danced when in the appropriate social environment of the dance floor” when interacting socially within the hive.

“It’s not like they’re gyrating wildly on the dance floor out of control,” Robinson notes.<sup>398</sup>

“Foragers treated with cocaine but held in small vials isolated from the hive never performed any movements resembling dances.”<sup>399</sup> This indicates “cocaine stimulates dancing only in the appropriate social context of a forager returning resources to the colony.”<sup>400</sup>

“Cocaine increased the likelihood of an individual bee dancing, but did not make bees dance every time, demonstrating that cocaine did not simply release dance behaviour in every treated bee.”<sup>401</sup>

Unlike the hokey pokey, the YMCA, the macarena, the electric slide, or the nae nae, the honey bee dance known as the waggle is an “incredibly complex set of activities,” Robinson explains. “It’s a very integrated communication system, very elaborate and very elegant, one of the seven wonders of the animal behavior world.”<sup>402</sup>

Dancing is an important form of communication. “Forager honey bees perform symbolic dances to advertise the location and value of floral resources to their nest mates,” note the authors of this study.<sup>403</sup>

But the cocaine caused the bees to “overestimate the value of the floral resources they collected,” with the drugged bees essentially exaggerating the amount of nectar to the rest of the colony.<sup>404</sup>

“In these experiments, bees were given freebase cocaine.”<sup>405</sup> Barron notes the cocaine used in the study was kept “in a safe bolted to a concrete floor within a locked cupboard in a locked room in a locked building with a combination code not known even to me. A technician from the ethics department has to walk across campus to supervise the release of the cocaine.”<sup>406</sup>

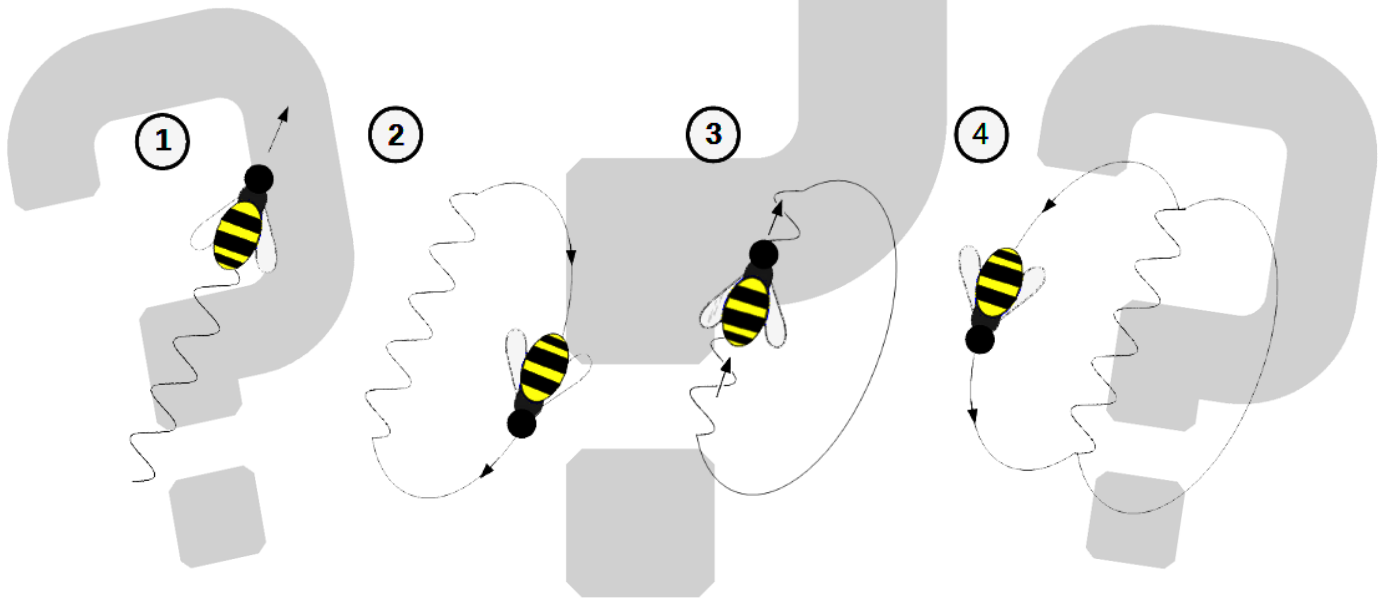
To administer the cocaine, the bees were first “chilled briefly to immobility by ~2 min exposure to -20°C in a domestic freezer,” then individually treated topically with the cocaine being applied to the dorsal thorax.<sup>407</sup>

The dose of cocaine administered did not appear to interfere with the bee’s ability to fly.<sup>408</sup> However, the bees exhibited withdrawal-like symptoms when no longer given the drug.<sup>409</sup>

The bee dances were video recorded.<sup>410</sup>

Scientists are now studying “whether bees begin to crave cocaine and need more for the same effect, like humans.”<sup>411</sup>

Enough dancing around the issue, these studies that are bee bopping with taxpayers’ money should buzz off.



*The honey bee dance known as the waggle consists of a set of motions that is varied to convey information to other bees. The dance involves this set of four general movements.<sup>412</sup>*

<sup>1</sup> Gary Guenther, “Research Tax Credit: Current Law and Policy Issues for the 114th Congress,” Congressional Research Service, August 5, 2015.

<sup>2</sup> John P. Holdren, Assistant to the President for Science and Technology and Director of the White House Office of Science & Technology Policy, “The 2017 Budget: Investing in American Innovation,” White House website, February 9, 2016; [https://www.whitehouse.gov/sites/default/files/microsites/ostp/fy\\_17\\_ostp\\_slide\\_deck.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/fy_17_ostp_slide_deck.pdf).

<sup>3</sup> Sam Stein, “Ebola Vaccine Would Likely Have Been Found By Now If Not For Budget Cuts: NIH Director,” The Huffington Post, October 16, 2014; [http://www.huffingtonpost.com/2014/10/12/ebola-vaccine\\_n\\_5974148.html?utm\\_hp\\_ref=politics](http://www.huffingtonpost.com/2014/10/12/ebola-vaccine_n_5974148.html?utm_hp_ref=politics).

<sup>4</sup> Charles F. Bolden Jr., “Congress, Don’t Make Us Hitch Rides With Russia. Love, NASA,” Wired, August 28, 2015; [http://www.wired.com/2015/08/congress-dont-make-us-hitch-rides-russia-love-nasa/?mbid=social\\_twitter](http://www.wired.com/2015/08/congress-dont-make-us-hitch-rides-russia-love-nasa/?mbid=social_twitter).

<sup>5</sup> Charles F. Bolden Jr., “Congress, Don’t Make Us Hitch Rides With Russia. Love, NASA,” Wired, August 28, 2015; [http://www.wired.com/2015/08/congress-dont-make-us-hitch-rides-russia-love-nasa/?mbid=social\\_twitter](http://www.wired.com/2015/08/congress-dont-make-us-hitch-rides-russia-love-nasa/?mbid=social_twitter).

<sup>6</sup> David Fahrenthold, “NASA’s \$349 million monument to its drift,” Washington Post, December 15, 2014; <http://www.washingtonpost.com/sf/national/2014/12/15/nasas-349-million-monument-to-its-drift/>.

<sup>7</sup> David Fahrenthold, “NASA’s \$349 million monument to its drift,” Washington Post, December 15, 2014; <http://www.washingtonpost.com/sf/national/2014/12/15/nasas-349-million-monument-to-its-drift/>.

<sup>8</sup> Peter K. Hatemi and Rose McDermott, “The genetics of politics: discovery, challenges, and progress,” Trends in Genetics, October 2012; [http://www.cell.com/trends/genetics/pdf/S0168-9525\(12\)00111-4.pdf](http://www.cell.com/trends/genetics/pdf/S0168-9525(12)00111-4.pdf).

<sup>9</sup> Ferric Fang, Anthony Bowen, and Arturo Casadevall, “NIH peer review percentile scores are poorly predictive of grant productivity,” eLife, as posted on the National Institutes of Health National Library of Medicine website, February 2016; <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4769156/pdf/elife-13323.pdf>.

The screenshot shows the NCBI PMC website interface. At the top, there is a search bar with the URL [www.ncbi.nlm.nih.gov/pmc/articles/PMC4769156/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4769156/). Below the search bar, the NCBI logo and navigation links like 'Resources' and 'How To' are visible. The main content area features the PMC logo and the text 'US National Library of Medicine National Institutes of Health'. A search dropdown menu is set to 'PMC'. Below this, there are links for 'Limits', 'Advanced', and 'Journal list'. The article title 'NIH peer review percentile scores are poorly predictive of grant productivity' is prominently displayed, along with the authors' names: Ferric Fang, Anthony Bowen, and Arturo Casadevall. The abstract text is visible below the title, starting with 'Peer review is widely used to assess grant applications so that the highest ranked applications can be funded. A number of studies have questioned the ability of peer review panels to predict the productivity of applications, but a recent analysis of grants funded by the National Institutes of Health (NIH) in the US found that the percentile scores awarded by peer review panels correlated with productivity as measured by citations of grant-supported publications. Here, based on a re-analysis of these data for the 102,740 funded grants with percentile scores of 20 or better, we report that these percentile scores are a poor discriminator of productivity. This underscores the limitations of peer review as a means of assessing grant applications in an era when typical success rates are often as low as about 10%.'

<sup>10</sup> Ferric Fang, Anthony Bowen, and Arturo Casadevall, “NIH peer review percentile scores are poorly predictive of grant productivity,” eLife, as posted on the National Institutes of Health National Library of Medicine website, February 2016; <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4769156/pdf/elife-13323.pdf>.

<sup>11</sup> Ronald J. Daniels, President of Johns Hopkins University, “A generation at risk: Young investigators and the future of the biomedical workforce,” Proceedings of the National Academy of Sciences of the United States of America (PNAS), January 13, 2015; <http://www.pnas.org/content/112/2/313.full.pdf>.

<sup>12</sup> Steven McKnight, “President’s Message: The curse of committees and clubs,” ASBMB Today, American Society for Biochemistry and Molecular Biology, September 2014;

<http://www.asbmb.org/asbmbtoday/201409/PresidentsMessage/> .

<sup>13</sup> Harold R. Garner, Lauren J. McIver and Michael B. Waitzkin, “Research funding: Same work, twice the money?,” Nature, January 30, 2013; <http://www.nature.com/nature/journal/v493/n7434/full/493599a.html> .

<sup>14</sup> Dan Vergano, “Analysis: ‘Double-dipping’ suspected in research,” USA Today, January 30, 2013;

<http://www.usatoday.com/story/tech/2013/01/30/research-duplication/1877141/> .

<sup>15</sup> “2012 Annual Report: Opportunities to Reduce Duplication, Overlap and Fragmentation, Achieve Savings, and Enhance Revenue,” U.S. Government Accountability Office, February 2012;

<http://www.gao.gov/assets/590/588818.pdf> .

<sup>16</sup> The National Institutes of Health, the Department of Defense, and the Department of Veterans Affairs, which collectively spend more than \$40 billion on health research annually, have been working on a multiagency database intended to spot duplication and “make more effective funding decisions,” according to a 2015 update by GAO.

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<sup>17</sup> Ethan Barton, “Feds Hide Why Shrimp On A Treadmill Cost \$1.3M,” The Daily Caller, January 16, 2016;

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#### Award Abstract #1239323

**CPS: Synergy: Provably Safe Automotive Cyber-Physical Systems with Humans-in-the-Loop**

|                                |   |
|--------------------------------|---|
| <b>NSF Org:</b>                | CNS<br>Division Of Computer and Network Systems   |
| <b>Initial Amendment Date:</b> | September 11, 2012  |
| <b>Latest Amendment Date:</b>  | September 11, 2012  |
| <b>Award Number:</b>           | 1239323   |
| <b>Award Instrument:</b>       | Standard Grant  |
| <b>Program Manager:</b>        | David Corman<br>CNS Division Of Computer and Network Systems<br>CSE Direct For Computer & Info Scie & Enginr  |
| <b>Start Date:</b>             | October 1, 2012   |
| <b>End Date:</b>               | September 30, 2015 (Estimated)  |
| <b>Awarded Amount to Date:</b> | \$1,100,000.00  |
| <b>Investigator(s):</b>        | Francesco Borrelli fborrelli@me.berkeley.edu (Principal Investigator)<br>Edward Vul (Co-Principal Investigator)<br>John Hedrick (Co-Principal Investigator)<br>Ruzena Bajcsy (Co-Principal Investigator)<br>Edgar Lobaton (Co-Principal Investigator) |
| <b>Sponsor:</b>                | University of California-Berkeley<br>Sponsored Projects Office<br>BERKELEY, CA 94704-5940 (510)642-8109   |
| <b>NSF Program(s):</b>         | INFORMATION TECHNOLOGY RESEARC,<br>COMPUTER SYSTEMS   |

#### ABSTRACT

This project focuses on the formal design of semi-autonomous automotive Cyber Physical Systems (CPS). Rather than disconnecting the driver from the vehicle, the goal is to obtain a vehicle where the degree of autonomy is continuously changed in real-time as a function of certified uncertainty ranges for driver behavior and environment reconstruction. The highly integrated research plan will advance the science and engineering for CPS by developing methods for (1) reconstructing 3D scenes which incorporate high-level topological and low-level metric information, (2) extracting driver behavioral models from large datasets using geometry, reasoning and inferences, (3) designing provably-safe control schemes which trade-off real-time feasibility and conservatism by using the evidence collected during actual driving.

Assisting humans in controlling complex and safety-critical systems is a global challenge. In order to improve the safety of human-operated CPS we need to provide guarantees in the reconstruction of the environment where the humans and the CPS operate, and to develop control systems that use predictive cognitive models of the human when interacting with the CPS. A successful and integrated research in both areas will impact not only the automotive sector but many other human-operated systems. These include telesurgery, homeland security, assisted rehabilitation, power networks, environmental monitoring, and all transportation CFS. Graduate, undergraduate and underrepresented engineering students will benefit through classroom instruction, involvement in the research and a continuous interaction with industrial partners who are leaders in the field of assisted driving.

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NSF Award #1047687

NSF Award #0729493

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