


# Research Tool Report

## PsychTable.org:

### *A tool for biopolitical researchers, policymakers, and citizens*

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**ABSTRACT.** PsychTable.org is a new online, mass-collaborative tool for the social sciences that aggregates evidence for and classifies the evolved psychological adaptations (EPAs) that have been proposed to comprise the human mind. This article provides an overview of the need for this reference tool and how it can benefit researchers who incorporate the behavioral sciences into their work. The article walks the reader through a hypothetical use case for PsychTable.org and describes the features of the website. PsychTable.org is intended to help key stakeholders better understand the linkages between EPAs and political behavior, public policy, and ethics.

**Key words:** Evolutionary behavioral science, evolved psychological adaptations, openscience, taxonomy; classification.

Imagine for a moment a science journalist who wants to write an article on the element Gallium and its applications in electronic devices, but the journalist has no background knowledge about Gallium, its atomic structure, or its chemical properties. Where would she go to find this information? The answer is simple: find any reference work on the Periodic Table of Elements—there are countless such volumes targeted toward lay readers, with beautiful illustrations and information about each element (e.g., Gray, 2012)—and flip to the entry on the element gallium: atomic number 31, atomic weight 69.723. This information will be the same everywhere the journalist looks, because it is based on an established taxonomy, the periodic table, that forms the backbone of chemical classification. Every chemist agrees on these fundamentals because the study of the chemical elements is based on centuries of empirical findings and scientific consensus and, most critically, has been compiled in a centralized reference tool that is

publicly accessible and universally accepted. There is very little ambiguity on how to find information about a given chemical element such as Gallium, let alone how to find a taxonomy of all chemical elements known to science.

By contrast, consider a researcher writing a manuscript on the human evolved psychological adaptation (EPA) of disgust and the way it influences public policy, international development, and political systems. In fact, this current issue of *Politics and the Life Sciences* contains several articles from researchers who have done precisely that. The researcher wants to find some background on the human universal adaptation of disgust, for instance, what external stimuli tend to activate this EPA (e.g., rotten food, body fluids, or insects), when it first arose in our evolutionary lineage, what genes are involved in its development, what brain pathways and neurochemical correlates underpin the emotion. Where does one go to find *this* information? Where does one even start?

As in the field of chemistry, the primary literature on emotions and behavior spans centuries (e.g., Darwin, 1872). It also spans disciplines, from philosophy to psychology, from neurophysiology to behavioral genetics, and from anthropology to primatology. Unlike

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chemistry, however, there is no central resource to turn to if one wants to see a snapshot of the scientific consensus on any particular EPA such as disgust. Are humans specifically evolved to experience disgust? If so, are the different types of disgust (e.g., sociomoral disgust, pathogen disgust, and toxin disgust) separately evolved mechanisms, clustered, nested, or all part of the same broad EPA (see, e.g., Simpson et al., 2006)? To what extent do scientists agree on these particular points?

As should be clear from this rhetorical exercise, there is no simple way to access this type of information in the evolutionary behavioral sciences as there is in a field such as chemistry or even biology, which has the Linnaean taxonomy. The best one can hope to do is to find a smattering of the most easily available empirical articles on disgust, a relatively comprehensive review article (e.g., Tybur et al., 2013), or an authored book on the subject (e.g., Kelly, 2011). These are not likely to be fully comprehensive sources of information that capture the entirety of scientific consensus, and consulting them certainly will not be quick—because the fact is, the evolutionary behavioral sciences have no centralized reference tool.

It may be fruitless to hope for an evolutionary behavioral science taxonomy as discrete and clean as the periodic table—obviously, evolved behaviors cannot be broken down into perfect distinct entities the way chemical elements can. Yet even imperfect and controversial classification systems can be more enlightening than no classification system at all—see the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5; American Psychiatric Association, 2013a), which serves as the cornerstone of psychiatry and clinical psychology, despite its controversies (Welch et al., 2013). The EPAs of the human mind have significant overlap with one another and indistinct “boundaries,” just as mental disorders show high comorbidity and generally are dimensional rather than categorical (Brown & Barlow, 2005). And yet, a taxonomic classification system of sorts was compiled for mental disorders; as problematic as it is, the DSM serves a useful organizational purpose (cf. Khoury et al., 2014), at the very worst allowing us to lay out what we know about the symptomatology of mental disorders and giving us a starting point to work from.

Now imagine a publicly available classification system that could organize the research on the capabilities of the human mind in a centralized manner that was democratized and led by the international research community rather than a select group of experts in a metaphorical

hushed, smoky room. The time has come for the evolutionary behavioral sciences to enter their next phase, based on a unified, central taxonomic system that any researcher, not just psychologists or neuroscientists, has equal opportunity to shape—and that anyone can access and learn from, whether or not they have paid for journal subscriptions or access to a vast university library system. Critically, this reference tool can serve as a cornerstone not just for the evolutionary behavioral sciences but also for the social sciences as a whole.

## Introducing PsychTable

PsychTable.org is an online, mass-collaborative, open-science taxonomy in which scientists and scholars across the behavioral and social sciences, anywhere in the world, can collaborate on a single mission: the systematic description and organization of the functional components of the human mind. Scholars from fields as diverse as developmental psychology, behavioral economics, primatology, and anthropology, as well as political science and policy design, will be able to contribute and rate evidence to support or challenge the existence of EPAs that have been proposed in the empirical literature.

By EPAs, we mean the specific programs that our minds are evolved to execute, such as color vision, thirst, peer aggression, romantic attachment, and out-group prejudice, among many others. EPAs that have strong evidentiary support will be systematically classified and presented in a meaningful and accessible taxonomy. The concept for a classification table of EPAs was first articulated by Balachandran (2011), who provided one example of how such a table could be meaningfully laid out in a manner analogous to the periodic table. Neurobiologists will be able to chart and present the neural pathways and biochemistry underlying the EPAs, geneticists will be able to contribute information about the genes underlying these behavioral systems, and behavioral ecologists will be able to present the evolutionary trajectory and phylogeny of these EPAs among our nonhuman ancestors and cousins. Best of all, the information from this resource will be open, accessible, and user-friendly for all, including political scientists, policymakers, and citizens, as well as international aid professionals, researchers, students, educators, practitioners, and journalists.

Consider, again, a researcher who is writing on disgust and its implications for policy design or evaluation. Before PsychTable, she would have had to arbitrarily search for and decide which of the thousands of scholarly papers and books on disgust she would read and

reference and then pull together the disparate information from this tiny subset of the disgust research into a single perspective. Hopefully, the perspective she comes away with would match the scientific consensus on the issue, but there would be no guarantee of this, as there is no way to determine, by looking at a single publication, how the issue is regarded by knowledgeable researchers in light of all the other literature on the subject. The only way to ascertain this knowledge is to be an expert on the specific subject.

Of course, not even subject matter experts are likely to be able to comb through decades (or centuries) of balkanized literature from behavioral ecology, anthropology, primatology, neuroanatomy, and behavioral genetics, for instance, to be able to get a full picture of every aspect of the EPA of disgust, such as, its neurochemical substrates, underlying neural pathways, behavioral elicitors and outputs, and cross-cultural incidence. More to the point, the average researcher has no way of even knowing whether any given proposed EPA, whether pathogen disgust, infant anxiety around strangers (Ainsworth & Bell, 1970), or—to take a more controversial example—a cheater-detection mechanism (Cosmides et al., 2005), actually has enough empirical support to be considered an actual specially evolved mechanism of the human mind, from the perspective of scientific consensus. In other words, trying to obtain organized, systematic information about human EPAs can sometimes be a messy proposition.

Now let us assume that the researcher in our example has access to PsychTable, the taxonomy of human evolved psychological adaptations. She first directs her web browser to [www.psychtable.org](http://www.psychtable.org) and then searches for her EPA of interest, “Pathogen Disgust,” in one of three ways: clicking its three-letter abbreviated symbol in the classification table of EPAs (more on this later), browsing for it in an alphabetized list, or searching for it using a keyword search. Doing so will bring up the EPA’s “dossier,” a comprehensive profile page of information about that EPA. Alternatively, the dossier for each EPA has links to other related EPAs, so the researcher can also navigate to the disgust EPA directly from another EPA linked to it (in this case, EPAs that rely on disgust—such as the Pregnancy-Mediated Food Aversion EPA—or that disgust relies on, such as the Olfactory Recognition of Spoiled Food EPA).

Each EPA’s dossier has basic information about what the EPA does, such as, what its evolved function is (e.g., “facilitate avoidance of pathogens”), what stimuli or other EPA inputs tend to activate it (e.g., “spoiled food,

viscera, olfactory cues thereof”), and what brain pathways and neurochemicals are involved (e.g., “insular-striatal system”). The dossier also has a number of special profile sections that the user can select to learn more information. By default, the Evidence special area is open. Here, the researcher can see the contributed and rated evidence citations and scores for each EPA. The evidence, scores, and ratings are at the heart of PsychTable’s functionality; they are described in their own section later.

The researcher can also choose to open one of the following other special information areas: Neural Pathways (showing a transparent 3D visual representation of the brain and the neural pathways thought to underlie the EPA); Phylogeny (showing a family tree of the likely evolution of the EPA in our nonhuman ancestors); Developmental Trajectory (showing how the EPA develops over the course of the lifespan and in response to typical and even aberrant environmental contexts); and Genetic/Epigenetic Influences (showing a more in-depth look at the genes and epigenetic processes that may be involved in the development of the EPA). Other special profile sections could include, for example, information on cultural variants and disorders involving the EPA. Of these, only the Evidence information area has been fully conceptually developed and implemented in the current embodiment of PsychTable.

### Evidence area of dossier

After browsing a number of special information areas to learn about the evolutionary, developmental, genetic, and neuroanatomical factors involved in disgust, the researcher can return to the main Evidence special area to determine how likely it is that humans do, in fact, have a specialized mechanism evolved to exhibit disgust reactions in the presence of certain stimuli. Humans exhibit many behavioral patterns, even species-typical ones, that may be the result of domain-general cognitive processes or other evolutionary forces besides natural selection (Buss et al., 1998; Gould & Lewontin, 1979; Schmitt & Pilcher, 2004), and the evolutionary behavioral sciences have been criticized, rightly or wrongly, for assuming adaptation with insufficient evidence (Gould, 1991; Kurzban & Haselton, 2006). PsychTable provides a means of aggregating and evaluating this evidence, toward the goal of putting a stop to these back-and-forth arguments once and for all.

It is critical to note that PsychTable can have a dossier for any EPA that has been proposed in the literature, but

only those whose status as true EPAs has been well-supported in the literature will show up in the final list of strongly supported EPAs; the rest are viewable and searchable in a separate list of proposed EPAs that do not currently have sufficient evidentiary support. The process of determining which EPAs do have sufficient support is the job of PsychTable's rating and scoring system, which underlies the Evidence special information area. In this Evidence area, the researcher will see a list of bibliographic references of scientific articles, book chapters, and scientific books that refer to that EPA. The references are user submitted (more on this submission process later), and they are the data that hold PsychTable together.

The Evidence area is divided into eight sections that each correspond to one of Schmitt and Pilcher's (2004) eight lines of evidence that speak to whether a psychological trait is, in fact, an EPA: theoretical, psychological, cross-cultural, physiological, medical, genetic, phylogenetic, and hunter-gatherer evidence. Under each line of evidence section, there is a list of references that speak to that EPA from the perspective of that type of evidence. If a particular piece of literature refers to, for example, both the cross-cultural and the hunter-gatherer evidence for (or against) the existence of that EPA, the reference to that piece of literature will be listed under both the Cross-Cultural and the Hunter-Gatherer sections within that EPA's dossier.

Each reference also has a score for how strongly it supports that EPA and how strongly it challenges the existence of that EPA, with respect to that line of evidence. For example, a study that shows that lesions in the fusiform gyrus impact the ability to distinguish human faces (e.g., Barton et al., 2002) may have a high score for Medical evidence supporting the existence of a Facial Recognition EPA. As PsychTable is a mass-collaborative, open-science effort, all the aforementioned scores are generated from user ratings.

Each line of evidence also displays a summary score showing how strongly the EPA is supported by that line of evidence, in light of all the references that have been submitted and rated. In this way, the researcher can see at a glance, for instance, how much genetic or cross-cultural evidence has been marshaled to support the notion that disgust is a true EPA. These lines of evidence scores, in turn, are combined to create an omnibus score that represents how strongly the contributed scientific literature supports the existence of the EPA overall. It is these omnibus scores that determine whether any given proposed EPA in PsychTable ends up in the final list

of strongly supported EPAs and which end up in the "insufficiently supported" list. Of course, any EPA listed on the Psych Table website can be promoted or demoted to/from the strongly supported list at any time if additional evidence or user ratings are added that increase the support scores for, or the challenge scores against, the EPA's existence. Each EPA also displays a score for evidentiary breadth (a measure of how many lines of evidence support the EPA's existence) and evidentiary depth (a measure of how many well-designed studies from within particular lines of evidence have been conducted, taking into account, for instance, sample sizes, modes of measurement, and levels of control) as suggested by Schmitt and Pilcher (2004).

If the researcher clicks any of the literature citations on an EPA's dossier page to learn more about that piece of literature, she will be taken to a literature ratings page for that source. This page has the full bibliographic information about that piece of literature and an abstract of the article. At best, a link on this page can take the researcher to the full text of the source, but because of the current system of journal paywalls (and the fact that many sources will be from books, some of which may have been out of print for decades), many sources will only be able to link to the journal's abstract page or the book's publication information. If the researcher clicks one of the author's names on this literature citations page, she will be taken to an author information page showing other pieces of literature in PsychTable's system by that same author. If the author also happens to be a PsychTable user, their author page will double as their public PsychTable user profile page.

Returning to the literature ratings page for a particular source, the researcher will see two main ratings display areas on the page—one that displays all the Supporting ratings (those that support the EPA's existence) that users have submitted vis-à-vis that piece of literature and another that displays all the Challenging ratings (those that argue against the existence of the EPA) that have been submitted. Each of these two display areas shows all eight lines of evidence again, and under each line of evidence is a list of submitted rating scores for that line of evidence, with the username of the rater next to each rating. Ratings are given on a scale of 1 to 100, with higher ratings denoting more convincing arguments for or against the EPA's existence. Because any given piece of literature can address any or all lines of evidence (although in practice, most studies address only one or two evidence lines), and can simultaneously offer arguments to both support and to challenge the existence of

an EPA, there are 16 possible ratings that a rater can give each source: one for how well each of the eight lines of evidence supports the EPA and one for how strongly each line of evidence challenges the EPA's existence.

Raters can input comments alongside their ratings to explain their reasoning, so the researcher can click any comment stub alongside a rating to open the full comment. Clicking on a rater's username will lead the researcher to that rater's public PsychTable user profile page, which displays statistics about their contributions to PsychTable, such as how many citations they have added and rated.

User ratings are combined into total EPA and evidence line scores using an algorithm that combines and appropriately weights supporting and challenging ratings to give a general sense of the evidentiary breadth and depth supporting the EPA, leading to the overall total EPA score. The logic behind the current algorithm is described by Balachandran and Glass (2012), and this algorithm can be updated and altered based upon feedback from the scientific and statistical research community as warranted.

The overall result of this system of scores and information areas is that the researcher, with only a few clicks, can look at the EPA of disgust just as easily as she could look up a chemical element, and learn a vast amount of information about it—for example, how well supported its status is as a true EPA, what types of evidence exist to support or challenge its EPA status, what specific studies have been conducted and what theoretical papers have been written on disgust, and where gaps in the research are—all in a matter of minutes.

## Contributing to PsychTable

Suppose a researcher wants to contribute to PsychTable. She knows of a study conducted on the cross-cultural expression of disgust that is not listed on the dossier page for disgust on PsychTable. Additionally, she sees a study cited on PsychTable that has been highly rated by many users as providing strong hunter-gatherer evidence for disgust, but in her opinion, this study actually refutes the notion that the particular hunter-gatherer tribe studied displays the universal emotion of disgust.

She is not a psychologist, and not even an evolutionary behavioral scientist, but PsychTable is a tool for all social science, not just particular disciplines. Thus, as a member of the research community, the researcher has the option of becoming more than a passive user of

PsychTable who occasionally leaves comments. She can submit her CV to the PsychTable Curator Review Board, which will evaluate her credentials. Any users whose credentials demonstrate that they are qualified to evaluate scientific literature (such as research graduate students or individuals who have authored relevant books or peer-reviewed articles) can become a curator and can therefore submit their own user ratings of literature on PsychTable. They can also submit additional literature citations that are not currently on PsychTable and even add new proposed EPAs to the website, as long as there is extant literature about those EPAs.

When the researcher is adding user ratings to a piece of literature, she will see a description next to each of the eight lines of evidence so she knows what it entails (e.g., "Phylogenetic evidence is evidence that shows how the EPA has evolved in other species. This includes comparative (animal) literature and fossil evidence,") and how to evaluate it (e.g., "Strongly supportive psychological evidence shows not only that the psychological trait exists, but also that it shows evidence of special design—that is, appears well designed by natural selection to address a particular adaptive problem"). In this way, the researcher has become not just a consumer, but also a co-creator, of a powerful, publicly available open-science reference tool.

## The classification table

Any EPA that has sufficient evidentiary support will be displayed on the taxonomic classification table on the PsychTable.org main page. As mentioned earlier, the concept for a tabular taxonomy of EPAs was first articulated by Balachandran (2011), who provides one example of how such a table could be meaningfully laid out, in a manner analogous to the periodic table. While PsychTable's classification table is currently laid out in four different "classes" (indicating the evolutionary force that shaped the EPA: natural selection, sexual selection, kin selection, or unknown/disputed), alternative visualization methods can be devised as well. For example, aided by the technology PsychTable is built on, the classification table could potentially be a three-dimensional structure that would display the connections and hierarchical relationships between the various EPAs. Like other elements of PsychTable, we hope that the classification table can develop and respond flexibly to the needs and expertise of the research community that is using it.

## Conclusion

We view PsychTable.org as a means of democratizing the study of the human mind so that anybody, anywhere, regardless of expertise, can have equal access to information about what psychological adaptations have evolved over our species' history (and prehistory). We anticipate that disgust and a range of other EPAs have substantial implications for the theory and practice of social science, including political science, foreign and domestic policy, governance, and international aid, including anti-poverty measures, citizen engagement, statecraft, and community organizing. Given the significance of human behavior on public affairs, it is our strongest hope that with PsychTable.org, evidence-driven practice will help key stakeholders better understand the linkages between EPAs and political behavior, public policy, and ethics.

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