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Copyright and the Brain

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COPYRIGHT AND THE BRAIN

MARK BARTHOLOMEW*

ABSTRACT

This Article explores the intersection of copyright law, aesthetic theory, and neuroscience. The current test for copyright infringement requires a court or jury to assess whether the parties' works are "substantially similar" from the vantage point of the "ordinary observer." Embedded within this test are several assumptions about audiences and art. Brain science calls these assumptions into question. The substantial similarity test posits that aesthetic reactions are unmeasurable and uniform. In actuality, they can be quantified and vary depending on audience and artistic medium. Neuroscience has already reconfigured the law in many areas, from tort damages to the death penalty. Now it may offer copyright law a way forward, opening up the black box of aesthetic encounters to reveal what is most salient when making the comparison at the heart of copyright infringement. Three suggested reforms—admitting expert testimony to tailor the substantial similarity test to different kinds of artistic works, using survey evidence to better understand the aesthetic responses of specialized audiences, and reordering the infringement analysis to debias judges and jurors—deploy the insights of neuroaesthetics to improve the law of copyright infringement.

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INTRODUCTION

Nobody likes the current test for copyright infringement. A court or jury determining whether illegal copying occurred must assess whether the plaintiff's and defendant's works are "substantially similar" from the vantage point of the "ordinary observer."¹ A frequent punching bag for intellectual property scholars, the substantial similarity test has been described as "mak[ing] no sense,"² "notoriously confusing and confused,"³

1. See, e.g., *Tanksley v. Daniels*, 902 F.3d 165, 174 (3d Cir. 2018); *Rentmeester v. Nike, Inc.*, 883 F.3d 1111, 1121 (9th Cir. 2018).

2. Mark A. Lemley, *Our Bizarre System for Proving Copyright Infringement*, J. COPYRIGHT SOC'Y U.S.A. 719, 719 (2010).

3. Rebecca Tushnet, *Worth a Thousand Words: The Images of Copyright*, 125 HARV. L. REV. 683, 716–17 (2012).

and “a virtual black hole in copyright jurisprudence.”⁴

Judges feel no better about the test. Early on, a court complained of the ordinary observer analysis’s “artificial and disappointingly inaccurate application.”⁵ Another prophesized that the test would prevent judges and juries from making “an intelligible and intellectual decision” on the question of infringement.⁶ The passage of time did not make things any better. One court of appeals deemed the test “of doubtful value” given its interplay with other parts of copyright law.⁷ Or, as another court opined, the “essential question” of how to compare two works for purposes of substantial similarity has not been answered “[a]fter 200 years of wrestling with copyright questions, [and] it is unlikely that courts will come up with the answer any time soon, if indeed there is ‘an’ answer, which we doubt.”⁸

To a large degree, these complaints reflect a larger skepticism of the ability of one person to comprehend the aesthetic experience of another. The substantial similarity test, also referred to as the “audience test,”⁹ requires art to be appreciated from the perspective of its intended audience. As formulated by the federal courts, “the essence of the audience test is its focus on viewers’ spontaneous reaction” to the infringing work.¹⁰ These courts assume that human reactions to art are inherently subjective and, therefore, not susceptible to objective analysis or outside expertise.

As a result, decisionmaking in copyright cases remains particularly opaque as courts largely abdicate any role in policing what can be relied on when comparing the plaintiff’s and the defendant’s works.¹¹ This has negative consequences, including making infringement disputes unpredictable and difficult to resolve before trial.¹² Rather than base copyright infringement on a phenomenon incapable of measurement, some law professors, including the author of the most-cited treatise on copyright

4. Shyamkrishna Balganesesh, *The Questionable Origins of the Copyright Infringement Analysis*, 68 STAN. L. REV. 791, 794 (2016).

5. *Shipman v. R.K.O. Radio Pictures, Inc.*, 100 F.2d 533, 536 (2d Cir. 1938).

6. *Arnstein v. Porter*, 154 F.2d 464, 476 (2d Cir. 1946) (Clark, J., dissenting).

7. *Whelan Assocs. v. Jaslow Dental Lab., Inc.*, 797 F.2d 1222, 1232–33 (3d Cir. 1986).

8. *Nash v. CBS, Inc.*, 899 F.2d 1537, 1540 (7th Cir. 1990).

9. *Kohus v. Mariol*, 328 F.3d 848, 854 (6th Cir. 2003).

10. 4 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 13.03[E][3][a][ii] (2019).

11. *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960) (“The test for infringement of copyright is of necessity vague.”); *see also* *Blehm v. Jacobs*, 702 F.3d 1193, 1202 (10th Cir. 2012) (“We have not defined the ‘outer limits’ of substantial similarity, likely because the line between substantial similarity and no substantial similarity is imprecise.”); *Lyons P’ship v. Morris Costumes, Inc.*, 243 F.3d 789, 801 (4th Cir. 2001) (admitting that “[t]he notion of intrinsic similarity can be a slippery one”).

12. Joseph P. Fishman, *Music as a Matter of Law*, 131 HARV. L. REV. 1861, 1870 (2018); Pamela Samuelson, *A Fresh Look at Tests for Nonliteral Copyright Infringement*, 107 NW. U. L. REV. 1821, 1837 (2013); Lemley, *supra* note 2, at 739–40.

law, call for the audience test's wholesale abandonment.¹³

Maybe there is a way to rehabilitate copyright infringement doctrine without junking the audience test. Brain science offers the potential for a much richer portrait of the aesthetic experience. "Neuroaesthetics is the study of the neural processes that underlie aesthetic behavior."¹⁴ Neuroscientists have identified several regions and processes in the brain central to appreciating creative works and are continuing to develop the field.¹⁵ Using new technologies for measuring blood flow and electrical activity in the brain, researchers examine the neural indicia of attention, novelty, emotional response, and even the perception of beauty that are part of the aesthetic experience. In this way, brain science may offer copyright law a way forward, opening up the black box of aesthetic encounters to reveal which things are most salient when making the comparison at the heart of copyright infringement.

This is not to say that brain scans have suddenly laid bare the entire process of aesthetic judgment. Today's imaging technologies lack the spatial resolution and speed needed to capture all of the complexities of human thought, including thoughts about art, music, and literature. The brain regions and processes identified as being part of the aesthetic experience also perform other functions, making it difficult to determine which neural processes are central to aesthetic judgment.¹⁶

Nevertheless, the recent development of non-invasive techniques for recording the biological incidents of human thought has surfaced many insights into the experiences of audiences that were not available even a few years ago.¹⁷ Much of the neurological activity that is involved in aesthetic appreciation is subconscious. As a result, reports from audience members themselves cannot do this activity justice. Brain imaging offers a window into aesthetic encounters that we are unable to articulate ourselves.¹⁸ The

13. See 4 NIMMER & NIMMER, *supra* note 10, at § 13.03[E][1][b] ("It would seem preferable, in short, to discard the audience test."); Lemley, *supra* note 2, at 740–41; Tushnet, *supra* note 3, at 687–88.

14. Martin Skov & Oshin Vartanian, *Introduction: What Is Neuroaesthetics?*, in NEUROAESTHETICS 1, 3 (Martin Skov & Oshin Vartanian eds., 2009).

15. Marcus T. Pearce, Dahlia W. Zaidel, Oshin Vartanian, Martin Skov, Helmut Leder, Anjan Chatterjee & Marcos Nadal, *Neuroaesthetics: The Cognitive Neuroscience of Aesthetic Experience*, 11 PERSPECTIVES ON PSYCH. SCI. 265, 274 (2016) ("[R]ecent studies show that aesthetic pleasure is characterized by the tight coupling of activity in reward brain regions and sensory brain regions."); Mark Reybrouck, Peter Vuust & Elvira Brattico, *Brain Connectivity Networks and the Aesthetic Experience of Music*, 107 BRAIN SCI. 10 of 14 (2018) (describing "target regions in the brain" that are activated in the aesthetic reaction to music).

16. See *infra* notes 225–226 and accompanying text.

17. See *infra* Part II.B.

18. See Robert L. Solso, *The Cognitive Neuroscience of Art: A Preliminary fMRI Observation*, 7 J. CONSCIOUSNESS STUD. 75, 77 (2000).

substantial similarity analysis is based on judicial suppositions as to how audiences perceive creative works as well as a belief that the aesthetic experience cannot be measured. Neuroaesthetic research can confirm or refute these judicial hunches with new, objective measures of art appreciation that copyright law has long assumed could never exist.¹⁹ By showing that our reactions to art can be measured, neuroscientific discoveries should force an immediate reconsideration of copyright law's current prohibitions on the use of survey evidence and expert testimony to better understand the audiences for creative works. By demonstrating that our aesthetic reactions to art are formed quickly, brain science suggests that the trier of fact should evaluate substantial similarity at the outset of a case, not after days of testimony on other issues.

Neuroscience has already reconfigured the law in many areas outside of copyright and appears poised for significant future influence. “[L]awyers are introducing so-called neurobiological evidence into court more than ever.”²⁰ Thanks to studies of the plasticity of the developing brain, some criminal punishments for juvenile offenders are no longer allowed.²¹ The vast field of tort law now takes fMRI imaging into account; such images were credited with forcing the National Football League into a settlement with thousands of former players suffering from Chronic Traumatic Encephalopathy.²² Perhaps most analogous to the relationship between neuroaesthetics and copyright, another intellectual property regime, trademark law, appears poised to embrace neuroscientific evidence of consumer perception.²³

In many ways, copyright and its problematic infringement test represent a particularly promising legal territory for neuroscientific analysis. It is true that the intricacies of aesthetic judgment mean that it is extremely difficult to know what a single person is thinking when staring at a picture or listening to a song. Fortunately, the substantial similarity analysis does not require a perfect understanding of one person's aesthetic experience.

19. ANJAN CHATTERJEE, *THE AESTHETIC BRAIN* 137 (2014) (describing neuroaesthetic study “of aesthetic properties of objects, properties that are objective but evoke an aesthetic experience within us”).

20. Robbie Gonzalez, *How Criminal Courts Are Putting Brains—Not People—On Trial*, WIRE (Dec. 4, 2017).

21. See *Miller v. Alabama*, 567 U.S. 460, 472 n.5 (2012) (barring mandatory life-without-parole sentence for juvenile offenders in homicide cases); *Graham v. Florida*, 560 U.S. 48, 68–74 (2010) (barring mandatory life-without-parole sentence for juvenile offenders in non-homicide cases); *Roper v. Simmons*, 543 U.S. 551, 569–78 (2005) (barring the death penalty for crimes committed by juvenile offenders).

22. Joseph J. Avery, *Picking and Choosing: Inconsistent Use of Neuroscientific Legal Evidence*, 81 ALB. L. REV. 941, 959–60 (2018).

23. Mark Bartholomew, *Neuromarks*, 103 MINN. L. REV. 521, 524–28 (2018).

Instead, the audience test depends on an *aggregate* sense of what audiences will think. This stands in sharp contrast to criminal law, where legal determinations typically hinge on the mental state of a single person. If neuroscientific evidence has already influenced criminal-law determinations, it stands to reason that this sort of evidence may be even more useful in an area like copyright law where the trier of fact only needs a general sense of an audience's overall mental state.²⁴

This Article begins by exploring the centrality of audience reactions to copyright infringement. Even though the experience of audiences forms the linchpin of every infringement claim, this critical component of copyright law has attracted relatively little academic attention. Part I explains how the substantial similarity test requires courts and jurors to engage in a fraught and uncertain exercise: a channeling of the thought processes of relevant audience members. By and large, the test for infringement assumes a one-size-fits-all approach to aesthetic encounters. Whether juror or judge, the assumption seems to be that one's own subjective processing of the works at issue will translate into the same broadly applicable reactions as the original audience for the works at issue. Neuroaesthetics challenges this universalist take. Recent studies reveal that reactions to art differ depending on audience and on the type of creative work being processed by that audience.

Part II demonstrates that substantial similarity also depends on certain judicial assumptions about how human beings experience art. Courts insist that the subjective nature of art appreciation renders it impossible to measure. They also posit that aesthetic responses occur rapidly and are stable. Both of these assumptions help justify the current legal approach, which disclaims lengthy deliberation over the qualities of creative works and bars expert testimony to aid the trier of fact's substantial similarity analysis. Although brain imaging confirms that our impressions of creative works form quickly, fMRI and EEG readings show that this process does not have to remain impervious to outside observation.

Part III turns to a normative account of the future intersection of copyright law and neuroscience and recommends some related doctrinal reforms. Although it is tempting to believe that any tool facilitating a better understanding of audiences should be embraced by the courts, there are

24. At this point, brain scans are most useful for proving and disproving general theories about aesthetic appreciation, not for answering questions about a particular copyright dispute. It may be years before this research can be directly employed to adjudicate individual cases and, even then, it could only serve as an evidentiary supplement, not a replacement, for the trier of fact. In the immediate term, however, neuroaesthetics calls into question some of the basic premises behind the substantial similarity analysis.

reasons for caution. We may not always trust audiences (or legal decisionmakers channeling those audiences) to decide when a defendant's borrowing from the creative work of another is improper.²⁵ Ultimately, where to set the line between acceptable and unacceptable copying is a question of policy, which neuroscience can inform but not determine.

Yet if we conclude that the copyright infringement analysis warrants some assessment of aesthetic reactions—and such assessment may be unavoidable given copyright's artistic subject matter—then the law should be changed to make these assessments more transparent and better aligned with the ways our minds actually work. Insights into the biology of aesthetic reaction counsel three specific doctrinal reforms. Experts should be allowed to help the trier of fact understand which aspects of a work will be most salient to a target audience. Survey evidence should be admitted to allow judges and juries to appreciate the variability in audience reactions that the law has thus far ignored. The trier of fact should judge substantial similarity quickly so as to better mimic the fast, casual review of creative works that characterizes actual aesthetic appreciation outside of the courtroom.

I. UNDERSTANDING AUDIENCES

Jimi Hendrix first met fifteen-year-old guitarist Randy Wolfe in a New York City music store in 1966. After some talking and jamming together, the as-yet-unknown Hendrix invited Wolfe (whom he dubbed “Randy California”) to sit in with his band.²⁶ Shortly thereafter, the two had a falling out. Hendrix moved on to superstardom. Wolfe formed a band named Spirit that had some success, including a top 40 hit. But he never quite cracked the big time like Hendrix.

Wolfe died in a drowning accident in 1997,²⁷ but his music lives on in many ways, including in the form of a blockbuster lawsuit against iconic rock band Led Zeppelin. Wolfe's estate sued Led Zeppelin for copyright infringement, contending that Led Zeppelin's song “Stairway to Heaven” copied key portions of Wolfe's song “Taurus.” “Stairway to Heaven” is often rated the greatest rock song of all time, enjoying more sheet music

25. Alfred C. Yen, *Copyright Opinions and Aesthetic Theory*, 71 S. CAL. L. REV. 247, 294 (1998) (“Indeed, courts generally refuse to consider evidence of how actual people appraise the similarity between two works precisely because those appraisals may not be appropriate for copyright law.”); see also Fishman, *supra* note 12, at 1903–04 (calling for a focus only on melody for music copyright cases even though such a focus does not match the aesthetic experience of listeners).

26. Pierre Perrone, *Obituary: Randy California*, THE INDEPENDENT (Jan. 17, 1997), <https://www.independent.co.uk/news/people/obituary-randy-california-1283572.html>.

27. *Id.*

sales and radio play than virtually any other musical composition.²⁸ The lawyer for Wolfe's estate estimated that his lawsuit against Led Zeppelin was worth \$40 million.²⁹

The dispute over "Stairway to Heaven" exemplifies many of the frustrations courts and commentators have with the current state of copyright infringement law. Even in high-stakes cases, the trier of fact's substantial similarity analysis remains largely unknowable and underdetermined. After an initial verdict for Led Zeppelin, a Ninth Circuit panel reversed, faulting the trial court for failing to instruct jurors that they could find infringement based on Wolfe's original selection or arrangement of otherwise uncopyrightable musical elements.³⁰ Yet some commentators fretted such an instruction would backfire. Concerned over the jurors' lack of musical experience, these commentators thought the new instruction would prompt the jury to wrongly base its substantial similarity decision on uncopyrightable stock motifs appearing in both works.³¹ More broadly, even though the California jury hearing the case was supposed to determine "whether the ordinary, reasonable person would find the total concept and feel of the works to be substantially similar,"³² one might wonder whether a different group of listeners—perhaps ones with more musical expertise or more familiarity with 1970s rock and roll—would have a different reaction

28. James Joiner, *Did Zeppelin Steal "Stairway to Heaven?"*, ESQUIRE (May 19, 2014), <https://www.esquire.com/entertainment/music/news/a32855/was-stairway-to-heaven-stolen/> [<https://perma.cc/ZK82-VPGM>].

29. Kory Grow, *Led Zeppelin Win in "Stairway to Heaven" Trial*, ROLLING STONE (June 23, 2016, 5:27 PM), <https://www.rollingstone.com/music/music-news/led-zeppelin-win-in-stairway-to-heaven-trial-70565/>.

30. *Skidmore v. Led Zeppelin*, 905 F.3d 1116, 1127 (9th Cir. 2018). The Ninth Circuit elected to hear the case en banc. It reversed the panel, concluding that there was no need for a jury instruction as to Wolfe's selection and arrangement given that the jury had already received instruction that an "an original work may include or incorporate elements taken from prior works or works from the public domain." *Skidmore v. Led Zeppelin*, 952 F.3d 1051, 1071 (9th Cir. 2020) (en banc). A vigorous dissent maintained that failure to require a selection and arrangement instruction "weakens copyright protection for musicians by robbing them of the ability to protect a unique way of combining musical elements." *Id.* at 1089 (Ikuta, J., dissenting in part).

31. Steve Brachman, *Ninth Circuit Vacates and Remands "Stairway to Heaven" Copyright Case Over Erroneous and Prejudicial Jury Instructions*, IP WATCHDOG (Oct. 6, 2018), <https://www.ipwatchdog.com/2018/10/06/ninth-circuit-vacates-remands-verdict-in-stairway-to-heaven-copyright-case/id=101920/> [<https://perma.cc/5NVJ-GM42>]; Mike Masnick, *Ninth Circuit Never Misses a Chance to Mess Up Copyright Law: Reopens Led Zeppelin "Stairway to Heaven" Case*, TECHDIRT (Oct. 1, 2018, 9:33 AM), <https://www.techdirt.com/articles/20180928/18021040739/9th-circuit-never-misses-chance-to-mess-up-copyright-law-reopens-led-zeppelin-stairway-to-heaven-case.shtml> [<https://perma.cc/8LYL-54H9>]; see also Anne Steele, *Music Industry Braces for More Lawsuits on Copyrights*, WALL ST. J., Aug. 5, 2019, at B1 (describing concern that \$2.8 million infringement verdict against Katy Perry and her collaborators is symptomatic of copyright infringement decisions that unfairly punish artists for using musical elements in the public domain).

32. *Skidmore*, 905 F.3d at 1125 (citation omitted).

to the two songs and reach an entirely different verdict.³³

As the *Led Zeppelin* case illustrates, substantial similarity requires difficult line drawing from judges while at the same time offering little guidance or predictability for litigants. The problem largely lies in the decision to make a particular kind of audience reaction the centerpiece of copyright infringement without any corresponding way to ascertain the inputs that make up that reaction. One might think that every copyright jury should be instructed in how to appreciate the perspective of the relevant audience. Instead, given “the abstract and intuitive nature” of the audience test, no federal court of appeals provides district courts with model jury instructions on the question of substantial similarity.³⁴ The *Led Zeppelin* jury, like all triers of fact in copyright infringement disputes, faced the daunting task of trying to recreate an audience’s experience with creative works with no tools for understanding that experience save their own personal responses to those works. As the Ninth Circuit affirmed, the substantial similarity analysis demands a “subjective” comparison of the two works, seemingly closing the door on any attempts to more precisely identify what an audience for Wolfe’s work would find most relevant when comparing it to “Stairway to Heaven.”³⁵

This Part details the centrality of audience understanding to the test for copyright infringement and explains how neuroscience can facilitate that understanding. Substantial similarity must be assessed from the perspective of the intended audience for the works at issue. Courts struggle both with how to adopt the audience’s perspective and when a case warrants a specialized approach to audience understanding. History is important here: by seeing how the law changed over time, we can better appreciate the assumptions about audiences embedded in today’s substantial similarity doctrine. Neuroaesthetic research challenges those assumptions, particularly the law’s insistence on the universality of our reactions to creative works.

A. *The Role of the Audience in Copyright Law*

Copyright’s early history reflected a belief that judges could assess similarity on their own terms and a belief that their study of the works at issue did not need to be filtered through the gaze of an audience. In the early

33. Stephen Carlisle, *Stairway to Nowhere: Court Reverses Verdict in Favor of Led Zeppelin*, NOVA (Oct. 11, 2018), <http://copyright.nova.edu/led-zeppelin/> (“The underpinnings of music theory are complex, and not easily understood by people who are not musicians.”).

34. Shyamkrishna Balganes, Irina D. Manta & Tess Wilkinson-Ryan, *Judging Similarity*, 100 IOWA L. REV. 267, 274–75 (2014).

35. *Skidmore*, 905 F.3d at 1125.

twentieth century, courts confidently determined when “the same impressions will be created, and the same emotions excited” by two works.³⁶ Substantial similarity could be evaluated without regard for audience sensibilities. Instead, the task of the judge was simply to compare the works and determine if the defendant had borrowed too heavily from the plaintiff. This permitted the judge to engage in an exacting scrutiny of the two works; there was no need to avoid such scrutiny out of fear that this was not the way the works would be processed by their actual audience.

An early illustrative example comes from the case of *Sheldon v. Metro-Goldwyn Pictures Corp.*³⁷ The district court judge in that matter justified his refusal to trust the audience’s perspective over his own as well as his decision that a film was not substantially similar to the plaintiff’s play this way:

I must, as the trier of the facts, have a more Olympian viewpoint than the average playgoer. I must look at the two opposing productions, the Play and the Picture, not only comparatively, but, as it were, genealogically.³⁸

In review, a Second Circuit panel disagreed with the judge’s take, but simply replaced one “Olympian viewpoint” with another, opining that it knew infringement had occurred because “the dramatic significance of the scenes [in the two works] is the same, almost to the letter.”³⁹

The district judge’s temerity to nakedly assert the right to decide the case from his particular perspective and the Second Circuit’s willingness to interpose its own view stands in sharp contrast to the modern instruction that substantial similarity must be evaluated through the senses of the ordinary observer.⁴⁰ Most trace the arrival of the ordinary observer test to

36. *Curwood v. Affiliated Distribs., Inc.*, 283 F. 223, 228 (S.D.N.Y. 1922).

37. 7 F. Supp. 837 (S.D.N.Y. 1934), *rev’d*, 81 F.2d 49 (2d Cir. 1936).

38. *Id.* at 842.

39. *Sheldon v. Metro-Goldwyn Pictures Corp.*, 81 F.2d 49, 56 (2d Cir. 1936).

40. Even when courts in this earlier era mentioned that works should be evaluated based on the impressions they made on spectators, this was meant to train the trier of fact’s attention on how the author intended for the work to be experienced, not to channel the sensations of intended audience members. For example, the case of *Daly v. Palmer* is sometimes credited as the source of the modern-day audience test. 4 NIMMER & NIMMER, *supra* note 10, at § 13.03[E][2]. But that case did not “ask the judge to put him or herself in the place of a hypothetical and undiscerning ‘ordinary’ observer.” Bruce E. Boyden, *Daly v. Palmer, or the Melodramatic Origins of the Ordinary Observer*, 68 SYR. L. REV. 147, 165 (2018). Rather, because *Palmer* was a case about rival plays, the judge in that case explained that he had “to focus attention on the play as performed as opposed to the play as written.” *Id.* So far as possible, one was meant to experience the play as presented on the stage, not simply read its underlying script. Substantial similarity analysis in this era did not demand adopting the perspective of an average audience member though it did require the judge to experience the work for himself in a similar fashion to the way it would be performed.

the case of *Arnstein v. Porter*.⁴¹ Though drawing on strands of earlier case law that highlighted the perspective of the audience,⁴² *Arnstein* cemented the move to determine infringement based on the impressions of an ordinary audience member, a doctrinal innovation that has achieved “canonical status” in copyright jurisprudence.⁴³

Ira Arnstein was a musical composer with a paranoid streak. In the 1930s and 1940s, he launched a wave of copyright infringement lawsuits against various well-known composers and publishers. His complaints against these musical luminaries not only alleged infringement of his compositions, but also included other provocative allegations. In 1945, he filed a lawsuit against famed composer and songwriter Cole Porter. Not only had Porter wrongfully appropriated his musical works, Arnstein contended, but he had also hired “stooges . . . to follow me, watch me, and live in the same apartment with me.”⁴⁴

Porter moved for summary judgment, which was granted by a federal district court. Arnstein appealed the district court’s decision to the Second Circuit, where it was heard by a trio of legal legends: Judges Jerome Frank, Learned Hand, and Charles Clark. The panel reversed the district court, asserting that there were two parts to every infringement analysis—(1) whether the defendant copied from the protected work (i.e., “copying in fact”) and (2) whether such copying constituted “improper appropriation”—and both were questions of fact that needed to proceed to trial if there was “the slightest doubt.”⁴⁵ Writing for the majority, Judge Frank considered it still to be an open question as to whether Porter could have copied Arnstein’s work, even if some of Arnstein’s allegations rang fantastic. Frank also explained that the issue of improper appropriation (what we now call “substantial similarity”) could not be disposed of as neatly as the district court wished. A jury or judge must decide this issue from the vantage point of an “ordinary lay hearer,” something that had not been done at the trial court level.⁴⁶ Frank even suggested that a jury—so long as “tone-deaf persons” were excluded from it—would be better at this task than out-of-touch judges unfamiliar with popular music and that, in the event of a bench

41. 154 F.2d 464 (2d Cir. 1946); see, e.g., Oren Bracha, *Not De Minimis: (Improper) Appropriation in Copyright*, 68 AM. U. L. REV. 139, 173–74 (2018).

42. *Arnstein* harvested seeds that had been planted by other courts. As explained in a 1926 case, “copying which is infringement must be something ‘which ordinary observations would cause to be recognized as having been taken from’ the work of another.” *Dymow v. Bolton*, 11 F.2d 690, 692 (2d Cir. 1926) (quoting *King Features Syndicate v. Fleischer*, 299 F. 533, 535 (2d Cir. 1924)).

43. Balganesch, *supra* note 4, at 801.

44. *Arnstein*, 154 F.2d at 467.

45. *Id.* at 468.

46. *Id.*

trial, a judge trying such a case should solicit the input of an advisory jury.⁴⁷

Before *Arnstein*, being able to filter out unprotectable elements from consideration was considered more important to evaluating substantial similarity than conveying the audience's overall reaction to the work. The *Sheldon* judge asserted the superiority of his "Olympian" perspective over what the plaintiff's attorney urged, which was to consider "the impression of the Play and the Picture on the 'average playgoer'" in a way analogous to "the 'reasonable man' in other branches of the law."⁴⁸ The judge explained that because both works were based on the same public-domain element—a mid-nineteenth century trial—it made more sense to decide the case based on an objective, legally adept perspective that could filter out uncopyrightable similarities.⁴⁹ After *Arnstein*, priorities flipped: it was now considered more important to identify the impressions of the target audience than to worry about the risk that those impressions might rely on unprotectable ideas or expressive material from the public domain.⁵⁰

Now every federal court evaluates substantial similarity from the perspective of a lay audience.⁵¹ Even when a judge decides the issue of improper appropriation, she is meant to do so through the lens of the audience for the work. *Arnstein*'s push to make the infringement analysis revolve around audience impressions had two primary consequences.

First, expert witnesses could not be used to inform an infringement analysis dependent on the perceptions of laypersons. If the intended audience for a work is one with an ordinary eye and ordinary ear for literature, music, or art, then the opinions of experts with extraordinary artistic sensibilities arguably offer no insight and might even bias a trier of fact trying to guess the reactions of that audience. As a result, courts since *Arnstein* have largely blocked expert testimony on the question of substantial similarity.⁵² In some jurisdictions, there is an outright

47. *Id.* at 473 & n.22.

48. *Sheldon v. Metro-Goldwyn Pictures Corp.*, 7 F. Supp. 837, 842 (S.D.N.Y. 1934).

49. *Id.*

50. Daniel Su, Note, *Substantial Similarity and Architectural Works: Filtering Out "Total Concept and Feel"*, 101 NW. U. L. REV. 1851, 1875 (2007) (criticizing an infringement standard that asks the ordinary observer to evaluate the "total concept and feel" of two architectural designs in their entirety, thereby protecting what should be unprotectable features like "functionally determined and standard design elements").

51. 4 NIMMER & NIMMER, *supra* note 10, at § 13.03[E][3][d]; *see, e.g.*, *Carol Barnhart Inc. v. Econ. Cover Corp.*, 773 F.2d 411, 422 (2d Cir. 1985). An important authority on copyright law maintains the audience test has never been recognized by the Supreme Court and that the linking of infringement with audience reaction may even clash with the Court's limited copyright precedent. 4 NIMMER & NIMMER, *supra* note 10, at § 13.03[E][1][b]. This argument has yet to find any traction in the lower courts.

52. *See, e.g.*, *Stromback v. New Line Cinema*, 384 F.3d 283, 293–95 (6th Cir. 2004).

prohibition on expert assistance in the substantial similarity analysis.⁵³

Second, once the perspective of the ordinary observer became paramount, copyright infringement claims could rarely be disposed of before trial. After all, if the infringement analysis depended on an assessment of what “is recognizable by an ordinary observer,”⁵⁴ then it would seem inappropriate for the judge to substitute her opinion on infringement for that of the lay juror. Recognizing the new paradigm, appellate judges warned district judges away from granting summary judgment on the basis of their own comparison of the plaintiff’s and defendant’s works. As one early Second Circuit opinion chastised, judges who award summary judgment to defendants “when upon a reading of the two works it seems unlikely from their relative merits that the common matter could have been borrowed . . . deprive the plaintiff of his day in court.”⁵⁵ Summary judgment on the issue of substantial similarity continues to be disfavored.⁵⁶ As explained by the Ninth Circuit, “subjective comparisons of literary works that are objectively similar in their expression of ideas must be left to the trier of fact.”⁵⁷

A final critical point is that the substantial similarity analysis is premised on the assumption that different audiences will react to creative works in the same way. The *Arnstein* decision holds that triers of fact need to experience the works at issue subjectively, without the intrusion of expert testimony or instructions to dissect and compare the works’ individual components. Yet the decision also assumes that this subjective process will lead to common conclusions instead of each juror coming up with their own idiosyncratic analysis.⁵⁸ Otherwise, jurors should be precluded from determining substantial similarity. One might worry that one audience member’s reaction is likely to differ from another, causing infringement decisions to vary based on the personal predilections of individual judges and jurors, particularly when these decisions are not kept in check through judicial or expert guidance. Instead, it is assumed that the trier of fact can uncover the aesthetic essence bound up in a creative work in a way that translates across audiences and does not require specialized training.

53. Lemley, *supra* note 2, at 723.

54. *Fleischer Studios v. Ralph A. Friendlich, Inc.*, 73 F.2d 276, 278 (2d Cir. 1934).

55. *MacDonald v. Du Maurier*, 144 F.2d 696, 701 (2d Cir. 1944).

56. *E.g.*, *Jones v. Blige*, 558 F.3d 485, 490 (6th Cir. 2009); *Litchfield v. Spielberg*, 736 F.2d 1352, 1355 (9th Cir. 1984).

57. *Shaw v. Lindheim*, 919 F.2d 1353, 1361 (9th Cir. 1990), *overruled on other grounds by Skidmore v. Zeppelin*, 942 F.3d 1051 (9th Cir. 2020) (en banc).

58. *See* Balganesch, *supra* note 4, at 856 (positing deference to the jury on the issue of substantial similarity “derive[s] from the idea that collective decisionmaking and deliberation are likely to iron out any individual biases and idiosyncratic biases that an individual decisionmaker (e.g., a judge) might have”).

Reflecting this belief in a largely universal aesthetic experience, courts rarely consider the views of a particular audience. Most decisions fall back on the presumption that “the response of the ordinary reasonable person” will serve as an adequate stand-in for the target audience.⁵⁹ Jury instructions vary between asking jurors to determine whether an “ordinary reasonable person” would find the works substantially similar to equating the concept of the ordinary reasonable observer with the jurors themselves.⁶⁰ The implication seems to be that jurors are a sufficient proxy for the audience because they will have the same ultimate response to the two works as that audience. “In most cases, when a copyrighted work will be directed at the public in general, the court need only apply a general public formulation to the intended audience test.”⁶¹

In “exceptional circumstances,” courts adjust the substantial similarity analysis to consider the views of a particular audience.⁶² For example, in a case involving the alleged infringement of characters from a puppet show, the court explained that it had to confront “the particular factual issue of the impact of the respective works upon the minds and imaginations of young people.”⁶³ Even when departing from the presumption of audience universality, however, courts do little to investigate the particular understandings of a specialized audience. The most frequent deviation from considering infringement from a generalized perspective is when the works at issue are designed to appeal to children. In these cases, only the relative inability of these observers to detect disparities is emphasized.⁶⁴ More fine-grained explorations of target audience sensibilities are rare,⁶⁵ testifying to the assumption that, in general, different audiences experience creative works in the same way.⁶⁶

59. *Shaw*, 919 F.2d at 1358; *see also* *Baxter v. MCA, Inc.*, 812 F.2d 421, 423 (9th Cir. 1987) (“This Court’s ‘ear’ is as lay as they come.”) (quoting opinion below).

60. Irina D. Manta, *Reasonable Copyright*, 53 B.C. L. REV. 1303, 1335 (2012).

61. *Lyons P’ship v. Morris Costumes, Inc.*, 243 F.3d 789, 801 (4th Cir. 2001); *see also* *Well-Made Toy Mfg. Corp. v. Goffa Int’l Corp.*, 210 F. Supp. 2d 147, 161–62 (E.D.N.Y. 2002) (stating that a “specialized intended audience” test “has not taken root in the Second Circuit”).

62. *Copeland v. Bieber*, 789 F.3d 484, 491 (4th Cir. 2015) (explaining that adopting the perspective of a specialized audience should be reserved for “exceptional circumstances”).

63. *Sid & Marty Krofft Television Prods., Inc. v. McDonald’s Corp.*, 562 F.2d 1157, 1166 (9th Cir. 1977), *overruled by on other grounds by* *Skidmore v. Zeppelin*, 952 F.3d 1051 (9th Cir. 2020) (en banc).

64. *See, e.g.*, *Aliotti v. R. Dakin & Co.*, 831 F.2d 898 (9th Cir. 1987); *Krofft*, 562 F.2d 1157; *Williams v. Crichton*, 860 F. Supp. 158, 166 (S.D.N.Y. 1994).

65. Audiences with professional or technical expertise occasionally receive specialized treatment. *E.g.*, *RGIS, LLC v. A.S.T., Inc.*, No. 2:07-CV-10975, 2008 U.S. Dist. LEXIS 4226 at *6–7 (E.D. Mich. Jan. 22, 2008); *Nat’l Med. Care, Inc. v. Espiritu*, 284 F. Supp. 2d 424, 436 (S.D. W. Va. 2003).

66. *Dawson v. Hinshaw Music*, 905 F.2d 731, 735–36 (4th Cir. 1990); 4 NIMMER & NIMMER, *supra* note 10, at § 13.03[E].

Perhaps because of this belief in aesthetic universality, courts reject opportunities to use outside evidence to gain a better understanding of audience differences. Surveys of representative audience members are not admissible in copyright infringement actions.⁶⁷ Take, for example, a case involving the manufacture of action figures thought to resemble characters from the first *Star Wars* film. An effort to introduce a survey of the perceptions of children—the relevant audience for these creative works—was rebuffed. The court explained that admitting such a survey would set the “dangerous precedent of allowing trial by the court to be replaced by public opinion poll.”⁶⁸ Similarly, in a different matter involving a television show alleged to infringe the Superman character, the Second Circuit blocked consideration of survey evidence out of concern such evidence would usurp what should be the trier of fact’s independent role in determining substantial similarity.⁶⁹

Contrast this state of affairs with the widespread use of outside evidence of audience perception in trademark law. Courts have been much more transparent about their own difficulties in accurately assessing the minds of consumers in trademark cases.⁷⁰ As a result, the history of trademark law reveals a growing acceptance of outside evidence to determine issues of likely consumer confusion as well as mark distinctiveness.⁷¹ Survey evidence is widely accepted and even required for some of trademark law’s legal questions.⁷² For trademark infringement claims, courts deploy multi-factor tests to determine the likelihood of consumer confusion from the defendant’s activities. All of these tests call for consideration of evidence of “actual confusion”—whether in the form of survey evidence or anecdotal testimony—and “customer sophistication,” which allows for scrutiny of the particularized understandings of the relevant target consuming group.⁷³ In sum, there is a much greater willingness to collect empirical information on a target audience when it comes to that audience’s processing of brand names and symbols than when it comes to an audience’s encounters with music and literature.⁷⁴

67. 3 WILLIAM F. PATRY, PATRY ON COPYRIGHT § 9:83 (2018).

68. *Ideal Toy Corp. v. Kenner Prods.*, 443 F. Supp. 291, 297 (S.D.N.Y. 1977).

69. *Warner Bros., Inc. v. Am. Broad. Cos.*, 720 F.2d 231, 245 (2d Cir. 1983).

70. For example, Judge Richard Posner acknowledged that “judges and jurors have their own biases and blind spots” in trying to understand the thought processes of consumers. *Kraft Foods Grp. Brands LLC v. Cracker Barrel Old Country Store, Inc.*, 735 F.3d 735, 741 (7th Cir. 2013) (Posner, J.).

71. Bartholomew, *supra* note 23, at 548–51.

72. 2 J. THOMAS MCCARTHY, MCCARTHY ON TRADEMARKS AND UNFAIR COMPETITION § 12:14 (5th ed. 2018) (stating that surveys have become “almost de rigeur in litigation over genericness”).

73. *See, e.g., AutoZone, Inc. v. Tandy Corp.*, 373 F.3d 786, 792–93 (6th Cir. 2004).

74. *See* Michael Ferdinand Sitzer, Note, *Copyright Infringement Actions: The Proper Role for*

B. Distinguishing Between Audiences Through Neuroscience

By characterizing the audience members' experience of creative works as both subjective and universal, the current test for copyright infringement matches the view of the most important philosopher of aesthetics: Immanuel Kant. Writing in the eighteenth century, Kant referred to aesthetic judgment as "the judgment of taste," and explained that the experience of pleasure from art had a necessarily "subjective condition."⁷⁵ But Kant also insisted on the commonality, or what he described as the "universal validity," of aesthetic encounters. As he explained, "if [someone] proclaims something to be beautiful, then he requires the same liking from others; he then judges not just for himself but for everyone, and speaks of beauty as if it were a property of things."⁷⁶ Agreeing with this folk intuition about our responses to art, Kant maintained that aesthetic judgments are like empirical judgments (e.g., there are ten provinces in Canada) in that they claim universal validity, although they are different from empirical judgments in that they are based on an inner subjective response.⁷⁷ In accord with Kant, copyright's audience test relies on the assumption that audience members respond to creative works in their own way but somehow arrive at common conclusions.

Neuroaesthetic research challenges this assumption. A great deal of this research reveals audience difference. For example, brain imaging demonstrates differences in how men and women process art and how they experience music.⁷⁸ Imagine a copyright infringement dispute involving a

Audience Reactions in Determining Substantial Similarity, 54 S. CAL. L. REV. 385, 397–98 (1981) (discussing trademark law's willingness to take a more specific view of relevant audiences whereas copyright law fails to distinguish the intended audience for the relevant works from the general public or average observer). Part of this difference between copyright and trademark may lie in the difference between the accessibility of each regime's normative goals. There are complexities to both, but trademark law is most certainly about reducing the information costs of consumers in the marketplace. Mark P. McKenna, *A Consumer Decision-Making Theory of Trademark Law*, 98 VA. L. REV. 67, 75 (2012). Copyright law's boundaries are more contentious, in part, because the courts have not found an acceptable way to measure "aesthetic progress." Barton Beebe, Bleistein, *the Problem of Aesthetic Progress, and the Making of American Copyright Law*, 117 COLUM. L. REV. 319, 331–48 (2017). I thank Brian Soucek for helping me realize this point.

75. IMMANUEL KANT, *CRITIQUE OF JUDGMENT* § 9 at 61 (Werner S. Pluhar trans., 1987).

76. *Id.* § 7 at 55–56.

77. Nick Zangwill, *Aesthetic Judgment*, STAN. ENCYCLOPEDIA PHIL. (Edward N. Zalta ed. 2019), <https://plato.stanford.edu/archives/spr2019/entries/aesthetic-judgment/> [<https://perma.cc/8WF2-DGTD>]. See also *infra* Part II.

78. See Valentina Cazzato, Sonia Mele & Cosimo Urgesi, *Gender Differences in the Neural Underpinning of Perceiving and Appreciating the Beauty of the Body*, 264 BEHAV. BRAIN RES. 188, 194–95 (2014); Camilo J. Cela-Conde et al., *Sex-Related Similarities and Differences in the Neural Correlates of Beauty*, 106 PROC. NAT'L ACAD. SCI. 3847, 3851 (2009); Magzhan Kairanbay, John See & Lai-Kuan Wong, *Towards Demographic-Based Photographic Aesthetics Prediction for Portraits*,

work consumed predominantly by one gender. For example, although fan fiction is diverse and different works and genres in fan fiction can have different readerships, most fan fiction is written by women and its audience trends female.⁷⁹ If women experience fan fiction differently from men, an analysis of substantial similarity without attention to this difference risks either over- or underpolicing copyright in a discriminatory manner.⁸⁰

The current implementation of the audience test assumes not only that people will respond to the same works in the same ways but that this aesthetic experience stays the same regardless of prior experience with the work's style, genre, or format.⁸¹ Neuroscience offers the ability to compare the aesthetic responses of audiences with different backgrounds and to search for differences in their reactions. Studies reveal cognitive differences in the ways experts and non-experts react to creative works.⁸² Some amount of artistic training produces changes in "art-specific organization in the cerebellum."⁸³ As expertise increases, so does visual exploration of a painting's overall composition, background features, and color contrasts. The "art-naïve," however, spend more time looking at individual figurative elements and figures in the painting's center and foreground.⁸⁴ A study examining the brain activity of architects and non-architects revealed that only the architects retrieved information stored in memory when assessing the aesthetic appeal of different buildings.⁸⁵

in 10704 LECTURE NOTES ON COMPUTER SCI. 531, 539–41 (K. Schoeffmann et al. eds., 2018); Alexandre N. Tuch, Javier A. Bargas-Avila & Klaus Opwis, *Symmetry and Aesthetics in Web Design: It's a Man's Business*, 26 COMPUTERS HUMAN BEHAV. 1831, 1834–35 (2010).

79. Tabitha Carvan, *Fan Fiction is Women's Work*, OVERLAND (June 28, 2018), <https://overland.org.au/2018/06/fanfiction-is-womens-work/> ("Fanfiction surpasses romance as the most female genre of all, with more of its readers and writers identifying as genderqueer (6 per cent) than male (4 per cent).").

80. Cf. Pamela Kalinowski, *The Fairest of Them All: The Creative Interests of Female Fan Fiction Writers and the Fair Use Doctrine*, 20 WM. & MARY J. WOMEN & L. 655, 661–65 (2014) (discussing predominantly female appeal of fan fiction as reason for revising copyright fair use).

81. It is true that relevant expertise may disqualify someone from a copyright infringement jury. Presumably a musicologist would be excluded from a case of musical copyright infringement, and an art historian would be kept off a jury deciding a claim of infringement over abstract art. Yet leaving these unusual situations to the side, the test for copyright infringement assumes that all observers are created relatively equal and will come to a shared consensus as they compare their own aesthetic experiences.

82. CHATTERJEE, *supra* note 19, at 149; Vinoo Alluri, Petri Toiviainen, Iballa Burunat, Marina Kliuchko, Peter Vuust & Elvira Brattico, *Connectivity Patterns During Music Listening: Evidence for Action-Based Processing in Musicians*, 38 HUMAN BRAIN MAPPING 2955 (2017).

83. Juan García-Prieto, Ernesto Pereda & Fernando Maestú, *Neurocognitive Decoding of Aesthetic Appreciation*, in MULTIMODAL OSCILLATION-BASED CONNECTIVITY THEORY 87, 97 (S. Palva ed. 2016).

84. Anjan Chatterjee & Oshin Vartanian, *Neuroscience of Aesthetics*, 1369 ANNALS N.Y. ACAD. SCI. 172 (2016).

85. Ulrich Kirk, Martin Skov, Mark Schram Christensen & Niels Nygaard, *Brain Correlates of Aesthetic Expertise: A Parametric fMRI Study*, 69 BRAIN & COGNITION 306, 310 (2009).

The research shows that familiarity inevitably influences perception.⁸⁶ Experience triggers more attention to technique and style when rendering an aesthetic judgment; lack of experience prompts greater reliance on personal feelings.⁸⁷ Audiences differ wildly in their familiarity with different art forms. For example, there is a wide disparity among the general population in terms of musical experience. This means that one jury or judge will likely have significantly different aesthetic responses from another.⁸⁸ It is not that some audience members are comfortable evaluating creative works and others are not. Everyone makes aesthetic judgments, even if they lack training or familiarity with the category of work at issue. It is just that the means and content of these judgments differ based on who is making the judgment and their background relationship to the work.⁸⁹

Regardless of audience familiarity, the process of aesthetic judgment changes depending on the mode of artistic expression. The substantial similarity analysis remains the same regardless of the kind of creative work at issue or the particular senses employed to appreciate that art. It is true that courts display a somewhat greater comfort with literary works and, as a result, are particularly loath to allow dissection and expert testimony in those cases.⁹⁰ But this is by no means an established rule. In general, copyright law does not adjust to note differences in creative formats. The dominant assumption in copyright law is that aesthetic judgment operates in the same fashion in one artistic context as it does in another.⁹¹

In reality, the character of our aesthetic understanding changes

86. Adam L. Alter & Daniel M. Oppenheimer, *Uniting the Tribes of Fluency to Form a Metacognitive Nation*, 13 PERSONALITY & SOC. PSYCH. REV. 219, 228 (2009).

87. Helmut Leder, *Next Steps in Neuroaesthetics: Which Processes and Processing Stages to Study?*, 7 J. PSYCH. AESTHETICS, CREATIVITY & ARTS 27, 33 (2013).

88. Valorie N. Salimpoor, David H. Zald, Robert J. Zatorre, Alain Dagher & Anthony Randal McIntosh, *Predictions and the Brain: How Musical Sounds Become Rewarding*, 19 TRENDS COGNITIVE SCI. 86, 89 (2015); see also KEVIN J. MITCHELL, *INNATE: HOW THE WIRING OF OUR BRAINS SHAPES WHO WE ARE* 142–43 (2018) (discussing differences in perceptual abilities in the general population, including the three percent of the population that is tone deaf).

89. Johan De Smedt & Helen De Cruz, *Toward an Integrative Approach of Cognitive Neuroscientific and Evolutionary Psychological Studies of Art*, 8 EVOLUTIONARY PSYCHOL. 695, 696 (2010).

90. This comfort has consequences. In contrast to other kinds of copyright disputes, no plaintiff in a copyright infringement case involving a literary work has won at trial in the last twenty-five years. Steven T. Lowe, *Death of Copyright 3: The Awakening*, 41 L.A. LAW. 28, 28, 30 n.9 (2018). By contrast, the success rate is greater for copyright suits involving musical compositions where courts are more accepting of expert testimony. See Regina Zernay, Comment, *Casting the First Stone: The Future of Music Copyright Law After Blurred Lines, Stay With Me, and Uptown Funk*, 20 CHAPMAN L. REV. 177, 209–11 (2017) (describing use of experts in music copyright infringement cases as “not uncommon” and recounting commentary attributing the jury verdict finding infringement in a lawsuit over the song “Blurred Lines” to testimony from plaintiff’s expert musicologists).

91. See Tushnet, *supra* note 3, at 684 (“Copyright is literal. It starts with the written word as its model, then tries to fit everything else into the literary mode.”).

depending on the kind of creative work presented. Abstract art prompts more varied aesthetic reactions than representational art.⁹² Dance expertise and architectural knowledge exhibit their own unique biologies.⁹³ Perhaps most significantly, our biological responses to visual works differ from our responses to aural ones.⁹⁴ For example, there is evidence that listeners perceive music in a dissective manner as they analyze various individual features of a song rather than evaluating the song holistically. By contrast, evaluation of other creative works involves a more gestalt-like analysis.⁹⁵ This difference between the aesthetic processing of visual and aural works has direct implications for music infringement cases. Often such cases depend on a judge's choice to believe that the relevant audience will either consider a song in its entirety or focus its attention on a particular measure in the work's chorus.⁹⁶

Some might question whether neuroscientific research, which, by necessity, is conducted with small sample sizes, can offer generalizable insights into audience reaction. The answer is that, in a variety of contexts, small sample sizes for neuroscientific studies supply results that apply to larger, legally relevant populations.⁹⁷ Although there is variability, "studies of aesthetic preference are reasonably consistent in their findings."⁹⁸ Instead of being hopelessly different, aesthetic reactions *in particular audiences* appear to have enough coherence that information about these reactions can help inform the audience test. Neuroaesthetic studies provide probative evidence of commonalities among various cohorts, including women,

92. Edward A. Vessel, Natalia Maurer, Alexander H. Denker & G. Gabrielle Starr, *Stronger Shared Taste for Natural Aesthetic Domains Than for Artifacts of Human Culture*, 179 COGNITION 121, 122 (2018).

93. Beatriz Calvo-Merino, Shantel Ehrenberg, Delia Leung & Patrick Haggard, *Experts See It All: Configural Effects in Action Observation*, 74 PSYCHOL. RES. 400 (2010); Kirk et al., *supra* note 85, at 309.

94. Jon O. Luring, *Visual Art*, in AN INTRODUCTION TO NEUROAESTHETICS 115, 125 (Jon O. Luring ed. 2014) (visual beauty triggers activity in the caudate nucleus, but not musical beauty); Cristina Rosazza, Qing Cai, Ludovico Minati, Yves Paulignan & Tatjana A. Nazir, *Early Involvement of Dorsal and Ventral Pathways in Visual Word Recognition: An ERP Study*, 1272 BRAIN RES. 32, 32–33 (2009) (maintaining that there is better understanding of the neural pathways underlying visual object recognition than for recognition of spoken or written words).

95. Isabel Comgold, Note, *Copyright Infringement and the Science of Music Memory: Applying Cognitive Psychology to the Substantial Similarity Test*, 45 AIPLA Q.J. 319, 339–42 (2017); Paul J. Locher, *The Aesthetic Experience with Visual Art "At First Glance"*, in INVESTIGATIONS INTO THE PHENOMENOLOGY AND THE ONTOLOGY OF THE WORK OF ART: WHAT ARE ARTWORKS AND HOW DO WE EXPERIENCE THEM 75, 75–77 (Peer F. Bundgaard & Frederik Stjernfelt eds., 2015).

96. *See, e.g., Swirsky v. Carey*, 376 F.3d 841, 851 (9th Cir. 2004).

97. Emily B. Falk, Elliot T. Berkman & Matthew D. Lieberman, *From Neural Responses to Population Behavior: Neural Focus Group Predicts Population-Level Media Effects*, 23 PSYCHOL. SCI. 439, 444 (2012) (explaining that "behavioral responses of entire populations whose brains are never examined may be inferred from the brain activations of a small neural focus group").

98. García-Prieto et al., *supra* note 83, at 98.

children, and individuals of a particular socioeconomic status.⁹⁹

Moreover, in the context of copyright infringement, everyone in a target audience need not evaluate an artwork in the same way for such evidence to be probative. A finding of substantial similarity relies only on general agreement about the audience's aesthetic experience, not certitude about the uniformity of that experience.¹⁰⁰ Neuroaesthetic research demonstrates there are enough differences in aesthetic judgment to invalidate copyright law's one-size-fits-all approach to audience reaction while at the same time offering evidence of commonalities within particularized audiences.

Once audience difference is taken seriously, some difficult line-drawing may be necessary when it comes to determining who makes up the relevant audience for a work. Mistakes might be made, resulting in either over- or underinclusion. But even the occasional misstep in selecting an audience represents an improvement over the status quo, where audience differences are ignored entirely. As I suggest in Part III, courts should embrace the neuroscientific understanding of audience variability by calibrating the substantial similarity analysis to the intended audience for the plaintiff's work instead of assuming that any onlooker would process the creative work at issue in the same fashion.¹⁰¹

In sum, neuroaesthetics challenges copyright's assumption that most audiences think alike. Recent findings reveal great variability in aesthetic response, which has potential consequences for construction of the substantial similarity analysis. Merely distinguishing between experts and non-experts does not capture the full scope of audience heterogeneity. Rather than being in general agreement, different audience members, even if they are not experts, process artistic works in different ways. Moreover, if the audience test is to be informed by current neuroscientific understandings, the test will need to be able to adapt to different modalities in creative expression. Neuroscience demonstrates that not all audiences are the same and that the mechanics of aesthetic judgment differ across kinds of art. Unfortunately, copyright law offers no guidance to a trier of fact striving to understand audience difference. The substantial similarity analysis vigorously resists outside evidence whether in the form of

99. See generally Cazzato et al., *supra* note 78; Jason Chien, Dustin Albert, Lia O'Brien, Kaitlyn Uckert & Laurence Steinberg, *Peers Increase Adolescent Risk by Enhancing Activity in the Brain's Reward Circuitry*, 14 DEVELOPMENTAL SCI. 1 (2011); Martha J. Farah, *The Neuroscience of Socioeconomic Status: Correlates, Causes, and Consequences*, 96 NEURON 56 (2017).

100. Cf. Brian Soucek, *Aesthetic Judgment in Law*, 69 ALA. L. REV. 381, 454 (2017) (maintaining that one can reject the argument that aesthetic preference is so relative that judges may never make aesthetic decisions while still not requiring that "everyone converge on one single, universally agreed-upon interpretation and evaluation of every artwork").

101. See *infra* Part III.A.2.

testimony from an expert in the field or surveys of relevant audience members.

II. UNDERSTANDING AESTHETICS

In 2009, Tashera Simmons came up with an idea for a reality show called “Hip Hop Wives.”¹⁰² Simmons was married to the rapper DMX, but a string of arrests and extra-marital affairs took their toll on the relationship, and the pair ultimately divorced.¹⁰³ Simmons envisioned a show about the trials and tribulations of women, including herself, in relationships with hip hop artists. She pitched the idea to the television network VH1. VH1 passed, but two years later began airing a reality show called “Love & Hip Hop” focused on the personal and professional lives of women in the hip hop industry.¹⁰⁴ The show grew into a major media franchise with over four hundred episodes airing to generally high ratings.¹⁰⁵

There were a number of similarities between the “Hip Hop Wives” proposal and the first season of “Love & Hip Hop.” Both shows centered on the troubled personal relationships of women attached in some form to the hip hop industry. Both featured Chrissy Lampkin, partner of the hip hop artist Jim Jones. Both shows were described as having a “fast” and “high octane” pace. Nevertheless, a district court concluded that “no reasonable jury could conclude that the two works are substantially similar.”¹⁰⁶

Three years earlier, the same court needed to decide another copyright infringement suit involving reality television. This time, the plaintiff managed to convince the court that a jury could find the two works substantially similar. The plaintiff proposed a reality show that pitted celebrity contestants against one another in events designed to mimic the training for Navy Seals. A producer affiliated with NBCUniversal responded favorably to the plaintiff’s pitch, but then declined. Shortly thereafter, NBC aired a show called “Stars Earn Stripes” that revolved around celebrity contestants competing in skill-based competitions based on military maneuvers. In the court’s view, both shows demonstrated a similar theme and mood (“appreciation and respect for military personnel”) and

102. 8th Wonder Entm’t v. Viacom Int’l, Inc., No. 2:14-cv-01748-DDP-JCG, 2016 WL 6882832, at *1–3 (C.D. Cal. Nov. 22, 2016).

103. Charli Penn, *Tashera Simmons: Why I’m Really Divorcing DMX*, ESSENCE (June 12, 2012), <https://www.essence.com/news/tashera-simmons-why-im-really-done-with-dmx/> [<https://perma.cc/M4XY-L2FW>].

104. 8th Wonder Entm’t, 2016 WL 6882832 at *1–3.

105. *Love & Hip Hop*, WIKIPEDIA, https://en.wikipedia.org/wiki/Love_%26_Hip_Hop [<https://perma.cc/4SFW-4JX4>].

106. 8th Wonder Entm’t, 2016 WL 6882831 at *7–8.

“uncannily similar” kinds of contestants (e.g., WWE professional wrestlers, former Dancing with the Stars competitors).¹⁰⁷ Unlike in the case of Ms. Simmons, the court concluded that when “[v]iewing the protectable elements of the works as a whole,” a reasonable trier of fact could determine the two works to be substantially similar.¹⁰⁸

Some critics blame *Arnstein*’s call to interpret infringement through audience sensibilities for the inconsistent and unpredictable state of copyright infringement doctrine.¹⁰⁹ As discussed in Part I, neuroscience indicates that the audience test does a bad job of addressing variations in audiences and their judgment of creative works. Yet even though *Arnstein* identified *who* was relevant for determining infringement, the decision did not specify *what* its audience test was supposed to measure. A judge or jury examining two works for substantial similarity needs to know what level of similarity should be considered “substantial.” Other decisions supplied this information, instructing that the task for the trier of fact was to determine if the “aesthetic appeal” of the defendant’s work is the “same” as the plaintiff’s work.¹¹⁰ At the same time, “aesthetic appeal” is not a term with a clear legal or philosophical definition.¹¹¹ Maybe two reality shows featuring celebrities enduring military training had the same aesthetic appeal whereas programs showcasing the personal lives of women in hip hop did not, but it is hard to know why. Somehow the moods and themes in the first case were insufficiently similar but not in the second. The shared use of comparable kinds of celebrity contestants was probative of aesthetic similarity for the military reality show, but featuring the same cast member in both hip hop shows—Chrissy Lampkin—was not. By tethering infringement to aesthetic experience, copyright law makes the infringement analysis highly uncertain and often inconsistent.¹¹²

This is not to say that there are no guideposts for determining a work’s

107. *Dillon v. NBCUniversal Media*, 2013 WL 3581938, at *5–6 (C.D. Cal. June 18, 2013).

108. *Id.* at *7.

109. Balganes, *supra* note 4, at 859 (tying lack of guidelines for infringement analysis to the audience test’s “anti-intellectual (i.e., intuitive) nature”); Lemley, *supra* note 2, at 719 (stating that *Arnstein* “has the analysis of proof exactly backwards”).

110. *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960).

111. See Robert Kirk Walker & Ben Depoorter, *Unavoidable Aesthetic Judgments in Copyright Law: A Community of Practice Standard*, 109 NW. U. L. REV. 343, 374–76 (2015) (suggesting different ways to approach aesthetic judgments, and advocating for rendering such judgments from the perspective of a hypothetical “Community of Practice” that can inform courts as to “the aesthetic norms and traditions that influenced the works”).

112. My point here is not that both cases should have had the same outcome. Strong arguments can be made for why common elements in the “Hip Hop Wives” case were unprotectable ideas or already in the public domain whereas the similarities in the “Stars Earn Stripes” case involved protectable expression. These distinctions are not clear, however, nor is it clear how the courts should identify which similarities map onto the aesthetic experience of the relevant audience.

aesthetic appeal. Over the years, in attempting to define the parameters of the aesthetic experience, courts have made certain assumptions. Aesthetic experience is considered subjective and unmeasurable, making a quantitative analysis impossible. Any effort to empirically determine the features of copyrighted works that audiences would pay the most attention to or that would rank highest in their aesthetic evaluations is doomed to fail and therefore must be excluded from the substantial similarity analysis. Moreover, the belief that responses to art occur rapidly makes judges skeptical of lengthy deliberations over work similarities. As we will see, neuroaesthetic studies challenge some of these assumptions about the aesthetic experience, placing the foundation of substantial similarity on unstable ground.

A. Moving from Empirical Investigation to Unquantifiable Intuition

Courts in the late nineteenth and early twentieth centuries posited certain qualities to the aesthetic experience. They maintained that pleasure was at the heart of aesthetic response and this response was unavoidably subjective, preventing its discernment through objective criteria. They also believed that one appreciates art spontaneously, not through lengthy analysis. These assumptions, despite a complete lack of empirical support at the time they were made, remain embedded in the law of substantial similarity today.

1. Daly v. Palmer and the Turn to Aesthetic Experience

By stressing aesthetic concerns, the substantial similarity test leaves out other potential commonalities that could inform the infringement analysis. One might envision a substantial similarity test that asked the jury in the *Led Zeppelin* case to tally up what matches and what does not in a measure-by-measure analysis of the two musical works, perhaps with the court first screening out those aspects of Randy Wolfe's song that are not copyrightable.¹¹³ Instead, the jury was told to make a "subjective comparison" of Led Zeppelin and Wolfe's works and evaluate their "total concept and feel," thereby foreclosing this kind of defined, detailed comparison of song similarities and differences.¹¹⁴ A comparison of aesthetic appeal means that raw similarity, by itself, is not enough to

113. See *Swirsky v. Carey*, 376 F.3d 841, 847–48 (9th Cir. 2004) (finding that district court erred in "basing its comparison of the two choruses at issue almost entirely on a measure-by-measure comparison" for purposes of the Ninth Circuit's extrinsic test for substantial similarity).

114. *Skidmore v. Led Zeppelin*, 905 F.3d 1116, 1125, 1134 (9th Cir. 2018), *vacated and rev'd in part on other grounds*, 952 F.3d 1051 (9th Cir. 2020) (en banc).

establish infringement.¹¹⁵

Another potential route for the infringement analysis would be to analyze the commercial effect of the defendant's work on the plaintiff's audience instead of its aesthetic effect.¹¹⁶ If market harm was the *sine qua non* of infringement, the substantial similarity test would look much different.¹¹⁷ If proof that the defendant's work serves as an economic substitute for the plaintiff's work was required to find infringement, Tashera Simmons' case might have hinged on an assessment of whether VH1's "Love & Hip Hop" empire hurt the potential market for "Hip Hop Wives." Copyright law has not chosen this path either. The audience test rejects direct consideration of perceived similarities or financial harm, instead defining infringement on the unknowable aesthetic sensibilities of the trier of fact.¹¹⁸

The critical precedent that eventually led to aesthetic appeal becoming the *sine qua non* of infringement was *Daly v. Palmer*.¹¹⁹ That case, decided seventy-five years before *Arnstein*, signaled a move from defining infringement as bodily appropriation of copyrighted expression to something broader and ineffable. Beginning with *Daly*, in the mid to late nineteenth century, "[t]he infringement analysis slowly shifted from having a strong focus on verbatim copying to encompassing increasingly remote

115. Raw similarity is relevant to the copying in fact analysis. See *Feist Publ'ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340, 363–64 (1991) (holding that while copying as a factual matter was shown, copying as a legal proposition had not been established because the copied information was merely raw data that did not "owe its origin" to the plaintiff).

116. Charles E. Colman, *Design and Deviance: Patent as Symbol, Rhetoric As Metric Part 2*, 56 JURIMETRICS 1, 10 (2015).

117. See Amy B. Cohen, *Masking Copyright Decisionmaking: The Meaninglessness of Substantial Similarity*, 20 U.C. DAVIS L. REV. 719, 732 (1987) ("Instead of using some objective standards or criteria based on economic impact or quantity, courts [are] to determine infringement on an unpredictable, impressionistic basis."); Shyamkrishna Balganes, *The Normativity of Copying in Copyright Law*, 62 DUKE L.J. 203, 251–55 (2012) (maintaining that the substantial similarity analysis is structured so as to take into account non-utilitarian values).

118. Analysis of market harm has largely been outsourced to copyright's fair use analysis. According to the Supreme Court, a defendant making a successful fair use defense must show that his copying "does not materially impair the marketability of the work which is copied." *Harper & Row Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 567 (1985). Rather than guessing at audience response, courts determine market harm by examining evidence regarding purchasers of the plaintiff's and defendant's works, concluding that market harm is unlikely when these two groups of purchasers do not overlap. See *Cariou v. Prince*, 714 F.3d 694, 708–09 (2d Cir. 2013). Although arguments about harm to future markets for derivatives of the original are considered in fair use, courts evaluating the defense reject such arguments when they are speculative or lack empirical grounding. See *Perfect 10, Inc. v. Amazon.com, Inc.*, 508 F.3d 1146, 1168 (9th Cir. 2007). Admittedly, determining when a market might exist in the future is inherently difficult and can potentially depend on the fair use determination itself. See *Am. Geophysical Union v. Texaco Inc.*, 60 F.3d 913, 929–31 (2d Cir. 1994). Nevertheless, the fair use doctrine's insistence that fair use only be determined based on the presence of "a workable market" indicates a level of objective inquiry that is not present in the current substantial similarity analysis. *Cambridge Univ. Press v. Patton*, 769 F.3d 1232, 1276 (11th Cir. 2014); see also *infra* Part III.A.2.

119. 6 F. Cas. 1132 (C.C.S.D.N.Y. 1868) (No. 3552).

levels of similarity.”¹²⁰

Playwright Augustin Daly wrote a melodrama with a sensationalist scene featuring a character tied to a railroad track by a villain; the character was then rescued from a steaming locomotive by the play’s protagonist in the nick of time. When a theatre owner staged another play with a similar railroad scene, Daly sued for copyright infringement.¹²¹ A federal court in New York found in Daly’s favor explaining:

it is a piracy, if the appropriated series of events, when represented on the stage, although performed by new and different characters, using different language, is recognized by the spectator, through any of the senses to which the representation is addressed, as conveying substantially the same impressions to, and exciting the same emotions in, the mind, in the same sequence or order.¹²²

For decades, courts had assessed whether infringement occurred by looking to whether the actual language of the original work had been copied by the defendant. For example, Harriett Beecher Stowe failed in her infringement action against an unauthorized translator of her book *Uncle Tom’s Cabin* because the German translation did not contain the exact same English words as the original.¹²³ The *Daly* decision conceived of the copyright interest more broadly, not as a right in the four corners of a tangible object, but as a right to prevent others from recreating aspects of a copyrighted work in a way that would prompt the same aesthetic experience. *Daly* began to shift substantial similarity away from an empirical investigation of tangible qualities to a question that relied on unquantifiable intuition to answer.

Daly’s vision of aesthetic experience did not lend itself to a rigorous picking apart of works. By locating infringement in the registering of “impressions” and “emotions,”¹²⁴ *Daly* implied that substantial similarity could not be determined on the basis of careful study or an exacting breakdown of two works into their component parts. As one early twentieth century court explained, because “copyright, like all statutes, is made for plain people . . . infringement must be something which ordinary observations would cause to be recognized”; if “dissection rather than observation” is needed “to discern any resemblance,” then there is no

120. Bracha, *supra* note 41, at 171.

121. *Daly*, 6 F. Cas. at 1133.

122. *Id.* at 1138.

123. *Stowe v. Thomas*, 23 F. Cas. 201, 208 (C.C.E.D. Pa. 1853) (No. 13,514) (“A translation may, in loose phraseology, be called a transcript or copy of her thoughts or conceptions, but in no correct sense can it be called a copy of her book.”).

124. *Daly*, 6 F. Cas. at 1137.

infringement.¹²⁵ More recently, a federal court of appeals described the “touchstone of the [substantial similarity] analysis” as only countenancing those differences that the ordinary observer had not “set out to detect.”¹²⁶

To protect the impressionistic quality of aesthetic reaction, courts largely prohibit attempts to determine substantial similarity by compiling lists of similarities and differences in the works at issue.¹²⁷ Determining aesthetic response should not involve a “catalogue,” explained Learned Hand. Instead the “proper approach . . . must be more ingenious, more like that of a spectator, who would rely upon the complex of his impressions of each character.”¹²⁸ Courts today describe the infringement comparison as one of “overall look and feel.”¹²⁹ Thanks to the focus on aesthetic response, “copyright infringement is supposed to be based on a gestalt reaction,”¹³⁰ not an evaluation of “minute differences between the two works.”¹³¹

2. *Pleasure and the Inherent Subjectivity of Aesthetic Experience*

In attempting to formulate the central components of aesthetic experience, courts highlight audience pleasure. Copyright decisions speak of a certain substance in creative works that is pleasurable to the senses and can be elucidated without much effort. In a formulation endorsed by several federal courts, *Arnstein* framed the substantial similarity analysis as “whether defendant took from plaintiff’s works so much of what is pleasing to the ears of lay listeners . . . that defendant wrongfully appropriated something which belongs to the plaintiff.”¹³² Courts can equate that which is “pleasing” in the aesthetic experience with beauty, explaining that it is the “beautiful” aspects of a work that must be protected from appropriation by others.¹³³ Put another way, the trier of fact must assess what the audience

125. *Dymow v. Bolton*, 11 F.2d 690, 692 (2d Cir. 1926) (internal quotation marks omitted) (quoting *King Features Syndicate v. Fleischer*, 299 F. 533 (2d Cir. 1924)).

126. *Sturdza v. United Arab Emirates*, 281 F.3d 1287, 1296 (D.C. Cir. 2002).

127. 3 PATRY, *supra* note 67, at § 9.76; *see, e.g.*, *Olson v. Tenney*, 466 F. Supp. 2d 1230, 1235 (D. Or. 2006) (expressing skepticism over probative value of plaintiff’s compilation of 185 supposed similarities between her work and the defendant’s).

128. *Nichols v. Universal Pictures Corp.* 45 F.2d 119, 123 (2d Cir. 1930).

129. *Sturdza*, 281 F.3d at 1296; *Sid & Marty Krofft Television Prods., Inc. v. McDonald’s Corp.*, 562 F.2d 1157, 1167 (9th Cir. 1977) (“total concept and feel”); *DuBay v. King*, 366 F. Supp. 3d 1330, 1348 (M.D. Fla. 2019).

130. Tushnet, *supra* note 3, at 736.

131. *Atari, Inc. v. N. Am. Philips Consumer Elecs. Corp.*, 672 F.2d 607, 618 (7th Cir. 1982); *see also Copeland v. Bieber*, 789 F.3d 484, 489 (4th Cir. 2015) (“[W]e analyze works as cohesive wholes, without distinguishing between protected and unprotected elements, just as the works’ intended audiences likely would encounter them in the marketplace.”).

132. *Arnstein v. Porter*, 154 F.2d 464, 473 (2d Cir. 1946); *see also, e.g., Sturdza*, 281 F.3d at 1296.

133. *E.g., King Features Syndicate v. Fleischer*, 299 F. 533, 536 (2d Cir. 1924) (“The concept of

would consider of value in the plaintiff's work and determine if that pleasurable essence is replicated in the defendant's work.¹³⁴ This linking of audience pleasure and aesthetic response takes what might be a logical inquiry regarding the tangible material of the plaintiff's work and transforms it into a query that is subjective and resistant to judicial scrutiny.

For copyright law, the pleasure enjoyed by audiences is inevitably subjective and intuitive. Take these comments from the Ninth Circuit on how the trier of fact should put herself in the shoes of the average audience member. Substantial similarity, the court explained:

is not a legal conclusion; rather it involves the audience in an interactive process with the author of the work in question, and calls on us "to transfer from our inward nature a human interest and a semblance of truth sufficient to procure for those shadows of imagination that willing suspension of belief for the moment, which constitutes poetic faith."¹³⁵

This "interactive process" between author and audience is unavoidably subjective, requiring courts to abandon their penchant for objective analysis.¹³⁶ The panel went on to employ a quote from *Hamlet* to describe this process, stating that "this interactive assessment is by nature an individualized one that will provoke a varied response in each juror, for what 'makes the unskillful laugh, cannot but make the judicious grieve.'"¹³⁷ In other words, the pleasure experienced by audiences cannot be derived through objective calculation. It must be subjectively experienced by the

beauty expressed in the materials of statuary or drawing, is the thing which is copyrighted. That is what the infringer copies."). One might worry that linking the aesthetic experience to beauty would overly limit the range of copyrightable materials, with courts reserving protection for only works that fall into preconceived categories of classical or fine art. But "beauty" has been defined broadly. See *Mazer v. Stein*, 347 U.S. 201, 214 (1954) ("Individual perception of the beautiful is too varied a power to permit a narrow or rigid concept of art."). Moreover, although perhaps challenged by relatively recent trends in contemporary art, there is widespread agreement that beauty and pleasure are essential components in the aesthetic experience. CHATTERJEE, *supra* note 19, at xx–xxi. One study showed that "beauty" was the word most commonly associated with aesthetics. Thomas Jacobsen, Katharina Buchta, Michael Köhler & Erich Schröger, *The Primacy of Beauty in Judging the Aesthetics of Objects*, 94 PSYCH. REP. 1253, 1253–60 (2004).

134. The Tenth Circuit defines substantial similarity as "whether the accused work is so similar to the plaintiff's work that an ordinary reasonable person would conclude that the defendant unlawfully appropriated the plaintiff's protectible [sic] expression by taking material of substance and value." *Country Kids 'N City Slicks, Inc. v. Sheen*, 77 F.3d 1280, 1288 (10th Cir. 1996). Courts applying this "substance and value" standard have equated it with "aesthetic appeal." *Blehm v. Jacobs*, 702 F.3d 1193, 1202 (10th Cir. 2012).

135. *Shaw v. Lindheim*, 919 F.2d 1353, 1360 (9th Cir. 1990) (quoting S.T. Coleridge, *Biographia Literaria*, ch. 14, reprinted in 5 ENGLISH LITERATURE: THE ROMANTIC PERIOD (A. Reed ed., 1929)), *overruled on other grounds by Skidmore v. Led Zeppelin*, 952 F.3d 1051 (9th Cir. 2020) (en banc).

136. See *id.*

137. *Id.* (citing WILLIAM SHAKESPEARE, *HAMLET*, act 3, sc. 2).

trier of fact in the way that the audience itself experienced it or would experience it.¹³⁸

Hence, courts rely on “intuitive sense” to assess a work’s aesthetic appeal rather than reasoned evaluation or guidance from experts in the field.¹³⁹ Zahr Said describes copyright’s conception of aesthetic reading as “subjective in the nonlegal sense of intuitive, impressionistic[,] and gestalt as opposed to analytic and dissective.”¹⁴⁰ Instinct is what matters for measuring aesthetic response, not reasoned deliberation. Dissenting in *Arnstein*, Judge Clark contended that “[m]usic is a matter of the intellect as well as the emotions; that is why eminent musical scholars insist upon the employment of the intellectual faculties for a just appreciation of music.”¹⁴¹ Yet the majority took a different path, now followed by all other federal courts, that asks for the immediate reactions of the trier of fact, unaided by scholarly expertise, to diagnose the actionable essence of creative works.¹⁴²

The downside to characterizing aesthetic response as inherently subjective is that it makes that response impossible to pin down, leaving copyright litigants on uncertain terrain and the trier of fact reliant on instinct to decide the ultimate issue of infringement. Courts acknowledge this demerit without really coming up with any workable corrective. Responding to criticism that its test for substantial similarity was too vague, the Second Circuit somewhat feebly responded that the trier of fact must “identify precisely the particular aesthetic decisions—original to the plaintiff and copied by the defendant—that *might be thought* to make the designs similar in the aggregate.”¹⁴³ Yet the court offered no guidance for determining how to make this precise identification of what the audience might think similar. Outsiders cannot help with this identification. Because aesthetic judgment is an intuitive process not a deliberative one, the trier of fact must rely on

138. A good example comes from *Copeland v. Bieber*, 789 F.3d 484 (4th Cir. 2015) where the court tried to recreate how “the general public typically encounters popular music” by listening to the songs at issue “from start to finish” as “lay listeners,” but seemingly not repeating them over and over. *Id.* at 491–92.

139. Walker & Depoorter, *supra* note 111, at 374.

140. Zahr K. Said, *A Transactional Theory of the Reader in Copyright Law*, 102 IOWA L. REV. 605, 619 (2017).

141. *Arnstein v. Porter*, 154 F.2d 464, 476 (2d Cir. 1946) (Clark, J., dissenting).

142. Even after the decision, Judge Clark continued to think that *Arnstein*’s privileging of “average” aesthetics over objective expertise was wrongheaded:

[T]he issue is no longer one of musical similarity or identity to justify the conclusion of copying—a[n] issue to be decided with all the intelligence, musical as well as legal we can bring to bear upon it—but is one, first, of copying, to be decided more or less intelligently, and, second, of illicit copying, to be decided blindly on a mere cacophony of sounds.

Heim v. Universal Pictures Co., 154 F.2d 480, 491 (2d Cir. 1946) (Clark, J., concurring in the judgment).

143. *Tufenkian Imp./Exp. Ventures, Inc. v. Einstein Moonjy, Inc.*, 338 F.3d 127, 134 (2d Cir. 2003) (emphasis added).

her sensibilities alone and “detect piracy ‘without any aid or suggestions or critical analysis by others.’”¹⁴⁴

An important Ninth Circuit decision, *Shaw v. Lindheim*,¹⁴⁵ openly recognizes the predictive difficulties spawned by copyright law’s focus on aesthetic reaction. *Shaw* affirmed that substantial similarity in that jurisdiction requires satisfaction of both an “extrinsic test” and an “intrinsic test.” The extrinsic test allows an analysis of similarities according to objective criteria and a filtering out of unprotectable elements. If the plaintiff satisfies the extrinsic test, the trier of fact must then evaluate infringement under the intrinsic test. The intrinsic test, far different from the extrinsic test, is based on the “total concept and feel” of the work to “the ordinary, reasonable person.”¹⁴⁶ It allows the unprotectable elements filtered out during the extrinsic analysis to flood back in for comparison. It is also extremely vague, making it exceedingly difficult for courts to evaluate and overturn problematic infringement rulings.¹⁴⁷ The *Shaw* court acknowledged that “a judicial determination under the intrinsic test is now virtually devoid of analysis, for the intrinsic test has become a mere subjective judgment as to whether two literary works are or are not similar.”¹⁴⁸ It went on to note that courts often supply no more than a single paragraph of analysis to justify their determination under the intrinsic similarity determination.¹⁴⁹

These may sound like criticisms, but the *Shaw* court did not call for changing the intrinsic test. It was comfortable, or at least accepting, of the test’s unanalytic, unreviewable conception of aesthetic response. *Shaw* only requires that the intrinsic analysis be conducted by the trier of fact, making summary judgment impossible once the defendant clears the hurdle of the

144. *Peel & Co. v. Rug Mkt.*, 238 F.3d 391, 398 (5th Cir. 2001) (emphasis added) (quoting *Harold Lloyd Corp. v. Witwer*, 65 F.2d 1, 18 (9th Cir. 1933)).

145. 919 F.2d 1353, 1357 (9th Cir. 1990), *overruled on other grounds by* *Skidmore v. Led Zeppelin*, 952 F.3d 1051 (9th Cir. 2020).

146. *Williams v. Gaye*, 895 F.3d 1106, 1119 (9th Cir. 2018). The Ninth Circuit’s intrinsic test has been described as operating in the same fashion and serving the same purpose as the traditional ordinary observer test. *Said*, *supra* note 140, at 611.

147. *Samuelson*, *supra* note 12, at 1830–32 (contending that, by making the defendant’s capture of the “total concept and feel” of the plaintiff’s work the core inquiry of the intrinsic test, courts have made “it too easy for unprotectable elements to be swept into the infringement analysis”).

148. *Shaw*, 919 F.2d at 1357 (citing *Berkic v. Crichton*, 761 F.2d 1289, 1294 (9th Cir. 1985) and *Olson v. Nat’l Broad. Co.*, 855 F.2d 1446, 1453 (9th Cir. 1988)). Judicial insistence that the audience’s experience with the works at issue is subjective and therefore undefinable may be viewed not just as a belief about the reality of art appreciation, but also a ploy to avoid decisionmaking in this area. Christine Haight Farley traces a pervasive judicial reluctance to engage with aesthetic questions in the law generally. “Art is assumed to be the quintessence of the subjective,” says Farley, and “[s]ubjectivity makes judges uncomfortable.” Christine Haight Farley, *Judging Art*, 79 TUL. L. REV. 805, 856 (2005).

149. *See* *Olson v. Nat’l Broad. Co.*, 855 F.2d 1446, 1453 (9th Cir. 1988) (reaching a result under the intrinsic test in one paragraph); *Berkic v. Crichton*, 761 F.2d 1289, 1294 (9th Cir. 1985) (same).

extrinsic test.¹⁵⁰

3. *Time*

Another component of aesthetic appeal involves its temporal scope. Courts have suggested a time limit for judges and juries attempting to discern the aesthetic response of ordinary observers and listeners. The probable response by the ordinary observer after labored scrutiny of the works at issue is not what the analysis asks for. Instead, the analysis asks for only the “spontaneous and immediate” experience of audiences.¹⁵¹ The “visceral reactions” of the observer are what determine infringement.¹⁵² Courts sometimes refer to the “ordinary observer” as the “casual observer,” implying that a speedy, non-deliberative processing of the works at issue is the appropriate means for calculating substantial similarity.¹⁵³

As a result, rapid responses to creative works have more validity for the infringement analysis than ones drawn out over time. Aesthetic experience should be immediate: “There is a notion that juries ought to be able to look at works and experience a gut reaction.”¹⁵⁴ Unless the work at issue is particularly complex or technical, the work is “seen to speak for itself,” obviating the need for lengthy scrutiny.¹⁵⁵ Even comparisons that may be relatively challenging because the plaintiff’s work and the defendant’s work are in different media are evaluated for their instantaneous impression. For example, a court assessing whether a book and a movie were substantially similar explained that it compared the two works “to determine a lay observer’s *immediate* response.”¹⁵⁶ In this view, the rapidity of aesthetic judgment makes it more reliable in diagnosing improper copying, not less.

This call for immediate impressions rather than careful comparison vexes some opponents of the ordinary observer test. “Why should the ordinary observer be expected to detect spontaneously and immediately the theft which probably took weeks and months to disguise?” queried one

150. *Shaw*, 919 F.2d at 1361.

151. *Peel & Co. v. Rug Mkt.*, 238 F.3d 391, 398 (5th Cir. 2001) (quoting *Harold Lloyd Corp. v. Witwer*, 65 F.2d 1, 18 (9th Cir. 1933)). *See also* *Walker v. Time Life Films, Inc.*, 784 F.2d 44, 51 (2d Cir. 1986) (noting that the Second Circuit generally judges substantial similarity “by the spontaneous response of the ordinary lay observer”).

152. 4 NIMMER & NIMMER, *supra* note 10, at §13.03[E][2].

153. *E.g.*, *United Feature Syndicate, Inc. v. Koons*, 817 F. Supp. 370, 377 (S.D.N.Y. 1993).

154. *Said*, *supra* note 140, at 639.

155. Zahr K. Said, *Reforming Copyright Interpretation*, 28 HARV. J.L. & TECH. 469, 502 n.232 (2015).

156. *Randolph v. Dimension Films*, 634 F. Supp. 2d 779, 792 (S.D. Tex. 2009) (emphasis added).

exasperated law professor.¹⁵⁷ The answer is that substantial similarity investigates aesthetic encounters, which courts believe to be instantaneous phenomena. Many other areas of the law require the trier of fact to intuit the behavior of outsiders. Tort law famously asks whether the defendant's conduct matches the conduct of the "reasonable person." Yet, because copyright law asks the trier of fact to intuit the reasonable person's *aesthetic* response, courts stress that there is no time for the reasonable person to engage in lengthy deliberation or analysis.

By defining aesthetic response as something immediate, courts supply another reason—in addition to the assumption that aesthetic responses are universal—to exclude experts from the substantial similarity analysis.¹⁵⁸ Expertise would seem to have little place in describing a phenomenon that operates so instinctually. At times, courts explicitly bifurcate the non-aesthetic properties of a creative work, which they believe can benefit from articulation by an expert, from its aesthetic properties, which they believe cannot. Expert testimony is allowed in copyright cases involving computer software because software typically reflects more of an emphasis on functional properties than aesthetic ones.¹⁵⁹ By contrast, there is a "traditional role of lay observers in judging substantial similarity in copyright cases that involve *the aesthetic arts*, such as music, visual works or literature."¹⁶⁰ In one case, a court diagnosed "structural" similarities and "aesthetic" similarities in two gazebos.¹⁶¹ Expert testimony was not allowed regarding the gazebos' aesthetic elements, but "because structural and engineering elements are not necessarily within the jury's knowledge, expert testimony as to these matters may assist the jury."¹⁶² According to the law of copyright infringement, non-aesthetic components of creative works are susceptible to reasoned deliberation; aesthetic components are not.

157. Robert Fuller Fleming, *Substantial Similarity: Where Plots Really Thicken*, 19 COPYRIGHT L. SYMP. 252, 275 (1969). See also 4 NIMMER & NIMMER, *supra* note 10, at § 13.03[E][2] ("There are reasons why the spontaneous impressions of an ordinary observer—or reasonable person in comparing two literary works—may not always prove an accurate guide to ferreting out the existence of literary theft.")

158. See Balganesch et al., *supra* note 34, at 274 (describing the relevant audience reaction as one that is "spontaneous and immediate" which "adds a further air of subjectivity and apparent impulsiveness to the similarity comparison").

159. See Joseph P. Fishman & Deepa Varadarajan, *Similar Secrets*, 167 U. PA. L. REV. 1051, 1075 (2019).

160. *Computer Assocs. Int'l v. Altai, Inc.*, 982 F.2d 693, 713–14 (2d Cir. 1992) (emphasis added).

161. *W.H. Porter, Inc. v. Kline Multiproducts, Inc.*, No. 1:00-CV-371, 2001 WL 35741246, at *1 (W.D. Mich. Dec. 21, 2001).

162. *Id.*

B. The Science of How Aesthetic Decisions Are Made

Neuroscientists are becoming more and more adept at quantifying different components of aesthetic judgment, a mental process that copyright law insists is impossible to measure. By no means do these neural recordings reflect a complete or invariably accurate picture of our experiences with creative works. But they do offer empirical information for a process that legal actors have long complained was in need of just such information. At the same time, brain research confirms the courts' temporal assessment of aesthetic experience. Our reactions to creative works occur automatically and are rarely shaken from this initial estimate.

1. Searching for Objective Measures

As neuroaesthetic studies continue to reveal more specifics about aesthetic choice, copyright law's longstanding insistence that aesthetic choice cannot be interrogated may weaken. Researchers claim to be able to distinguish the hallmarks of aesthetic experience from functional experiences.¹⁶³ Neuroscientists identify a "fundamentally different pattern of neurophysiological activation" for artworks audience members perceive as "best in terms of aesthetic quality"¹⁶⁴ or "the most aesthetically moving."¹⁶⁵ Scientists are also getting better at separating aesthetic judgment into its component parts. The neural evidence of an audience's processing of an artwork's pictorial content can be distinguished from evidence of the audience's processing of the artist's style.¹⁶⁶

Neuroscientific study of human reactions to music provides a good example of how brain science can contribute to our understanding of aesthetic encounters. "Aesthetic listening" experiments purport to offer a "traceable" mental process for the perception, understanding, and enjoyment of musical events.¹⁶⁷ These experiments reveal the significance of particular portions of musical works to the listener. Tell-tale neural

163. Lauring, *supra* note 94, at 148; Edward A. Vessel, G. Gabrielle Starr & Nava Rubin, *The Brain on Art: Intense Aesthetic Experience Activates the Default Mode Network*, 6 FRONTIERS HUMAN NEUROSCI. 1, 9 (2012).

164. García-Prieto et al., *supra* note 83, at 100; see G. GABRIELLE STARR, FEELING BEAUTY: THE NEUROSCIENCE OF AESTHETIC EXPERIENCE 59–63 (2013).

165. Vessel et al., *supra* note 163, at 9.

166. M. Dorothee Augustin, Birgit DeFranceschi, Helene K. Fuchs, Claus-Christian Carbon & Florian Hutzler, *The Neural Time Course of Art Perception: An ERP Study on the Processing of Style Versus Content in Art*, 49 NEUROPSYCHOLOGIA 2071, 2072 (2011); García-Prieto et al., *supra* note 83, at 95.

167. Reybrouck, *supra* note 15, at 10 (reviewing neuroimaging studies involving music and concluding that "where the individual perceives, understands, enjoys and evaluates a musical event is traceable in terms of network connectivity and activations of target regions of the brain").

signals distinguish between sounds serving as a real stimulus that can contribute to the aesthetic experience from sounds that the listener will only consider noise.¹⁶⁸

Perhaps most relevant to the substantial similarity calculation, neuroaesthetics investigates which aspects of artistic work are most salient to audiences.¹⁶⁹ Understandably, substantial similarity doctrine asks the trier of fact to render a judgment as to aesthetic salience. For example, when an R&B songwriter accused Usher and Justin Bieber of wrongfully appropriating his musical work, the Fourth Circuit reversed a substantial similarity determination in the defendants' favor.¹⁷⁰ It faulted the trial court for ignoring the importance of the choruses to both songs and applying a "purely quantitative inquiry" to the question of "aesthetic appeal."¹⁷¹ Because choruses are the part of a song "that many listeners will recognize immediately or hear in their minds when a song title is mentioned," the appellate judges deemed chorus similarities "disproportionately significant."¹⁷²

This makes sense. If one is concerned with protecting the creative incentives of authors, it is appropriate to use copyright law to protect the original aspects of a work that are most noticeable or important to audiences. The problem is that the Fourth Circuit relied on a hunch about audience reaction to the songs' choruses, not any objective information about how the choruses were actually perceived. In the past, this kind of information about aesthetic salience was largely unknowable; hunches were all judges could go on. Today, imaging technologies offer an empiric and finer-grained portrait of aesthetic choice.¹⁷³

Aesthetic salience can be diagnosed in a variety of ways. Neuroaesthetic researchers often equate such salience with pleasure.¹⁷⁴ As the cognitive psychologist Steven Pinker writes, art's primary function is to "press our pleasure buttons."¹⁷⁵ Pleasure facilitates the brain's attentional networks as

168. PAUL B. ARMSTRONG, *HOW LITERATURE PLAYS WITH THE BRAIN: THE NEUROSCIENCE OF READING AND ART* 14, 45 (2013).

169. See *infra* notes 173–185 and accompanying text.

170. *Copeland v. Bieber*, 789 F.3d 484 (4th Cir. 2015).

171. *Id.* at 493–95.

172. *Id.* at 494 (citation omitted).

173. E.g., Valorie N. Salimpoor, Iris van den Bosch, Natasa Kovacevic, Anthony Randal McIntosh, Alain Dagher & Robert J. Zatorre, *Interactions Between the Nucleus Accumbens and Auditory Cortices Predict Music Reward Value*, 340 *SCIENCE* 216, 217 (2013) (revealing greater connectivity between particular brain regions when listeners experience unfamiliar music that they find pleasurable and desirable).

174. CHATTERJEE, *supra* note 19, at 111–12 (discussing relationship between pleasure and aesthetic experience); STARR, *supra* note 164, at 7 ("[A]ll aesthetic experiences involve pleasure or displeasure and some degree of emotional response.").

175. STEVEN PINKER, *HOW THE MIND WORKS* 524–25 (1997).

pleasurable sensations prompt a reallocation of cognitive resources for enhanced processing of a stimulus.¹⁷⁶

A related subject of neuroaesthetic research is how audiences recognize beauty—a logical avenue of inquiry given beauty’s role in the popular imagination as the primary criterion for making aesthetic judgments.¹⁷⁷ One might question the ability to interrogate something as seemingly amorphous as beauty. We have all heard the saying that beauty is in the eye of the beholder. But scientists searching for the biological signs of perceived beauty contend that the “neural activity seems to be detectable and quantifiable, which makes it apt for empirical investigation.”¹⁷⁸ Cultural differences exist, but there is also a shared, unconscious sense of what is attractive.¹⁷⁹

Some work finds that the experience of beauty has its own unique neural signature. Scientists have identified “a single faculty of beauty into which different senses feed.”¹⁸⁰ When audience members are asked to rate stimuli as either “ugly,” “indifferent,” or “beautiful,” the stimuli designated as “beautiful” generate particular brain behaviors. Multiple experiments correlate the experience of beauty with activity in a particular area of the brain: the medial orbit-frontal cortex or mOFC.¹⁸¹ Other studies demonstrate links between patterns of neural activity across the brain and the experiences of aesthetic contemplation and pleasure.¹⁸²

It is not just that brain-imaging tools offer a clue as to when an observer or listener will consider something to be beautiful. Neuroaestheticians are more ambitious, leveraging their current understandings to develop ways to calculate the strength of an aesthetic response. In one highly publicized study, participants listened to unfamiliar fragments of music and were allocated a fixed sum that they used to “vote” on which fragments they would like to listen to again. The degree of neural activity in particular brain

176. García-Prieto et al., *supra* note 83, at 98.

177. See Donald A. Hodges, *The Neuroaesthetics of Music*, in *THE OXFORD HANDBOOK OF MUSIC PSYCHOLOGY* 247, 248 (2016).

178. Reybrouck, *supra* note 15, at 3.

179. See THOMAS HILGERS, *AESTHETIC DISINTERESTEDNESS: ART, EXPERIENCE, AND THE SELF* 17 (2017); ERIC R. KANDEL, *THE AGE OF INSIGHT* 379 (2012).

180. Tomohiro Ishizu & Semir Zeki, *Toward a Brain-Based Theory of Beauty*, 6 *PLOS ONE* 1, 1 (2011).

181. de Smedt, *supra* note 89, at 701; García-Prieto et al., *supra* note 83, at 92; see also Reybrouck, *supra* note 15, at 9 (stating that neuroscience has “the potential to inform our knowledge about how the brain responds to music and decides if a musical piece is considered beautiful or not”).

182. Edward A. Vessel, G. Gabrielle Starr & Nava Rubin, *Art Reaches Within: Aesthetic Experience, the Self and the Default Mode Network*, 7 *FRONTIERS HUMAN NEUROSCIENCE* 1, 1–2 (2013); Robin W. Wilkins, D.A. Hodges, P. J. Laurenti, M. Steen & J.H. Burdette, *Network Science and the Effects of Music Preference on Functional Brain Connectivity: From Beethoven to Eminem*, 4 *SCI. REP.* 6130, at 4 (2014).

regions predicted the amount of money participants were willing to pay to listen to their preferred fragments a second or third time. The activated brain regions had been ascertained from previous research to be integral to “emotional processing and value-guided decision-making.”¹⁸³ Copyright law assumes that our intuitive reactions to art cannot be measured, but, according to the study’s authors, their findings reveal “a mechanism for valuation of stimuli with abstract importance.”¹⁸⁴ Neuroscientists envision a near future where they can calculate the depth of an audience’s aesthetic reactions. As two leaders in the field contend, “the subjective experience of beauty and of ugliness can be objectively ascertained and measured” and will “take aesthetics very much into the subjective, though quantifiable, arena.”¹⁸⁵

Admittedly, there is more to aesthetic processing than experiencing beauty and pleasure. Both cognitive psychologists and philosophers agree that dislike, disgust, and other aesthetic emotions are important as well.¹⁸⁶ But the subjective experience of beauty is directly linked to the sensation of pleasure, something that is assuredly at the heart of aesthetic judgment.¹⁸⁷ In general, there is a significant overlap between the basic hedonic pleasures we experience through activities like sex and eating and the higher-order pleasures we associate with aesthetic experience.¹⁸⁸ Consciously or not, we find these experiences rewarding and fMRI and EEG technologies have the ability to reveal when the mind’s reward center has been activated from such experiences.¹⁸⁹

As noted, in seeming agreement with neuroaesthetic research, courts articulating the audience test speak of “beauty” and “pleasure,” encouraging

183. Salimpoor et al., *supra* note 173, at 218.

184. *Id.*

185. Ishizu & Zeki, *supra* note 180, at 8–9.

186. Steven Brown, Xiaoqing Gao, Loren Tisdelle, Simon B. Eickhoff & Mario Liotti, *Naturalizing Aesthetics: Brain Areas for Aesthetic Appraisal Across Sensory Modalities*, 58 *NEUROIMAGE* 250, 251 (2011); Pearce et al., *supra* note 15, at 268; *see also* Camilo J. Cela-Conde, Luigi Agnati, Joseph P. Huston, Francisco Mora & Marcos Nadal, *The Neural Foundations of Aesthetic Appreciation*, 94 *PROGRESS NEUROBIOLOGY* 39, 41 (2011) (noting that “ugly” objects can still be considered great works of art).

187. Amy M. Belfi, Edward A. Vessel, Aeneas Brielmann, Ayse Ilkay Isik, Anjan Chatterjee, Helmut Leder, Denis G. Pelli & G. Gabrielle Starr, *Dynamics of Aesthetic Experience Are Reflected in the Default-Mode Network*, 188 *NEUROIMAGE* 584, 593 (2019); Cela-Conde et al., *supra* note 186, at 42 (listing multiple studies demonstrating that “beauty ratings capture the aesthetic experience in a more meaningful way” than other ratings like originality or interest).

188. Reybrouck, *supra* note 15, at 8; Arthur P. Shimamura, *Toward a Science of Aesthetics*, in *AESTHETIC SCIENCE* 3, 4 (Arthur P. Shimamura & Stephen E. Palmer eds., 2014) (referring to aesthetics as “any ‘hedonic’ response to a sensory experience”).

189. Mona Lisa Chanda & Daniel J. Levitin, *The Neurochemistry of Music*, 17 *TRENDS COGNITIVE SCI.* 179, 181 (2013) (employing fMRI imaging to reveal “neural correlates of musical pleasure”); de Smedt, *supra* note 89, at 701.

the trier of fact to examine their subjective experience of the works at issue for those qualities and feelings.¹⁹⁰ Those same courts may be unwilling, however, to equate aesthetic reward with the reward from stroking a romantic partner's hair or eating a mouth-watering cheeseburger.¹⁹¹ Fortunately, neuroscience offers the potential for separating the sensory rewards of art from other experiences. As Gabrielle Starr writes in her investigation of the aesthetic experience of beauty, "[t]he finding that reward activations for painting straddle both the dorsal ventral regions of the striatum begins to support the possibility . . . that aesthetic rewards may be processed differently."¹⁹² Starr goes on to note that research shows not only a particularity in how aesthetic rewards are processed in the brain but also in how those rewards are integrated. Aesthetic experience, like other pleasurable experiences, integrates reward signals to engage emotional processes. But this engagement involves a particularly large, integrated system in the brain—the default mode network—that is not necessarily activated in response to other sensory rewards.¹⁹³ The default mode network is associated with introspection and self-assessment, making it a likely locus of activity for aesthetic judgment.¹⁹⁴

In a related vein, there is a measurable biological difference between the reward received from a stimulus someone "likes" and the reward received from a stimulus someone "wants."¹⁹⁵ It is hypothesized that liking—what the neuroscientist Anjan Chatterjee describes as "pleasure without an acquisitive impulse"¹⁹⁶—is what it means to experience aesthetic pleasure. We can enjoy a painting without thinking we need to take it home. One neuroscientist contends that "the central question regarding the rewarding dimension of aesthetic experience is to shed light on the difference between 'liking' and 'wanting' processes."¹⁹⁷ If the aesthetic pleasure at issue in the

190. See *supra* Part II.A.2.

191. See Christopher Buccafusco, *Making Sense of Intellectual Property Law*, 97 CORNELL L. REV. 501, 511 (2012) (critiquing copyright law's privileging of the senses of vision and hearing while discounting the aesthetic experience generated by the senses of touch and taste).

192. STARR, *supra* note 164, at 51.

193. *Id.* at 51–56.

194. García-Prieto et al., *supra* note 83, at 99–100.

195. Kent C. Berridge, Terry E. Robinson & J. Wayne Aldridge, *Dissecting Components of Reward: "Liking," "Wanting," and Learning*, 9 CURRENT OPINION PHARMACOLOGY 65, 65–68 (2009); Louise P. Kirsch, Cosimo Urgesi & Emily S. Cross, *Shaping and Reshaping the Aesthetic Brain: Emerging Perspectives on the Neurobiology of Embodied Aesthetics*, 62 NEUROSCIENCE & BIOBEHAVIORAL REVS. 56, 65 (2016).

196. CHATTERJEE, *supra* note 19, at xx.

197. García-Prieto et al., *supra* note 83, at 94. This maps onto a central component of aesthetic theory—the idea that aesthetic judgment requires disinterested appreciation, i.e., enjoying art for its own sake and not as a means for serving our own interests. See Alexandra King, *The Aesthetic Attitude*, INTERNET ENCYCLOPEDIA PHIL. (2019), <https://www.iep.utm.edu/aesth-at/> [<https://perma.cc/8HDZ-ACBN>].

audience test is the pleasure from liked but not wanted rewards, then perhaps an ability to determine when the neural signature for liking has been triggered upon experiencing a particular creative work could be relevant to substantial similarity.¹⁹⁸

It is important to state here that neuroscience is not yet at the point where such measurements are reliable or specific enough to determine the substantial similarity analysis. The overlap between aesthetic pleasure and other sensory pleasures can be difficult to disentangle as is the difference between “liking” rewards and “wanting” rewards. Nevertheless, the possibility of a future where aesthetic judgment lends itself to quantification deserves serious consideration. A roadmap to the particular aspects of creative works that produce the greatest devotion of attentional resources and prompt the most pleasurable sensations in their audiences would seem to be just what the substantial similarity analysis cries out for. Instead of guessing at the salience of a particular musical passage, the trier of fact could be provided with neural proof of that passage’s salience. Some tangible evidence of aesthetic response, even if incomplete, might be better than the current legal black box for understanding audiences.

Admittedly, at this point, neuroscience can only offer a very partial picture of aesthetic reaction; it can only serve as a supplement to, not a substitute for, the current substantial similarity inquiry. As the author of one copyright treatise writes regarding the use of psychological research more broadly, “[t]hese inquiries would not supplant the ordinary observer test, but instead assist in understanding how much weight the ordinary observer should give to similarities and differences.”¹⁹⁹ Neural imaging is not a cure-all, but it would be an improvement over the status quo if a court could make a more informed decision as to the aesthetic relevance of a particular musical passage instead of relying on complete guesswork (as in the case involving Usher and Justin Bieber).²⁰⁰

Most importantly, even if brain imaging is unlikely to be accepted as evidence in individual copyright cases in the short term, neuroaesthetic research will force courts to abandon the current assumption that any objective analysis of aesthetic response is impossible. The audience test

198. Although liking and wanting usually overlap, they do not always. An illustrative example comes from the stimulation of different areas of the ventral striatum region of the brain, one area devoted to liking and one to wanting. Stimulating the liking area will not cause an animal to eat more but it will make the animal enjoy eating more, as evidenced by increased lip-smacking behavior, a hedonic reaction found in both lab rats and human infants. Stimulating the wanting area will cause the animal to work harder to obtain food but without impacting its hedonic reactions upon eating the food. Kent C. Berridge & Morten L. Kringelbach, *Neuroscience of Affect: Brain Mechanisms of Pleasure and Displeasure*, 23 *CURRENT OPINION NEUROBIOLOGY* 294, 298–99 (2013).

199. 3 PATRY, *supra* note 67, at § 9:85.

200. *See supra* notes 160–161.

operates under the belief that our aesthetic experiences cannot be measured. As a result, substantial similarity decisions are not specified by the trier of fact or interrogated by courts in review. This, in turn, makes it extremely difficult to dispose of the issue of substantial similarity before trial. Copyright law exhorts triers of fact to examine their experiences of “beauty” and “pleasure” in deciding infringement claims yet offers little to no guidance for what those legally relevant sensory categories should mean. Even if neuroaesthetics cannot yet fully break down our experiences of aesthetic pleasure and beauty, it calls into question copyright law’s refusal to countenance any objective analysis of how we respond to creative works.

2. *Immediacy*

As discussed, the audience test assumes that aesthetic judgment is both rapid and stable.²⁰¹ This assumption has consequences for the copyright infringement analysis. It is the lay observer’s “immediate response” and “spontaneous reaction” that is relevant to identifying the protectable essence of the copyrighted work. Any longer appreciation of the work is considered illegitimate, either because courts assume that any later evaluation of the work will alter the original judgment or because the audience’s instant experience is deemed a better proxy for the market behavior of interested patrons. Dissection is discouraged because such an analytical approach seems unlikely to improve outcomes if the goal is to recreate the actual speed at which audiences evaluate creative expression.

Neuroscientists investigate the temporal dynamics of aesthetic judgment, something that has only been guessed at by the federal courts.²⁰² Their research has coalesced around a two-phase description of the timing involved in aesthetic appreciation.²⁰³ First, there is an initial implicit processing phase that captures “low-level” features of the perceived object. Second, there is a higher-level processing phase involving “a deeper aesthetic evaluation.”²⁰⁴

The critical thing to note here is that both phases take place rapidly. The first low-level phase occurs 300–400 milliseconds after presentation of a

201. See *supra* Part II.A.3.

202. EEG measurements, which can track brain activity at a much faster rate than fMRI analysis, have been critical here. Helmut Leder & Marcos Nadal, *Ten Years of a Model of Aesthetic Appreciation and Aesthetic Judgments: The Aesthetic Episode – Developments and Challenges in Empirical Aesthetics*, 105 BRIT. J. PSYCH. 443, 448 (2014) (“Electrophysiological techniques are ideally suited to examine the time course of the neural correlates of mental processes.”).

203. Camilo J. Cela-Conde, Juan García-Prieto, José J. Ramasco, Claudio R. Mirasso, Ricardo Bajo, Enric Munar, Albert Flexas, Francisco del-Pozo & Fernando Maestú, *Dynamics of Brain Networks in Aesthetic Appreciation*, 110 PROC. NAT’L ACAD. SCI. 10,454, 10,455 (2013).

204. García-Prieto et al., *supra* note 83, at 95.

stimulus. The second phase takes place almost immediately thereafter, 600 milliseconds after stimulus presentation.²⁰⁵ Much happens in this short time frame. An observer's brain can process the content in an artwork in 10 milliseconds and the artwork's style in 50 milliseconds.²⁰⁶

This research shows that aesthetic judgment occurs instantaneously, in a similar fashion to the "spontaneous reaction" described by the courts.²⁰⁷ Strong preferences form in this short window as the brain conducts both sensory and semantic analyses of the stimulus at issue.²⁰⁸ Judgment of a creative work's beauty occurs in a split second.²⁰⁹

Our aesthetic judgments are not just rapid, but reliable. Within 750 milliseconds, listeners can judge how much they like a musical excerpt and do so with a high degree of accuracy, i.e., the judgment about that excerpt remains the same even after hearing the entire piece.²¹⁰ One might think that past experiences with both similar and different creative works, as well as other relevant memories, would be determinative in this process. Yet research reveals that we do not need to comb through our frames of reference to enjoy art. "[A]esthetic pleasure comes into being without analysis, consideration, or reliance on—or reference to—former perceptual experiences."²¹¹ Our previous experiences are relevant to aesthetic appreciation, but they are not necessary.

Proving the speed at which aesthetic judgments occur is important because the faster these judgments, the more one can argue that there is little time in this process for objectively weighing a work's different components. One cognitive scientist puts it this way: "Since the timescale of the brain's functional activity is in the order of milliseconds, complex processes take place very quickly, leading to a qualitative, simple subjective conclusion about the beauty of a stimulus."²¹²

The other important insight neuroscience provides with regard to the timing of aesthetic experience is that our aesthetic responses fade over time. For a long while, psychologists have believed that audiences exhibit "aesthetic fatigue" after experiencing a stimulus too often or for too long of

205. *Id.*

206. Leder & Nadal, *supra* note 202, at 448; Eugen B. Petcu, *The Rationale for a Redefinition of Visual Art Based on Neuroaesthetic Principles*, 51 *LEONARDO* 59, 59 (2018).

207. *Peel & Co. v. Rug Mkt.*, 238 F.3d 391, 398 (5th Cir. 2001).

208. Vessel, *supra* note 163, at 10.

209. Cela-Conde et al., *supra* note 186, at 42.

210. Amy M. Belfi, Anna Kasdan, Jess Rowland, Edward A. Vessel, G. Gabrielle Starr & David Poeppel, *Rapid Timing of Musical Aesthetic Judgments*, 147 *J. EXP. PSYCH: GENERAL* 1531, 1532–35 (2018).

211. Zhihong Li, Yanhui Wang & Fanjun Meng, *Aesthetic Cognitive Module Theory: A Core Structure*, 52 *J. AESTHETIC EDUC.* 71, 79 (2018).

212. Cela-Conde et al., *supra* note 186, at 42.

a period of time.²¹³ Neuroscientists confirm this phenomenon, demonstrating that neurons in the brain regulate movements meant to orient an observer to a surprising stimulus but that when the surprise event is repeated, a habituation takes place that decreases this neural response.²¹⁴ This discovery allows one to measure the speed at which aesthetic responses decrease over time.²¹⁵

Relatedly, neuroaesthetic research examines the roles that familiarity and novelty play in aesthetic judgment. Although a certain amount of familiarity can be attractive and enhance a work's aesthetic appeal, most observers respond positively to novelty. In fact, there is some evidence that all positive aesthetic evaluation requires some degree of novelty. Research into audience appreciation of music reveals that novelty is critical to attention to and favorable evaluation of musical works. As the perception of novelty declines, so do favorability ratings.²¹⁶ Neural activity can reveal when someone is experiencing a reaction of surprise.²¹⁷ In fact, there are even specific "novelty neurons" as well as "familiarity neurons" identified by researchers.²¹⁸ Novelty may be a particularly important characteristic to identify as the activity of these novelty neurons predicts the likelihood we will form a memory of the stimulus.²¹⁹

Although it would be difficult to accurately discern the degree of audience familiarity or novelty in a creative work such that this information could be used in the substantial similarity analysis, these findings confirm current judicial understandings of the speed and durability of aesthetic judgment. Casual, fast reviews of stimuli provide the best window into the aesthetic experience. Lengthy deliberations over the merits of a creative work can distort or partially obscure those merits.²²⁰ Hence, neuroaesthetic

213. Kate Hevner, *The Aesthetic Experience: A Psychological Description*, 44 PSYCH. REV. 245, 249 (1937).

214. Jean-Pierre Changeaux, *Art and Neuroscience*, 27 LEONARDO 189, 199 (1994).

215. STARR, *supra* note 164, at 102.

216. *Id.* at 119.

217. ARMSTRONG, *supra* note 168, at 22.

218. Moran Cerf, Eric Greenleaf, Tom Meyvis & Vicki G. Morwitz, *Using Single-Neuron Recording in Marketing: Opportunities, Challenges, and an Application to Fear Enhancement in Communications*, 52 J. MKTG. RES. 530, 534 (2015) (identifying "familiarity neurons" in the amygdala that show increased firing rates when subject views images that had previously been seen); Jan Kamiński, Adam N. Mamelak, Kurtis Birch, Clayton P. Mosher, Michele Tagliati & Ueli Rutishauser, *Novelty-Sensitive Dopaminergic Neurons in the Human Substantia Nigra Predict Success of Declarative Memory Formation*, 28 CURRENT BIOLOGY 1333, 1340 (2018) (identifying "novelty neurons" in the hippocampus that exhibited larger firing rates when subject views novel rather than familiar images).

219. STARR, *supra* note 164, at 119; Kamiński, *supra* note 218, at 1334.

220. See MALCOLM GLADWELL, *BLINK: THE POWER OF THINKING WITHOUT THINKING* (2005); Joseph M. Melcher & Jonathan W. Schooler, *The Misremembrance of Wines Past: Verbal and Perceptual Expertise Differentially Mediate Verbal Overshadowing of Taste Memory*, 35 J. MEMORY &

research offers evidentiary support for the substantial similarity status quo when it comes to the temporal dynamics of aesthetic judgment.²²¹

C. Concerns and Limitations

Neuroaesthetics is not without its skeptics. Some worry that, despite advances in spatial resolution and processing speed, imaging technologies cannot hope to describe a cognitive process as complex as aesthetic judgment.²²² Others contend that neuroscience offers nothing to the study of aesthetics because it posits biological causation for a process that is much more ethereal.²²³ Finally, there is a concern that neuroaesthetics fails to capture the real world context of artistic appreciation.²²⁴

It is true that the process of aesthetic judgment is complex. Even though it occurs incredibly quickly, aesthetic judgment relies on a host of mental processes—perception, cognition, and affect—in a dynamic process. Critics who complain that aesthetic judgment cannot be located in one area of the brain are right.²²⁵ It will not be possible for researchers to look at a single biological unit to determine when someone is processing artistic stimuli. Nor will judges be able to look for activation in one neural terrain to determine if an audience will recognize one creative work as coming from another. Moreover, because many of the neural processes behind aesthetic response also apply to other sensory experiences, researchers need to be careful to avoid the problem of reverse inference. It is useful to discover that engaging in a particular cognitive process—like a judgment that a creative work is “beautiful”—produces activity in particular brain regions. But it is not fair to infer that activity in a particular brain region always signals that

LANGUAGE 231, 231 (1996) (non-expert wine drinkers do worse at recognizing wines when asked to describe them).

221. Other areas of the law may emphasize the need for a slower, more deliberative approach. For example, some contend that neuroscientific study of the role of emotion in normative judgment supports giving decisionmakers in criminal cases extra time to make an assessment of guilt or innocence. See Oliver R. Goodenough & Kristin Prehn, *A Neuroscientific Approach to Normative Judgment in Law and Justice*, 359 PHIL. TRANS. R. SOC'Y LONDON B 1709, 1719 (2005) (“In determining culpability and [meting] out punishment, the delay inherent in procedures of criminal law can intercede to prevent the quicker action of emotion driven judgments of immediate justice. Although some emotional content is probably inevitable and necessary in reviewing criminal allegations, letting the quick, intuitive and emotional impulse to punish dissipate before judgment and action take place may lead to preferable results in a complex society.”).

222. See *infra* note 226 and accompanying text.

223. See *infra* notes 230–231 and accompanying text.

224. See *infra* notes 237–239 and accompanying text.

225. Dahlia W. Zaidel, *Brain and Art: Neuro-Clues from the Intersection of Disciplines*, in NEUROAESTHETICS, *supra* note 14, at 158, 164 (finding that “multiple components of art defy functional localization” in the brain).

the subject is engaging in a particular cognitive process.²²⁶

The neural circuitry of aesthetic response is complex, but it is not unknowable nor is it hopeless to expect to understand it better. Scientists realize that they need to study neural networks acting across the brain at different times and not just the activity of a single region. At this point, neuroscientists are not looking for an “art button” in the brain. Instead, they apply advanced cognitive models that involve multiple brain regions and overlapping neural networks.²²⁷ As noted, particular attention has been paid to the default mode network, a neural circuit that constantly measures the sensory environment and, hence, appears germane to the processing of artistic stimuli.²²⁸ Other networks track the reward value of a stimulus, which can be useful in determining what is pleasing to the ear of an audience member.²²⁹ The problem of reverse inference is a concern, but it requires caution before attributing neural activity solely to an aspect of the aesthetic experience, not a wholesale abandonment of neuroaesthetic research.

Skeptics might press their point by maintaining that even if researchers acknowledge the biological complexity of the aesthetic experience, that complexity represents a barrier to understanding audiences that researchers have yet to cross. Scientists have gotten better in the last decade at decoding the different brain regions involved in aesthetic encounters, but they are still far removed from answering some of the basic questions one might want to know to fully comprehend the physiology of audience reaction. For example, at this point, when someone recognizes a particular stimulus, brain scans cannot determine whether the person is relying on a true memory (i.e., something that really happened to the person) instead of a false one.²³⁰ The philosopher John Hyman questioned what good can come of neuroaesthetic study if we cannot tell if an audience member viewing an image of a voluptuous woman is responding to the artistry used to create the image or sensuous impulses one might feel regardless of creative technique.²³¹

Hyman is right that neuroscientists have not cracked the code on exactly

226. Anjan Chatterjee, *Neuroaesthetics: A Coming of Age Story*, 23 J. COGNITIVE NEUROSCIENCE 53, 59 (2011); see also Craig M. Bennett, Abigail A. Baird, Michael B. Miller & George L. Wolford, *Neural Correlates of Interspecies Perspective Taking in the Post-Mortem Atlantic Salmon: An Argument for Proper Multiple Comparisons Correction*, 1 J. SERENDIPITOUS & UNEXPECTED RESULTS 1, 1 (2009) (using scan of dead fish that supposedly exhibited brain activity when being exposed to photographs of human subjects to illustrate the need for more correction for chance correlations in fMRI research).

227. Pearce et al., *supra* note 15, at 269.

228. STARR, *supra* note 164, at 63–64; Reybrouck, *supra* note 15, at 5.

229. Brown et al., *supra* note 186, at 255.

230. Joyce W. Lacy & Craig E.L. Stark, *The Neuroscience of Memory: Implications for the Courtroom*, 14 NATURE REV. NEUROSCIENCE 649, 654–55 (2013).

231. John Hyman, *Art & Neuroscience*, in BEYOND MIMESIS AND CONVENTION: REPRESENTATION IN ART AND SCIENCE 245, 250 (Roman Frigg & Matthew Hunter eds., 2010).

what makes aesthetic experiences unique. But they are aware of this. Experimenters routinely caution that aesthetic responses overlap with other biological processes and that reactions to creative works can look the same as reactions to other stimuli.²³² Aesthetic experiences involve many of the same biological processes as other experiences, but this does not make their study useless. As it stands now, the audience test offers no predictive ability for litigants or content for courts in review. Insights into how audiences process creative works (and confirming that there is indeed a unique biology to aesthetic thought) represent an improvement from the status quo even if it is not yet possible to identify every part of what makes aesthetic responses unique.

Hyman's critique also seems to fault neuroscientists for not offering an answer to a question that has haunted aesthetic philosophers for centuries. He rightly contends that fMRI imaging cannot tell us what should be considered art and what should not.²³³ But it is not necessary for neuroscience to resolve this philosophical conundrum before it can help us understand the aesthetic experience. Brain scans will never be able to explain what makes for good artwork. Instead, neuroaesthetics can provide information on the biological mechanisms behind the enjoyment of some artworks but not others.²³⁴ If one defines aesthetics to include the study of all stimuli generating positive emotions, then it would seem that neuroscientists can provide valuable information on aesthetic responses.²³⁵ This may not match Hyman's definition of aesthetics, but that is not the fault of scientists trying to describe a mental process while avoiding making normative claims about art appreciation.²³⁶

Other objections to neuroaesthetic study are more specific.²³⁷ One might question the ability of neuroscientists to recreate the real-world conditions of aesthetic judgment. This is important because the substantial similarity test calls for the trier of fact to experience creative works in the same manner as their intended audiences.²³⁸ Seeing an image of a painting while being scanned in an fMRI machine is not the same as seeing the original in a

232. See, e.g., Kirsch et al., *supra* note 195, at 65 (discussing need for and strategies to disentangle neural evidence of aesthetic experience from general, non-aesthetic emotional responses).

233. *Id.* at 260.

234. Marcos Nadal, *The Experience of Art: Insights from Neuroimaging*, 204 *PROGRESS BRAIN RES.* 135, 153 (2013).

235. See Kirsch et al., *supra* note 195, at 58.

236. Neuroscientists define aesthetic much more broadly than just experiencing art. According to one definition, "[a]esthetics, as generally understood, focuses on properties of objects and our emotional responses to those properties." CHATTERJEE, *supra* note 19, at 115–16.

237. For a discussion of whether neuroimaging experiments can offer meaningful data on audiences given their small sample sizes, see *supra* Part I.B.

238. See *supra* Part I.A.

museum. Experiments often confront participants with long successions of artworks divorced from their typical context.²³⁹

Those working in neuroaesthetics are sensitive to these concerns. Contexts have been varied in an effort to determine when a contextual change will influence the neural processes behind aesthetic judgment. For example, researchers try to partially recreate the art museum context by telling some subjects that the images they are viewing are “gallery art.”²⁴⁰ And not all studies are undertaken in artificial lab conditions. Researchers have sampled the reactions of actual museum visitors and live concert goers.²⁴¹ Moreover, as the technology for neural imaging becomes more portable, the opportunities for recreating the context surrounding creative works will only multiply. Already, in private industry and in government studies, researchers use portable EEG devices to measure subjects’ neural responses in shopping malls and on battlefields.²⁴²

In sum, neuroaesthetic research offers information that could be relevant to copyright law’s infringement analysis in a variety of ways. First, it both confirms and calls into question some background assumptions underlying the audience test. Aesthetic response operates automatically, supporting the current approach to evaluating substantial similarity in a way that avoids labored deliberation over the similarities in two works. These responses differ greatly, however, depending on the type of art form at issue and the level of familiarity the audience has with the art form. Copyright law’s current insistence on a uniform approach to audience and art work fails to capture the biological realities of the aesthetic experience. Second, neuroaesthetics suggests ways to potentially measure the strength of aesthetic responses. Current technologies do not allow for an inquiry into all aspects of aesthetic encounters, but the ability to assess audience reaction when experiencing a creative work represents a marked improvement over the black box that currently houses the substantial similarity analysis. Although there are many limitations on our ability to use neuroscience to comprehend audiences, copyright law does not insist on perfect understanding; it only looks to an aggregate appreciation. The next Part wrestles with the normative implications of a neuroaesthetic approach to substantial similarity, asking whether the improved understanding of

239. Cela-Conde et al., *supra* note 186, at 47.

240. Ulrich Kirk, Martin Skov, Oliver Hulme, Mark S. Christensen & Semir Zeki, *Modulation of Aesthetic Value by Semantic Context: An fMRI Study*, 44 *NEUROIMAGE* 1125, 1126 (2009).

241. Pearce et al., *supra* note 15, at 270.

242. Srivari Aishwarya, *US Army Researchers Explore Brain’s Influence on Soldiers Pulling the Trigger*, *ARMY TECH.* (Aug. 4, 2016), <https://www.army-technology.com/uncategorised/newsus-researchers-explore-brain-waves-influence-on-soldiers-twitchy-trigger-finger-4971270/> [<https://perma.cc/V5UG-FEQ7>].

audiences explored in Parts I and II can actually improve the quality of the copyright infringement analysis.

III. IS NEUROAESTHETICS GOOD FOR COPYRIGHT?

It might seem that any tool that helps courts better understand the thought processes of audiences should be embraced to improve the quality of infringement decisions. There are reasons, however, to be cautious when importing scientific insights into copyright doctrine. Ultimately, the substantial similarity test involves a policy decision. A better understanding of audiences could make the copyright infringement analysis worse, not better, if such an understanding is not aligned with the underlying normative considerations that justify copyright protection.²⁴³

After offering some thoughts on neuroaesthetics' normative implications, this final Part examines not only what related changes would be good for copyright law but also what is possible. The historical record shows that it is only in a particularized zone of insight—one that challenges current understandings but does not clash with fundamental legal precepts—that law and psychology are successfully married. To influence copyright law, any reform efforts based on neuroaesthetic discoveries will need to fit within this zone as well. Three doctrinal suggestions—(1) using experts to tailor the substantial similarity analysis to different kinds of artistic works; (2) accepting survey evidence to better understand the aesthetic responses of specialized audiences; and (3) reordering the infringement analysis to debias judges and jurors—steer this middle course while promising to improve the law of copyright infringement.

A. The Normative Implications of a Neuroaesthetic Approach to Infringement

Thanks to a nineteenth-century view of audience reaction to creative works as unavoidably subjective, copyright law's substantial similarity analysis has been on auto pilot for decades. Cognitive neuroscience demonstrates that the audience test rests on some flawed assumptions about the measurability and generalizability of the aesthetic experience. Armed with neural data, courts could begin to recalibrate the substantial similarity analysis in accordance with the ways our minds really think. Neuroaesthetics may also prompt a willingness to replace copyright's

243. See David L. Faigman, *Where Law and Science (and Religion?) Meet*, 93 TEX. L. REV. 1659, 1678–79 (2015) (maintaining that the law can and should borrow from science but “[i]n regard to what science might offer, then, the law ought to be a sophisticated consumer”).

current one-size-fits-all approach to understanding audiences, instead placing more emphasis on the actual likely listeners and observers for different kinds of creative expression.

Before rushing to reform the substantial similarity analysis, however, we should first ask some fundamental questions. Just because aesthetic response can now be measured does not mean that those measurements should guide the infringement determination. There are reasons to be wary of using scientific measurement. Those worried that such measurements will do violence to the humanistic values embedded in copyright law may call for their continued exclusion. A contrasting position, one that advocates for purging aesthetic considerations from the infringement calculus altogether, would have the same effect: stopping neuroscience's influence on copyright law before it can get started. I address these two concerns before turning to some specific and realizable recommendations for importing neuroscientific insights into the substantial similarity analysis in light of copyright law's normative commitments.

1. Copyright Law and the Two Cultures

There has long been a sense that science is at odds with art appreciation. Science and the humanities represent "two cultures," with the former being described as objective and the latter defined by its insistent subjectivity.²⁴⁴ This dichotomy is inscribed not only in popular perception but also in the law of intellectual property. The Constitution's Intellectual Property Clause separates the "Sciences" from the "useful Arts," prompting divergent legal approaches to the two categories.²⁴⁵ Patent law categorizes the sciences as susceptible to a qualitative measure of "Progress." By contrast, courts posit that such a measurement is not possible for copyright law. The arts are described as necessarily "useless" and their progress only loosely tied to the sheer quantity of such works generated.²⁴⁶

For some, any proposal to welcome neuroscientific evidence of audience reaction into copyright law risks violating the theoretical and constitutional separation of these two realms. At its heart, neuroaesthetics forces a partial reconception of our experience of creative works, painting this experience as a matter of biology. This shift can be jarring for its implied displacement

244. C.P. SNOW, *THE TWO CULTURES* (Canto ed. 1993); see also Peter Lee, *Patent Law and the Two Cultures*, 120 *YALE L.J.* 2, 11–15 (2010) (contrasting the different "cultures" of patent and copyright law).

245. U.S. CONST. art. I, § 8, cl. 8.

246. Beebe, *supra* note 74, at 358; see also *id.* at 359 (quoting Justice Holmes: "one of the grounds of aesthetic pleasure is waste").

of longstanding cultural considerations.²⁴⁷ Perhaps some injection of empirical assessment into aesthetics can be tolerated, but, if too concerned with finding objective answers, neuroscientists may create those answers even if they do not truly describe what makes art pleasurable to audiences.²⁴⁸ It does not help that the things being studied—“beauty,” “pleasure,” “similarity”—lack universally accepted definitions. The vague, undefined nature of aesthetic experience, it is feared, will give scientists too much leverage to impose their own definitions.²⁴⁹ As one philosopher wrote with regard to psychological studies of art appreciation, “I am convinced that the problem of the description of the nature of aesthetic experience is not a task to which the techniques of empirical science are relevant.”²⁵⁰ Anxious art historians and critics complain that neuroscientists rarely consult their work when charting new discoveries in aesthetic science.²⁵¹

A related critique when it comes to neuroaesthetics stems from the tendency of neuroscientists to study “classic” artistic representations, thereby embedding—in a supposedly objective analysis of aesthetic experience—their own tastes and predispositions. Many neuroaesthetic experiments expose subjects to paintings and sculptures in what would now be considered traditional styles. At the same time, by searching for the biological signs of aesthetic beauty and pleasure, neuroscientists can be accused of reifying outdated aesthetic theories.²⁵² For example, art critic Blake Gopnik accuses neuroscientists of using their enhanced ability to study viewer sensations to only chase an old-fashioned view of art as dependent on a work’s formal properties.²⁵³ Better to investigate the work’s meaning, and related social and historical backdrop, he says, which cannot be elucidated so easily through neural imaging.²⁵⁴ Otherwise, the scientists conducting neural studies of audiences will impose their own artistic tastes on copyright law, giving short shrift to conceptual art or other artistic movements that do not square with an old, Enlightenment view of

247. CHATTERJEE, *supra* note 19, at 123 (“The view of art as a biological imperative clashes with the view of art as a cultural artifact.”).

248. Bevil R. Conway & Alexander Rehdig, *Neuroaesthetics and the Trouble with Beauty*, 11 PLOS BIOLOGY 1, 4 (2013) (“In trying to crack the subjective beauty nut with scientific, objective information, we also run the risk of fueling a normative, possibly dangerous campaign through which science is required to valorize our experience.”).

249. See WILLIAM R. UTTAL, MIND AND BRAIN: A CRITICAL APPRAISAL OF COGNITIVE NEUROSCIENCE 21–22 (2011) (lamenting the unreliable results triggered from neuroscientific study of vague or undetermined concepts).

250. George Dickie, *Is Psychology Relevant to Aesthetics?*, 71 PHIL. REV. 285, 302 (1962).

251. Blake Gopnik, *Aesthetic Science and Artistic Knowledge*, in AESTHETIC SCIENCE: CONNECTING MINDS, BRAINS, AND EXPERIENCE 129, 130 (A.P. Shinmamura & S.E. Palmer eds., 2012).

252. CHATTERJEE, *supra* note 19, at xxi.

253. Gopnik, *supra* note 251, at 129.

254. *Id.*

aesthetics.²⁵⁵

It seems wrong, however, to insist that our understanding of aesthetic experiences cannot be improved by new knowledge of neural architectures. Neuroscientists need to be careful about instantiating eighteenth-century theories of aesthetics into experiments meant to track how twenty-first-century audiences perceive creative works. A single-minded focus on “beauty” would recreate the way eighteenth-century philosophers thought about art, but do a disservice to particular kinds of creative works.²⁵⁶ Studies involving only classical works of art will of course privilege certain art forms over others. But researchers are increasingly evaluating different kinds of art, including conceptual art.²⁵⁷ In its earliest stages, it made sense for neuroaesthetic study to focus on works of art that enjoyed the most popular acclaim, thereby minimizing individual variance when it comes to perceiving a work as “beautiful.” This prompted a reliance on more traditional works. But it seems likely that a broader description of the different inputs for aesthetic experience will come as the body of scientific studies grows.

Nor is it impossible to conceive of a new understanding of aesthetic encounters that borrows from both of the two cultures. Despite treating science and art as two separate subjects, copyright law and patent law sometimes borrow from each other,²⁵⁸ a cross-pollination that can be viewed as a strength and not a weakness.²⁵⁹ Neuroaesthetic data, rather than replacing the reported aesthetic reactions of observers and listeners, can act as a valuable supplement to articulated notions of beauty, pleasure, and similarity. Part of the value of neuroaesthetic study is that it can supply evidence of mental processes that individuals cannot perceive or describe on their own.²⁶⁰ Yet the goal is not to ignore conscious explorations of

255. *Id.*

256. See Brown et al., *supra* note 186, at 250–51.

257. E.g., PAUL M.W. HACKETT, *PSYCHOLOGY AND PHILOSOPHY OF ABSTRACT ART: NEURO-AESTHETICS, PERCEPTION, AND COMPREHENSION* (2016); Vered Aviv, *What Does the Brain Tell Us About Abstract Art?*, 8 *FRONTIERS HUMAN NEUROSCIENCE* 85 (2014).

258. E.g., *Impression Prods., Inc. v. Lexmark Int’l, Inc.*, 137 S. Ct. 1523, 1536 (2017) (applying rules for international exhaustion of copyright rights to patent rights); *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 439–42 (1984) (using the Patent Act’s grant of immunity for contributory infringement for sellers of “staple articles” to craft a similar exemption in copyright law); *BMG Rights Mgmt. (US) LLC v. Cox Commc’ns, Inc.*, 881 F.3d 293, 307–08 (4th Cir. 2018) (relying on jurisprudence of contributory patent infringement claims to allow imputation of intent for contributory copyright infringement claims when a defendant “knows that its action . . . is substantially certain to result in infringement.”).

259. Clark D. Asay, *Intellectual Property Law Hybridization*, 87 *U. COLO. L. REV.* 65, 70 (2016); cf. Nelson Tebbe & Robert L. Tsai, *Constitutional Borrowing*, 108 *MICH. L. REV.* 459, 484 (2010) (endorsing “constitutional borrowing” from one area of constitutional law to the other).

260. See Solso, *supra* note 18, at 77.

aesthetic encounters. Scientists check fMRI data derived from experiments on brain function against “reliable first-person accounts of consciousness,” rather than replace reported descriptions of aesthetic experience altogether.²⁶¹ Objective evidence of audience reactions can be incorporated into the substantial similarity analysis without independently defining it. Doctrinal innovations can rely on neuroscientific findings to help inform the substantial similarity analysis without completely determining that analysis.

A related concern comes from the danger outside evidence of audience reaction poses to aesthetic pluralism. Although the overwhelming scholarly consensus is that the substantial similarity test needs more definition, for some, this lack of specificity should be considered a feature, not a bug. For example, Shyam Balganesh celebrates the undetermined nature of the test. Because it is so difficult to determine a work’s aesthetic value and whether that value has been appropriated by the defendant, the audience test affords the trier of fact the opportunity to consider more than the economic effects of the appropriation, allowing for “the introduction and instantiation of plural values into the copyright analysis.”²⁶²

In a related vein, Brian Soucek warns against the legal imposition of aesthetic orthodoxy.²⁶³ Soucek does not caution against aesthetic discrimination because judges are ill-equipped to make aesthetic judgments or because the subjective nature of aesthetic judgment makes any attempt to determine the “best” aesthetic approach a losing proposition. Rather, he submits that the First Amendment commands aesthetic neutrality.²⁶⁴ Because some aesthetic judgment in the test for copyright infringement is unavoidable, one might conclude that the infringement analysis should be structured so that the state does not shrink the array of acceptable aesthetic choices.²⁶⁵ If the vagueness of today’s audience test aids this commitment to aesthetic pluralism, a more structured test, responsive to biological evidence of audience reaction, might do the opposite.

Balganesh and Soucek are right to celebrate aesthetic pluralism as a worthwhile consideration, but some tension between the need for greater

261. ARMSTRONG, *supra* note 168, at 20.

262. Balganesh, *supra* note 117, at 233, 253.

263. Soucek, *supra* note 100, at 448–58.

264. *Id.*

265. Soucek argues that unlike obscenity law and zoning ordinances, where “the government is undeniably in the business of regulating expression,” copyright protection might be construed as a mere government subsidy for the speech of authors, thereby neutralizing concerns that the substantial similarity test could result in a “state-imposed aesthetic orthodoxy” that violates the First Amendment. *Id.* at 459–61. Recent Supreme Court jurisprudence puts this argument in doubt. *See Matal v. Tam*, 137 S. Ct. 1744, 1760–62 (2017) (refusing to consider the federal protection of registered trademarks as a subsidy or as government speech that can avoid First Amendment proscription on viewpoint discrimination).

specificity in the definition of infringement and the desire to protect aesthetic pluralism is inevitable. Copyright policymakers need to weigh the costs and benefits of one approach against another rather than valuing pluralism over all other values. The years of frustration voiced by copyright scholars and judges over the substantial similarity test testifies to a consensus that the law has moved too far along the spectrum toward plurality and away from predictability. Lack of specifics makes copyright cases notoriously expensive as even somewhat specious claims become incapable of resolution before trial. Predictability is not the only value at stake in copyright jurisprudence, but it should be a central one.²⁶⁶

The audience test's unbounded nature allows for bias. In its present form, the audience test not only defies predictability but also permits wide disparities in the success rates of infringement suits depending on artistic medium. Plaintiffs claiming infringement of a musical composition fare far better than those alleging improper appropriation of a literary copyright.²⁶⁷ There may be good reasons for some of this discrepancy, but the problem with the current state of infringement law is that we have no way of finding out why the discrepancy exists. The infringement black box makes it impossible to discern potential failures in judgment. Perhaps the variance in infringement decisions reflects a desirable, ecumenical approach to art appreciation. But it also likely stems from decisionmaking errors, as when a jury bases its decision on unprotectable attributes of the plaintiff's work or on a retributive impulse after learning the defendant engaged in some intentional copying.²⁶⁸

Given these considerations, some potential sacrifice of aesthetic pluralism in favor of a more determined substantial similarity analysis is desirable. In addition, the specific reforms prompted by neuroaesthetic findings can be designed to do as little harm to pluralist values as possible. For example, one suggestion, described in more detail below, is to alter the infringement analysis to take into account the ways in which aesthetic encounters differ depending on the kind of work at issue.²⁶⁹ By leveraging neuroaesthetic findings to recalibrate the law of substantial similarity, copyright reformers can make infringement more determined while at the

266. Kem Thompson Frost, *Predictability in the Law, Prized Yet Not Promoted: A Study in Judicial Priorities*, 67 BAYLOR L. REV. 48, 52 & n.4 (2015) (offering examples of "the high value courts place on attaining predictability in the law"); Jennifer Understahl, *Copyright Infringement and Poetry: When Is A Red Wheelbarrow The Red Wheelbarrow?*, 58 VAND. L. REV. 915, 949 (2005) ("Predictability is important because it allows authors to understand the limits of their protectible expression and the boundaries of acceptable borrowing from prior works.").

267. Lowe, *supra* note 90, at 28, 30.

268. Balganesch et al., *supra* note 34, at 281.

269. *See infra* Part III.B.1.

same time avoiding a uniform approach to aesthetic judgment.

2. *Avoiding Aesthetics*

On the other side of the spectrum from those concerned with an overly circumscribed view of aesthetic reaction would be those who believe that aesthetic judgment should have no place in the infringement calculus at all. A frequent suggestion in the scholarly literature is to replace the vagaries of the audience test with a mechanism that more directly considers the economic harms of infringement.²⁷⁰ Such a change would better align the infringement test with copyright's utilitarian goals, the argument goes, while also having the advantage of making infringement cases more predictable.

There is also a doctrinal argument for purging aesthetic judgment from the substantial similarity calculus. An avoidance of aesthetic concerns would seem to follow what is “arguably the most influential copyright opinion the [Supreme] Court has ever produced.”²⁷¹ In *Bleistein v. Donaldson Lithographing Co.*, Justice Oliver Wendell Holmes cautioned against decisionmakers making any sort of qualitative, aesthetic judgment when setting the boundaries of copyrightability.²⁷² Out of fear of judicial bias in favor of traditional art and against the avant-garde, Holmes deemed it better to avoid any evaluation of aesthetic merit at all. For a century, *Bleistein* has influenced decisions about the standard for assessing whether a work was sufficiently original to enjoy copyright protection.

Bleistein's influence on the specific issue of copyright infringement has been more muted, but only because of the presumed impossibility of measuring audience reactions. By assuming that an audience's aesthetic judgment was impenetrable, courts were able to believe the substantial similarity analysis avoided the imposition of any aesthetic orthodoxy. After all, if one could not discern how jurors arrived at their infringement determinations, then arguably one could not steer those determinations in any particular direction. The longstanding prohibition on expert testimony and audience surveys served as additional safeguards against influences that might violate *Bleistein*'s aesthetic non-discrimination principle when evaluating substantial similarity.

Decisions about the admissibility of scientific evidence of aesthetic response tread much closer to an explicit qualitative judgment about art.

270. See, e.g., Laura G. Lape, *The Metaphysics of the Law: Bringing Substantial Similarity down to Earth*, 98 DICK. L. REV. 181, 194–204 (1994); Samuelson, *supra* note 12, at 1845–47 (2013).

271. Beebe, *supra* note 74, at 329.

272. 188 U.S. 239, 250 (1903).

Judicial choices about the probativity of such evidence would require decisions about how to prioritize findings that audiences find particular aspects of a work to be “beautiful” or just “noise.” Rather than revising the audience test to incorporate this evidence and risk offending *Bleistein*, one might be tempted to jettison aesthetic concerns altogether. Such an anti-aesthetic approach would render neuroaesthetics of no value for copyright law.

There are a few reasons not to excise aesthetic concerns from copyright infringement, however. First, it may be impossible. As multiple scholars point out, judges frequently disclaim aesthetic principles in copyright cases while in fact relying on their own aesthetic sympathies to decide cases.²⁷³ By maintaining that judges should not evaluate aesthetic merit, the *Bleistein* decision effectively adopts its own aesthetic theory, one that assesses aesthetic worth based on a work’s “commercial value.”²⁷⁴ Considering evidence of aesthetic reaction would at least make judicial sympathies more transparent.

Second, a non-aesthetic approach would likely substitute financial concerns for aesthetic ones. Some copyright scholars call for explicitly tethering commercial value to the infringement calculation. In 2010, a group proposed to change substantial similarity to “require the copyright owner to prove commercial harm in order to prove infringement of the owner’s exclusive rights.”²⁷⁵ They maintained that this doctrinal reform would replace the audience test’s subjectivity with an objective way to ascertain when appropriation of a creative work is improper.²⁷⁶

We should question whether an infringement determination based solely on market harm, and no longer reliant on aesthetic reaction, would make sense. First, to the extent copyright law is designed to preserve financial incentives for authors, it is likely that other components of copyright doctrine are already doing the job. The threshold question of eligibility for copyright protection depends more on a work’s potential marketability than its creativity.²⁷⁷ Copyright’s fair use defense also relies heavily on economic harm. In evaluating the defense, courts must consider four statutory factors,

273. See Beebe, *supra* note 74, at 386; Walker & Depoorter, *supra* note 111, at 358–71; Yen, *supra* note 25, at 266–97.

274. See Beebe, *supra* note 74, at 330; see also Soucek, *supra* note 100, at 386 (“[A]cceding to relativism is itself a substantive aesthetic judgment, not an avoidance of such judgments, as Holmes’s followers seem to believe.”).

275. Pamela Samuelson et al., *The Copyright Principles Project: Directions for Reform*, 25 BERKELEY TECH. L.J. 1175, 1211 (2010). The group also suggested that proof of commercial harm should not be required to prove substantial similarity when the defendant was using “all or virtually all of a copyrighted work.” *Id.*

276. *Id.* at 1209–13.

277. See Beebe, *supra* note 74, at 373–74.

including “the effect of the use upon the potential market for or value of the copyrighted work.”²⁷⁸ The Supreme Court described this factor as the “single most important element [in determining] fair use,”²⁷⁹ and even as subsequent decisions have caused the fair use determination to evolve, federal courts continue to consider market harm to be of primary importance.²⁸⁰

Second, doctrine meant to emphasize financial considerations can have adverse consequences. For many, copyright law has become an engine for inequality. Tethering copyright protection to market value has produced a star system where the biggest entertainment companies and the most well-known celebrities gain the most from the law.²⁸¹ Beebe cautions that the *Bleistein* decision, by employing “a market definition of aesthetic progress” in a supposed effort to avoid aesthetic discrimination, made the mistake of privileging the propertization of objects rather than valuing the creative process itself.²⁸² Yoking infringement exclusively to market value could have its own pernicious effects. It could fuel an unthinking “if value, then right” tendency in intellectual property law, enlarging the scope of copyright without considering competing values like the need for a robust public domain to provide raw material for new works of authorship.²⁸³

To address these concerns, non-economic values should remain part of the copyright infringement analysis. As Andrew Gilden persuasively argues, copyright decisions involving issues of copyrightability and fair use often employ economic rhetoric to justify the clandestine upholding of noneconomic interests such as sexual privacy, religious freedom, and democratic discourse.²⁸⁴ Gilden objects to the use of “market gibberish” to obfuscate the real values that are being vindicated in these cases.²⁸⁵ The substantial similarity test potentially serves as a mechanism for supporting and articulating these values. But, in its current incarnation, there is not even “gibberish” to rely on to determine what is going on.

The answer is not to abandon aesthetic analysis altogether. If the subject matter of copyright protection makes such analysis unavoidable, then copyright law should change to make its selection of aesthetic principles

278. 17 U.S.C. § 107(4).

279. *Harper & Row Publishers, Inc. v. Nation Enters.*, 471 U.S. 539, 566 (1985).

280. Barton Beebe, *An Empirical Study of U.S. Copyright Fair Use Decisions, 1978-2005*, 156 U. PA. L. REV. 549, 617 (2008).

281. MARTIN SKLADANY, *BIG COPYRIGHT VERSUS THE PEOPLE 3* (2018); Lea Shaver, *Copyright and Inequality*, 92 WASH. U. L. REV. 117, 141 (2014).

282. Beebe, *supra* note 74, at 351.

283. See Molly Shaffer Van Houweling, *Distributive Values in Copyright*, 83 TEX. L. REV. 1535, 1575 (2005).

284. Andrew Gilden, *Copyright's Market Gibberish*, 94 WASH. L. REV. 1019 (2019).

285. *Id.* at 1025–58.

open and notorious. As Gilden writes, “[i]f courts are going to engage in a deeply subjective endeavor, influenced by a wide variety of considerations, those considerations should at least be allowed to come to the surface.”²⁸⁶ Aesthetic reactions can serve as a proxy for additional values beyond preserving the financial incentives of authors. Neurological measurement has the potential to make these values more legible and prevent courts from hiding behind an outdated, mystical view of aesthetic experience.

B. The Right Way to Incorporate Neuroscience into Copyright Law

Below I offer some suggestions for how neuroaesthetic findings can improve copyright infringement decisionmaking, using the lessons of neuroaesthetics to justify doctrinal reforms. These are general proposals that deserve further refinement in future work. They may not be realized immediately given the inertia of copyright lawmaking. Nevertheless, such reforms become increasingly likely as neuroaesthetics matures as a research field and courts grow more dissatisfied with the flawed state of the substantial similarity status quo.

1. Different Aesthetic Approaches for Different Creative Media

If there was ever a doubt that audiences evaluate different artistic media in different ways, neuroscience has put those doubts to rest. Particular areas of the brain process, store, and retrieve music, but are not activated by other types of creative expression.²⁸⁷ We tend to dissect musical works into their component parts while evaluating images holistically. This suggests that the common substantial similarity instruction that the trier of fact should assess whether two works have the same “look and feel” tracks actual audience experiences for some media but not others.²⁸⁸

Neuroaesthetics shows that the answer is not to stick with a universal approach to substantial similarity regardless of art form. Instead, expert testimony is needed to help the trier of fact understand which aspects of a work will be most salient to audiences depending on artistic medium. For example, an expert could provide the trier of fact with knowledge that, for music, the similarity of a particular segment to another should be more telling than in non-music cases. Given the scientific evidence, jurors should not be told to rely on “total sound effect” when determining substantial

286. *Id.* at 1081–82.

287. OLIVER SACKS, MUSICOPHILIA: TALES OF MUSIC AND THE BRAIN 117–18 (2008); Margit Livingston & Joseph Urbinato, *Copyright Infringement of Music: Determining Whether What Sounds Alike Is Alike*, 15 VAND. J. ENT. & TECH. L. 227, 280 (2013).

288. *See supra* Part II.A.1.

similarity in music copyright cases as they are today.²⁸⁹

Not every copyright case warrants expert testimony.²⁹⁰ Scientists have more insight into some kinds of aesthetic encounters than others, which should be reflected in the substantial similarity analysis. Perhaps unsurprisingly, abstract art prompts more varied aesthetic reactions than representational art.²⁹¹ Neuroscientists have had more success at isolating emotional reactions to musical works than other creative works.²⁹² This might mean that music cases or representational art cases can begin to utilize neural evidence whereas other infringement matters will need to wait until our understanding of the relevant aesthetic reaction improves.²⁹³ Given the findings of neuroaesthetic research, the current prohibition on all expert guidance regardless of art form seems inappropriate.

2. Surveying Audience Difference

Neuroaesthetics demonstrates that copyright law's general assumption of audience universality is wrong. Gender, familiarity with a particular art form, and other factors impact perception of creative works.²⁹⁴ Because there is more variability in audiences than the law has assumed, there needs to be further guidance from courts to allow the trier of fact to adopt the perspective of intended audience members. Surveys should be admitted to help judges and jurors understand different audiences.

289. *Arnstein v. Porter*, 154 F.2d 464, 476 (1946) (Clark, J., dissenting).

290. Gathering data on the perceptions and experiences of a target audience can be expensive and may not be worth it in the majority of copyright infringement cases. Thomas M.S. Hemnes, *The Adaptation of Copyright Law to Video Games*, 131 U. PA. L. REV. 171, 226 (1982) (contending that the ordinary observer test "encourages judicial economy and avoids interminable expert testimony"). Other areas of the law, however, have not adopted complete prohibitions on such evidence despite its potential expense.

291. Vessel et al., *supra* note 92, at 122.

292. W. Tecumseh Fitch, Antje von Graevenitz & Eric Nicolas, *Bio-Aesthetics and the Aesthetic Trajectory: A Dynamic Cognitive and Cultural Perspective*, in *NEUROAESTHETICS* 59, 94 (Martin Skov & Oshin Vartanian eds., 2009).

293. Not only would expert testimony help curb the influence of an idiosyncratic trier of fact who fails to represent the "ordinary observer," but a medium-specific approach to substantial similarity would also do a better job of preserving the public domain than the universalist status quo. Artists rely on knowledge about how the brain perceives visual images. For example, even as we evaluate images holistically, we are deeply influenced by contrast. Yet this contrast, by itself, should not be protectable. It is a technique or, as one commentator writes, a "perceptual fact." Moon Hee Lee, Note, *Seeing's Insight: Toward a Visual Substantial Similarity Test for Copyright Infringement of Pictorial, Graphic, and Sculptural Works*, 111 NW. U. L. REV. 833, 860–64 (2017). With further study, neuroscience could offer a better means of separating unprotectable perceptual facts from protectable expression. Copyright law already applies a specialized test for determining when visual works are eligible for copyright protection. See *Star Athletica, LLC v. Varsity Brands, Inc.*, 137 S. Ct. 1002, 1007 (2017). New information about how audiences appreciate different kinds of art shows that specialized tests for visual substantial similarity are also appropriate.

294. See *supra* Part I.B.

By prompting greater attention to the reactions of intended audiences, surveys would alter the infringement analysis to better track the financial and non-financial harms of infringement. To the extent that the substantial similarity test is meant to assess economic harm from the defendant's copying, the reactions of people who will actually encounter the works provides a better sense of this harm than the reactions of the general public or individual triers of fact. Non-financial interests are also better represented by intended audience members. In her study of the reasons artists create, Jessica Silbey describes a desire to be known to a particular audience and to cultivate a favorable reputation among that audience as central motivators, not just a desire for financial remuneration.²⁹⁵ If so, it makes sense to position infringement according to the reactions of specific audiences for the plaintiff's and defendant's works.

Surveys also offer the capability of assessing audience reactions in a rapid manner that resembles the "spontaneous and immediate" aesthetic experiences of audience members in the real world.²⁹⁶ If recreating audience aesthetic judgment is the touchstone for substantial similarity, then the jurors in the *Led Zeppelin* case should have been exposed to the relevant "Taurus" and "Stairway to Heaven" compositions quickly and then asked for their judgment. The limitations of the courtroom and the adversarial process make it difficult to determine the "gut reaction" of the "casual observer" to creative works, however. The trier of fact ends up seeing or hearing the works at issue multiple times and deliberating over their similarities or differences in a less than casual manner. By contrast, if conducted the right way, surveys could more accurately sample the immediate impressions of onlookers and then report that information to the trier of fact.

Even if one believes that the aesthetic reaction of audience members is the right metric for evaluating infringement, there are prudential considerations when using surveys to gain insight into that reaction. Even the best survey that sheds light on how people respond to creative works cannot fully illuminate the complexities of this process. The concern here is that embracing survey evidence will somehow leave out critical parts of the aesthetic experience, potentially over or underprotecting deserving creative works.²⁹⁷

295. JESSICA SILBEY, *THE EUREKA MYTH: CREATORS, INNOVATORS, AND EVERYDAY INTELLECTUAL PROPERTY* 149–60 (2015).

296. *See supra* note 151.

297. There would also be concerns about survey accuracy. Jeanne C. Fromer & Mark A. Lemley, *The Audience in Intellectual Property Infringement*, 112 MICH. L. REV. 1251, 1279–80 (2014). But there is no reason to think that judges, in their gatekeeping function, could not screen out unreliable surveys from probative ones, just as they do in other legal contexts.

This objection deserves serious consideration and should help guide how surveys can be used to inform the substantial similarity analysis. Because our understanding of aesthetic reactions is far from perfect, survey evidence of those reactions should only serve as a supplement to the infringement calculation rather than the sole determinant.

Nevertheless, surveys of intended audiences should be permitted to aid in the substantial similarity determination. As noted, copyright courts have been hostile to surveys, refusing to allow them into the infringement calculation at all.²⁹⁸ In the very few copyright cases weighing the value of a proffered survey, there have been unfortunate mistakes in survey design. The proffered surveys queried respondents on the likelihood of confusing the defendant's work with the plaintiff's work, an issue more relevant for trademark infringement than copyright infringement.²⁹⁹ These mistakes may not be the fault of clumsy survey designs, but rather stem from the relative difficulty in figuring out how to interrogate particular audiences on their aesthetic responses. After all, one cannot simply ask audience members if they think one copyrighted work is "substantially similar" to the other.

Yet it is not impossible to design a survey that is relevant to the substantial similarity analysis. Irina Manta suggests that open-ended questions allowing a respondent to choose a degree of similarity would be appropriate. For example, members of the target audience could rate the works at issue on a five-point scale, with one standing for "not at all similar" and five for "very similar."³⁰⁰ Surveys could also ask audiences to identify the components of a copyrighted work that they found most noticeable or enjoyable. Neuroimaging may offer valuable data for survey design, indicating which parts of the works at issue are potentially most salient to the relevant demographic.

Attention will also need to be paid to the appropriate universe for a survey. Purchasing records and market analyses could define a survey universe based on the copyright holder's existing and likely customer base.³⁰¹ Because authors routinely are motivated to create with a particular audience in mind, contemporaneous evidence from the copyright holder may also shed light on the appropriate audience to survey.³⁰² Parties will no doubt

298. See *supra* Part I.A.

299. See *Ideal Toy Corp. v. Kenner Prods.*, 443 F. Supp. 291, 298–99, 304 (S.D.N.Y. 1977).

300. Jamie Lund, *An Empirical Examination of the Lay Listener in Music Composition Copyright Infringement*, 11 VA. SPORTS & ENT. L.J. 137, 155 & n.70 (2011); Manta, *supra* note 60, at 1352–53.

301. See *Lyons P'ship v. Morris Costumes, Inc.*, 243 F.3d 789, 802–03 (4th Cir. 2001) (using "all of the relevant evidence" to conclude that the intended audience for a copyrighted dinosaur costume was "an audience consisting of young children," not only adult renters and purchasers of the costume).

302. SILBEY, *supra* note 295, at 149–60.

argue as to whether a proffered survey polled a truly representative sample. Again, the perfect should not be the enemy of the good. Surveys are routinely accepted in other areas of the law, including trademark law, and courts are free to discount or even exclude a survey that takes too broad or too narrow of a sample.³⁰³

Even if surveys offer incomplete information about audience thought, they would provide more inputs for appreciating audience mindsets, thereby prompting a salutary cognitive realignment. Today, we know little to nothing about how judges and juries arrive at their infringement determinations. Without guidance, people tend to evaluate scenarios from their own perspective.³⁰⁴ It is likely that decisionmakers in copyright cases are constantly failing to appreciate the perspective of relevant audiences, even on those few occasions when they are instructed by courts to adopt that perspective. They may need a legal nudge, in the form of survey evidence, to approach the substantial similarity analysis from a different point of view.

3. *Debiasing the Trier of Fact*

As discussed above, in its current, amorphous form, the substantial similarity test acts as a mechanism for importing societal norms into copyright law.³⁰⁵ Even if one thinks the test should remain a mechanism for reflecting these norms, this does not mean that it should operate as a vehicle for subconscious bias. In most areas of the law, we do not believe that the very act of setting boundaries on the mental calculations of the trier of fact, regardless of the content of those boundaries, renders those calculations unreliable. Jurors are not subatomic particles whose positions will inevitably be disturbed by the act of trying to locate those positions. Nevertheless, substantial similarity doctrine has long proceeded under just such a belief about the fragility of the trier of fact. Believing “that one simply could not reason about the aesthetic,”³⁰⁶ courts tread extremely lightly, worrying that attempts to specify infringement will disturb jurors’ mental calculations. If this agnostic approach to substantial similarity was once justified given the absence of information as to how audiences actually

303. See, e.g., *Hodgdon Powder Co. v. Alliant Techsystems, Inc.*, 512 F. Supp. 2d 1178, 1181 (D. Kan. 2007); *Schieffelin & Co. v. Jack Co. of Boca*, 850 F. Supp. 232, 240–41 (S.D.N.Y. 1994).

304. Fromer & Lemley, *supra* note 297, at 1283 (“Cognitive science studies demonstrate that people tend to use themselves to simulate the mental states of others”); Manta, *supra* note 57, at 1353 (“If presented with the perceptions of numerous members of the intended audience, jurors and judges are more likely to reach the optimal result than if they are told that their own perceptions are the relevant ones or that they need to deduce what an abstract, average, reasonable observer would perceive.”).

305. See *supra* Part III.A.2.

306. Beebe, *supra* note 74, at 341.

appreciate art, neuroscientific discoveries make the justification no longer tenable. The law is filled with mechanisms designed to debias and improve legal decisionmaking.³⁰⁷ Copyright infringement should no longer be any different.³⁰⁸

Neuroaesthetic research argues for one concrete doctrinal debiasing innovation: the trier of fact should evaluate substantial similarity *before* determining whether actual copying took place. A common complaint about the current infringement paradigm is that judges and juries are biased by whatever determination they make about whether copying occurred when deciding whether that copying is improper. Keep in mind that there are two separate steps to the infringement analysis.³⁰⁹ First, there must be a determination of whether copying took place. At this step, the trier of fact can be aided by expert testimony and may dissect the works into their component parts for comparison. Here, the decision is whether similarities are probative of copying, not whether that copying is substantial enough to be considered improper. Only after this first step is there a comparison of the target audience's aesthetic response to the two works, an evaluation that currently precludes expert guidance or dissection.

The problem with the present ordering of these two separate stages of the infringement analysis is that the copying in fact step may skew the trier of fact's assessment of substantial similarity. The copying in fact analysis considers copying of either protectable or unprotectable expression as probative. The danger is that once any copying has been found, that initial finding will spill over into the separate question of whether this copying was improper. As one court noted, once a jury has been exposed to expert testimony on the separate issue of "copying in fact," it cannot "forget that

307. *E.g.*, FED. R. EVID. 403; *see also* Maggie Wittlin, *Hindsight Evidence*, 116 COLUM. L. REV. 1323, 1367 (2016) (discussing use of jury instructions to combat hindsight bias in jurors).

308. This should in no way suggest that neuroscientific evidence of audience reaction will act as a perfect tool for reforming copyright decisionmaking. There is the real danger that judges or jurors could be biased by the neuroscientific evidence itself. Inexperienced parties tend to be too persuaded by pictures showing activation in particular areas of the brain, even if those areas of activation have nothing to do with the phenomenon being interrogated. *See, e.g.*, Diego Fernandez-Duque, Jessica Evans, Colton Christian & Sara D. Hodges, *Superfluous Neuroscience Information Makes Explanations of Psychological Phenomena More Appealing*, 27 J. COGNITIVE NEUROSCIENCE 926, 926 (2015) (describing how "superfluous neuroscience information increased the judged quality of the argument for both good and bad explanations"); David P. McCabe, Alan Castel & Matthew G. Rhodes, *The Influence of fMRI Lie Detection Evidence on Juror Decision-Making*, 29 BEHAV. SCI. & L. 566, 566 (2011) ("Results showed that fMRI lie detection evidence led to more guilty verdicts than lie detection evidence based on polygraph evidence, thermal facial imaging, or a control condition that did not include lie detection evidence."). But explanation and cautionary instructions are a better way to correct our tendency to have too much faith in brain science than refusing to consider that science altogether. *See id.* ("However, when the validity of the fMRI lie detection evidence was called into question on cross-examination, guilty verdicts were reduced to the level of the control condition.").

309. *See supra* Part I.A.

evidence in analyzing the problem” of substantial similarity.³¹⁰

A way to help with this problem is to reverse the order of the two analyses. The trier of fact should decide substantial similarity first. If there is a conclusion that the two works are substantially similar, then there can be an examination of copying in fact.³¹¹

Although one might worry that this resequencing will cause the substantial similarity analysis to improperly influence the copying in fact test, this seems less likely than the reverse. Copying in fact is much more of a structured analysis than substantial similarity. It permits analytical dissection and expert testimony about which kinds of similarities should be considered probative. As a result, even when substantial similarity is found, this finding is unlikely to stampede the more bounded copying in fact analysis.

This idea about reordering the infringement decision has been suggested before.³¹² It should be given even more serious consideration given the teachings of neuroaesthetics. In addition to serving a debiasing function, reversing the order of the two components to infringement would better recreate the timing of aesthetic encounters. In an early formulation of the audience test, the Ninth Circuit proposed a waiting period between the observer’s experience of one work and her experience of another. The court described the test as inquiring whether an ordinary observer, “given an interval of two or three weeks between a casual reading of [plaintiff’s] story and a similar uncritical view of [defendant’s work],” would perceive the former in the latter.³¹³ Although this staggered reading of the two works proved too inefficient to implement, the motivating idea seems to be that

310. *Whelan Assocs. v. Jaslow Dental Lab., Inc.*, 797 F.2d 1222, 1233 (3d Cir. 1986) (internal quotation marks omitted); *see also* *Intervest Constr., Inc. v. Canterbury Estate Homes, Inc.*, 554 F.3d 914, 920 (11th Cir. 2008) (noting that even a “properly instructed” juror will have difficulty separating the copying in fact and substantial similarity analyses).

311. In *Led Zeppelin*, the original Ninth Circuit panel concluded that it was reversible error when the trial court refused to let the plaintiff play a sound recording of “Taurus” as part of the copying in fact part of the case. The plaintiff sought to play the sound recording in front of Led Zeppelin lead guitarist Jimmy Page to help prove that Page had access to “Taurus” and did not independently create the song’s signature guitar riff. *Skidmore v. Led Zeppelin*, 905 F.3d 1116, 1135-36 (9th Cir. 2018). The danger, however, is that the jury would also use the sound recording (Wolfe’s copyright only extended to the “Taurus” sheet music and not any associated recordings) to judge substantial similarity. “You can’t unhear what you have already heard,” chastised one expert. Stephen Carlisle, *Stairway to Nowhere: Court Reverses Verdict in Favor of Led Zeppelin* (Oct. 11, 2018), <http://copyright.nova.edu/led-zeppelin/> [<https://perma.cc/9QPT-R4TT>]. Hearing the case en banc, the Ninth Circuit concluded that the trial judge had been correct in preventing the jury from hearing the sound recording given the potential of the recording to prejudice the jury’s substantial similarity deliberations. *Skidmore v. Led Zeppelin*, 952 F.3d 1051, 1064 (9th Cir. 2020) (en banc). If substantial similarity was determined before copying in fact, one would not have the same concerns with jury bias.

312. Balganes, *supra* note 4, at 858–62; Manta, *supra* note 60, at 1349–50.

313. *Harold Lloyd Corp. v. Witwer*, 65 F.2d 1, 27 (9th Cir. 1933).

the essence of creative works can best be ascertained through immediate experience with those works. Infringement should not be assessed by a labored comparison of one work to another, lest that creative essence somehow become overlooked or fade under the pressure of a more logical comparison. Better to engage in a fast, “casual” review in order to discern the work’s aesthetic value.³¹⁴ In general, courts fear that too much time with a work causes deliberation to trump instinct, making the observer’s impression less probative of infringement.³¹⁵ Neuroscientific research reveals that there is some truth to these judicial suppositions. Reversing the order of the two central infringement determinations would help facilitate a more accurate rendering of an audience’s “spontaneous and immediate” impressions.³¹⁶

CONCLUSION

The current substantial similarity analysis uses the aesthetic judgment of audiences to determine whether one work infringes the copyright of another. Copyright law deems aesthetic judgment inherently subjective and, therefore, not susceptible to measurement or the imposition of objective criteria. At the same time, the law considers aesthetic judgment universal, making attention to audience differences largely unnecessary. By offering empirical evidence of audience attention and pleasure, neuroaesthetic research refutes these judicial suppositions about art appreciation. It turns out both that we can measure aesthetic experiences to some degree and that these experiences vary depending on audience and artistic medium.

Neural imaging of audiences is unlikely to replace the substantial similarity test wholesale. We won’t simply put sample viewers in fMRI

314. *Fulks v. Knowles-Carter*, 207 F. Supp. 3d 274, 279 (S.D.N.Y. 2016); *see also* *M & D Int’l Corp. v. Chan*, 901 F. Supp. 1502, 1511 n.3 (D. Haw. 1995) (questioning copyrightability of sculpture given that “only minor differences not readily apparent to the casual observer characterize the overall aesthetic appeal” of the work at issue versus competing works); *Judscott Handprints, Ltd. v. Washington Wall Paper Co.*, 377 F. Supp. 1372, 1376 (E.D.N.Y. 1974) (“To the casual observer, a glance at each would reveal little to distinguish [the wall coverings at issue], save the varying widths of the angular striping and the detailing of the bamboo. While closer scrutiny reveals actual design differences of size, spacing and the abovementioned detailing on the bamboo, these are, in a non-aesthetic sense, relatively insignificant to the structure and repeat of the design as a whole.”).

315. *See* *Fromer & Lemley*, *supra* note 297, at 1279 (describing difficulty inherent in recreating “the mindset of consumers in the actual marketplace,” including the problem of matching the multi-day deliberative process in the courtroom with a fast-paced marketplace experience).

316. *Peel & Co. v. Rug Mkt.*, 238 F.3d 391, 398 (5th Cir. 2001). By expanding the amount of information available for the substantial similarity analysis, my first suggestion—allowing in expert testimony as to differences in artistic mediums—will make it somewhat more difficult to get a truly immediate reaction from the trier of fact. Still, even under these conditions, a reordering of the test for infringement will help debias the substantial similarity determination while allowing for more rapid assessments of aesthetic appeal.

machines, expose them to the works at issue, and then look for one neural pattern for infringement and another for permissible copying. There are significant limitations on what brain-imaging technologies can detect when it comes to the complex neural processes involved in aesthetic judgment. Instead, as in other areas of the law, neuroscience seems ripe for making inroads into the infringement analysis without supplanting it. If done the right way, brain science can improve our controversial system for determining copyright infringement. We understand the audiences for creative works much better than we did even a few years ago. That understanding should be leveraged to rehabilitate the law of substantial similarity.