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# Design Research: Aesthetic Epistemology and Explanatory Knowledge

**Abstract** The article explores the “what” and the “how” of design research. It discusses the epistemological assumptions of design and design research – the conception of true knowledge that underpins the quest to advance design knowledge through research. The article also examines the media and methods of doing design research – that is, the “how” of such research. As it developed over the past century, the design field has drawn extensively on three pivotal but often tacitly deployed epistemologies: the Platonic-Aristotelian, the pragmatic, and the postmodern. Platonic epistemology is latent in many commonplace design instruction texts. Pragmatic epistemology underscores the industrial-arts ethos of design. Postmodern epistemologies dominate in university programs – especially graduate and Ph.D. programs. The article considers how these competing epistemologies understand the role of imagination in the act of creation. The article then considers the role of explanation in the carrying out of research in creative design and arts fields. It addresses whether, and to what degree, design research ought to rely on explanatory words as its principal medium of research, or whether it is valid to substitute artifactual creation for intellectual explanation in the research process.

## Keywords

Epistemology  
Design  
Imagination  
Knowledge  
Explanation  
Practice-based research

Received May 26, 2017

Accepted September 26, 2017

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The peer review process is the responsibility of Tongji University and Tongji University Press.

<http://www.journals.elsevier.com/she-ji-the-journal-of-design-economics-and-innovation>

<https://doi.org/10.1016/j.sheji.2017.09.002>



## Introduction

When we design, we shape things. We do so in order that things in the world work better, harder, and faster; more efficiently, elegantly, and gorgeously; with better fit and ease of use, and so on. But what about design research? What does it add to the primordial desideratum of design? Research advances knowledge. How does this apply to design research? *What* knowledge does it produce? And *how* does it produce such knowledge?

The kind of knowledge design research produces in practice – the *what* of design research – results from the tacit theory of knowledge, or epistemology, that each researcher has. There is not just *an* epistemology of design, however – there are several. Each provides a set of philosophical underpinnings for design research and the knowledge it creates. Epistemologies are contentious by nature – they offer competing worldviews. In practice, design scholars rarely consult the source epistemologies. The dicta that circulate in the world of researchers provide summaries and epistemological assumptions that researchers adopt without even being especially aware of the origins or full implications of the theories of knowledge they implicitly rely on.

Design shapes things in the world, while epistemologies shape things in the realm of knowledge. Epistemologies outline what true knowledge (valid, legitimate, genuine knowledge) looks like, and enable us to account for the point, purpose, and meanings of the knowledge we acquire. Epistemologies shape knowledge acquisition and advancement by providing criteria of true and false knowledge. Aesthetic epistemologies do this for design knowledge. Once a stock of design knowledge accumulates, it has a second-hand effect – its shape starts to affect the shape of design practice. That accumulated stock filters down from epistemology to knowledge, and from knowledge to doing. The sequence begins with aesthetic epistemologies. These *design* design-knowledge by establishing expectations and patterns for it. The stock of knowledge that follows, and its epistemological presuppositions, shapes design work and outcomes in turn. In other words, epistemologies design the act of designing. This shaping occurs subtly, quietly, and implicitly in the background of design work. All design – no matter how practical its focus – relies on some tacit notion of true knowledge that gives it its recognizable shape and form.

The *what* of design research gives us an account of the “design-i-ness” or shape of design research. It gives insight into the purpose and meaning of the research – what its reason-for-being is. But design research, having addressed the question of its purpose or point, then has to address the issue of *how* it is conducted. What are its compelling methods, approaches, and media? From this starting point, a further series of questions unfolds. When an instance of design research is undertaken, the researcher has to consider several approaches. What is the best medium to use? What are the most appropriate tools for undertaking the research? All research is aimed at advancing knowledge. So how, then, do we best go about advancing design knowledge?

A key issue in design research is the media of research. This reflects the fact that design work is mostly an artifactual activity. It shapes three-dimensional, two-dimensional, and sometimes even one-dimensional objects. It posits these in the world. In so doing, it enhances the efficiency, structure, and beauty of the world. This contrasts with research, which is normally undertaken through the medium of explanatory words and texts. It is usually not done by arranging colors and textures, contours and voids, and the like. The question then arises: is design research properly objectivated in theses, treatises, and books? Or is it, ideally, best posited in design artifacts? That is to say, is design research principally an act of making or is it one of explanation? Does the design researcher mainly engage in an

act of reasoning? Or, alternatively, in an act of production? Is the research object that is created most compelling when it is an assemblage of words? Or when it is an assemblage of materials?

## The Aesthetic Epistemology of the Imagination

Design achieves its most remarkable effects by mobilizing the imagination. The imagination, a cognitive faculty, parses the world around it into contrary qualities and forces – large and small, hot and cold, bright and dull, animated and tranquil, up and down, near and far, and so on. The imagination is the intellectual medium that enables these antonyms to become synonyms. It synthesizes antitheses. It turns difference into likeness and disparity into similarity. It unifies oppositions and does so in pleasing and striking ways.

How does the imagination manage this? Firstly through the organizing power of form. Proportion, harmony, balance, rhythm, and symmetry are among the principal means that enable the human mind to structure relationships between antipodal qualities so that they appear to us as being somehow just right. The imagination also deploys the structural power of analogy. Similes, metaphors, allegories, and symbols create resemblances out of things that are experienced as dissimilar. Form and analogy operate through multiple mediums – linguistic, visual, auditory, tactile, and so on. The imagination creates equivalences out of things that are not equivalent and comparisons out of what seems incommensurable. It produces unity out of opposition and forges meaning by translating the terms of one thing into those of another.

The epistemology of the imagination is not – and never has been – the only aesthetic epistemology in circulation. Nevertheless, it has been commonplace from antiquity to modernity. Its primary competitors in the twentieth century were pragmatic and, later, postmodern epistemologies. John Dewey gave the definitive account of pragmatic epistemology in the 1920s and 1930s. The postmodern wave arrived in the 1970s.

The aesthetic epistemology of the imagination is rooted in two ultimate sources. One of them is the Pre-Socratic and Platonic view of creation.<sup>1</sup> This looks on creation as a union of opposites achieved through the power of forms. The second source is Aristotle, for whom creation is the work of analogies that create resemblances between unlike things.<sup>2</sup> In both cases – form and metaphor – human cognition is able to perceive that A stands to B as B stands to C. The epistemological theory of this percolated from classical antiquity via various threads of Stoicism, Platonism, and Aristotelianism down to the Renaissance and beyond. Strong parallels also exist in the East Asian traditions of Taoism and Zen Buddhism.

By the sixteenth century, many Europeans had begun to use the word imagination to denote the cognitive processing faculty that performed the kinds of gymnastic analogical and patterning operations that underpin the uncanny equivalences that distinguish the act of creation. The epistemology of the imagination evolved from Francis Bacon's power of perceiving resemblances and Shakespeare's faculty that "bodies forth the forms of things unknown,"<sup>3</sup> through the "wit" of John Dryden, Thomas Hobbes, and John Locke, to Joseph Addison's pleasures of the imagination and Alexander Pope's dangerous art. William Hazlitt thought that the imagination was the faculty for finding "something similar in things generally alike," while wit was what allowed us to find something the same where we least expected it "in things totally opposite."<sup>4</sup>

Denis Diderot pointed to the paradox of great actors who do not feel the emotions that they act out. Johann Gottfried Herder emphasized the allegorical, metaphorical, and symbolic structure of archaic myth and legend. Friedrich Schlegel

1 Peter Murphy, *Civic Justice: From Greek Antiquity to the Modern World* (Amherst: Humanity Books, 2001), 45–78.

2 "Metaphor consists in giving the thing a name that belongs to something else..." Aristotle, *The Poetics*, trans. Ingram Bywater (Oxford: The Clarendon Press, 1920), 1457 b6–9.

3 William Shakespeare, *A Midsummer Night's Dream*, ed. Harold F. Brooks (London: Methuen Publishing, 1979), 163.

4 William Hazlitt, "On Wit and Humor," in *Selected Essays of William Hazlitt 1778 to 1830*, ed. Geoffrey Keynes (Whitefish: Kessinger Publishing, 2004), 436.

5 Peter Murphy, "Nature's God: Emerson and the Greeks," *Thesis Eleven* 93, no. 1 (2008): 64–71.

6 See especially "Christian Discourses," "Two Ethical-Religious Essays," and "Concluding Unscientific Postscript to Philosophical Fragments," in Søren Kierkegaard, *The Essential Kierkegaard*, ed. Howard V. Hong and Edna H. Hong (Princeton: Princeton University Press, 2000).

7 Heinrich Wölfflin, *Classic Art: An Introduction to the Italian Renaissance* (London: Phaidon, 1952), 258.

8 Weil's notebooks were written in Marseilles in 1941 and 1942, and posthumously published in an English-language edition in two volumes as *The Notebooks of Simone Weil*. Simone Weil, *The Notebooks of Simone Weil*, vol. 1 (London: Routledge and Kegan Paul, 1956), 31.

9 In many ways, William Wimsatt and Cleanth Brooks's *Literary Criticism: A Short History* was a summation-to-date of a long tradition of aesthetic epistemologies of the imagination. William K. Wimsatt and Cleanth Brooks, *Literary Criticism: A Short History* (New York: Vintage, 1957).

10 Ivor A. Richards, *Principles of Literary Criticism* (London: Routledge and Kegan Paul, 1964).

11 Arthur Koestler, *The Act of Creation* (London: Pan, 1970).

12 Albert Rothenberg, *The Emerging Goddess: The Creative Process in Art, Science and Other Fields* (Chicago: The University of Chicago Press, 1979).

13 Robert Grudin, *Mighty Opposites: Shakespeare and Renaissance Contrariety* (Berkeley: University of California Press, 1979).

14 Joshua W. Shenk, *Powers of Two: Finding the Essence of Innovation in Creative Pairs* (New York: Houghton Mifflin Harcourt, 2014).

15 Plato, "Phaedo," in *The Trial and Death of Socrates: Four Dialogues*, trans. Benjamin Jowett (New York: Dover, 1992), 64–138.

16 Mads N. Folkmann, *The Aesthetics of Imagination in*

pointed to the inverted, ironic ways the self was able to imagine itself. For Johann Fichte, the imagination was dialectical – a synthesis of thesis and antithesis. For Samuel Coleridge, the imagination balanced opposite and discordant qualities – sameness and difference, novelty and familiarity, steadiness and enthusiasm, the natural and the artificial. Ralph Waldo Emerson likewise thought that oppositions were pervasive and that the moments that make nature, society, and art interesting and powerful occur when contrasting forces – such as those of asceticism and business, fate and freedom, nearness and farness, shadow and light – are reconciled.<sup>5</sup> Emerson's contemporary Søren Kierkegaard argued that it was God's nature to join opposites and that the Christian apostles were called to paradox.<sup>6</sup> G.K. Chesterton agreed. For him also, creation was an act of paradox – two opposite things whose combination seemed impossible or absurd, and yet on reflection was valid or true.

Heinrich Wölfflin defined classic art as composition by contrasts.<sup>7</sup> Simone Weil saw proportionality as the way in which the inherent contradictoriness of the world was resolved.<sup>8</sup> The aesthetic theory of the mid-twentieth century New Critics stressed that literature operated through the media of irony and paradox.<sup>9</sup> I.A. Richards defined the act of imagination as equilibrium.<sup>10</sup> Arthur Koestler defined it as the merger of two ostensibly incompatible frames of reference.<sup>11</sup> Albert Rothenberg dubbed it Janus-like in its style of thinking.<sup>12</sup> Antithetical images and concepts coalesce in the imagination. Robert Grudin observed how the Renaissance imagination was permeated by paradoxes, the symbiosis of opposites.<sup>13</sup> Joshua Wolf Shenk dubbed this symbiosis the overlapping of connected opposites.<sup>14</sup> Shenk's sense that everything is the opposite in the realm of the creative imagination effectively brought the intuition of the imagination back to its very beginning. More than two millennia ago, Plato stated in the *Phaedo* that all opposites are generated out of one another and that there is a passing or process from one to the other.<sup>15</sup>

Unlike the disciplines of literature, painting and architecture, the field of design has produced little in the way of explicit aesthetic epistemology. A rare exception to this rule is Mads Nygaard Folkmann's *The Aesthetics of Imagination in Design*.<sup>16</sup> In it, Folkmann explores the coexistence and intersection of dichotomies – such as tactile material and immaterial structures – in the design process. His overarching claim is that design objects will always be both at the same time.<sup>17</sup> The synesthetic concept of being both at the same time is, arguably, as good a definition of the creative imagination as any. The imagination is a cognitive coalescent. Through an exchange between poles, it conjoins subject and object, inside and outside.<sup>18</sup>

How, exactly, does this exchange work? That query is an epistemological one, and also a practical one. The question is answered implicitly in numerous practical design texts – notably those that treat design as a kind of demotic Platonic geometry. This vernacular design Platonism embedded itself in early twentieth-century art education, and later on in design education, almost without being noticed. It was interpolated in many popular design handbooks. These are practical, instructional works, yet they incorporate – often to a high degree – numerous classical theoretical concepts. In these works, theories of balance, proportion, and symmetry, and related qualities – beauty, order, contrast, economy, elegance, integration, ratio, rhythm, synesthesia, and unity – play key pedagogic roles. This low-key, instructional design Platonism begins with Arthur Wesley Dow's *Composition*.<sup>19</sup> It is followed by a steady stream of textbooks including those by Denham Waldo Ross, Belle Boas, Walter Dorwin Teague, Gyorgy Kepes, Victor D'Amico, Paul Jacques Grillo, Amy Arntson, and Alex White (see [Table 1](#)).<sup>20</sup>

**Table I. Synthesizing principles (Platonic).**

	Harmony	Balance	Proportion	Pattern	Symmetry	Unity	Rhythm	Equilibrium	Simplicity	Order	Beauty
Dow, <i>Composition</i> (1899)	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Ross, <i>A Theory of Pure Design</i> (1907)	✓	✓	✓				✓	✓		✓	✓
Boas, <i>Art in the School</i> (1924)		✓		✓			✓	✓	✓		✓
Teague, <i>Design This Day</i> (1940)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kepes, <i>Language of Vision</i> (1944)		✓		✓		✓	✓	✓		✓	
D'Amico, <i>Creative Teaching in Art</i> (1947)		✓	✓	✓		✓	✓		✓	✓	
Grillo, <i>Form Function and Design</i> (1960)	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Arnston, <i>Graphic Design Basics</i> (1988)		✓	✓	✓	✓	✓	✓	✓	✓	✓	
White, <i>The Elements of Graphic Design</i> (2002)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Equilibrium = Equilibrium or Union of Contrasts, Oppositions, Antitheses;

Order = Order or Arrangement;

Simplicity = Simplicity, clarity, directness.

Vernacular Platonic design pedagogy has a large pool of theoretical tools available to it. These hardy, nuts-and-bolts concepts were developed over two millennia of philosophical thought and practical application. Design manuals rooted tacitly in the classic epistemology of the imagination rarely use all of the concepts that it affords. Rather, each writer selects key concepts and weaves these into a distinctive personal design approach. Each of their works is transient in its own way, but their conceptual underpinnings are timeless. Each pedagogy offers a new angle on the age-old challenge of composition. Ultimately, the underlying metaphysics of how to approach design today is not that much different from what Iktinos and Kallikrates – and after them, Vitruvius and Palladio – relied on. Across the twentieth century, the same unspoken Platonic epistemological toolkit handsomely served Dow’s Emersonian pastoralism, Teague’s machine-age American industrialism, Kepes’ European modernism, and Grillo’s organicism.

In contrast, the Aristotelian paradigm of design by metaphor played a relatively muted role in twentieth-century pedagogic handbooks. In the latter half of the century, it grew in influence. But it did so principally in scholarly, research-driven works such as Evelyn Hatcher’s *Visual Metaphors*, Barbara Stafford’s *Visual Analogy*, and Douglas Hofstadter’s *I Am a Strange Loop*.<sup>21</sup> Research has a trickle-down effect, so by the time Alex White’s popular handbook *The Elements of Graphic Design* came out in 2002, Aristotelian themes of analogy, similarity, and resemblance had begun to supplement the durable Platonic conceptual kit. The merger of Platonic and Aristotelian aesthetic epistemology was first introduced in mid-twentieth-century scholarship. The confluence of Platonic proportion and Aristotelian analogy is outlined in Umberto Eco’s 1959 work *Art and Beauty in the Middle Ages*.<sup>22</sup> Author-architect Peter F. Smith developed another, more contemporary version of this in *Architecture and the Human Dimension*.<sup>23</sup> Smith made an eloquent case for the combination of a first-order aesthetics of balance and equilibrium with a second-order aesthetics of rhyme, which he defined as likeness tempered with difference.<sup>24</sup> There are various ways of achieving the paradox of the same-but-different aesthetic rhyme – symbolism, iconicity, analogy, metaphor, echoing, allegory, and simile.

*Design* (Cambridge MA: MIT Press, 2013).

17 *Ibid.*, xv.

18 *Ibid.*, xv, 8.

19 Arthur W. Dow, *Composition: A Series of Exercises in Art Structure for the Use of Students and Teachers*, facsimile edition (1899; Stockbridge: HardPress Publishing, 2012).

20 Denman W. Ross, *A Theory of Pure Design: Harmony, Balance, Rhythm*, facsimile edition (1907; Stockbridge: HardPress Publishing, 2012); Belle Boas, *Art in the School* (New York: Doubleday and Doren, 1924); Walter D. Teague, *Design This Day: The Technique of Order in the Machine Age* (New York: Harcourt, Brace, 1940); Gyorgy Kepes, *Language of Vision*, rev. ed. (1944; New York: Dover, 1995); Victor D’Amico, *Creative Teaching in Art*, rev. ed. (1947; Scranton: International Textbook, 1967); Paul J. Grillo, *Form, Function, and Design* (New York: Dover, 1975), originally published as *What is Design?* (Minneapolis: P.Theobald, 1960); Amy E. Arntson, *Graphic Design Basics*, 6th ed. (Boston: Wadsworth, 2012); Alex W. White, *The Elements of Graphic Design: Space, Unity, Page Architecture, and Type*, 2nd ed. (New York: Allworth Press, 2011).

21 Evelyn P. Hatcher, *Visual Metaphors: A Methodological Study in Visual Communication* (1974; Albuquerque: University of New Mexico Press, 1989); Barbara M. Stafford, *Visual Analogy: Consciousness as the Art of Connecting*, rev. ed. (1999; Cambridge: MIT Press, 2001); Douglas Hofstadter, *I Am a Strange Loop* (New York: Basic Books, 2007).

22 Umberto Eco, *Art and Beauty in the Middle Ages*, trans. Hugh Bredin (1959; New Haven: Yale University Press, 1986).

23 Peter F. Smith, *Architecture and the Human Dimension* (Westfield: Eastview Editions, 1979).

24 *Ibid.*, 54, 218.

25 White, *The Elements of Graphic Design*, 9.

26 *Ibid.*, 9.

27 This is the ultimate root of the widespread contemporary business practice of managing by ratios.

28 John Dewey, *Experience and Nature* (1929; New York: Dover, 1958), 358.

29 As Ken Friedman has noted, "Transcendentalism's emphasis on experience as the basis for philosophy evolved into pragmatism toward the end of the 1800s in New England. John Dewey, George Herbert Mead, and Charles Sanders Peirce were born in New England, and William James spent much of his life there. Related to the Puritan Calvinist tradition through Congregationalism and transcendentalism, these men ultimately developed a concrete philosophy for the New World." Ken Friedman, "Fluxus: A Laboratory of Ideas," in *Fluxus and the Essential Questions of Life*, ed. Jacquelynn Baas (Chicago: University of Chicago Press, 2011), 38.

30 Dewey, *Experience and Nature*, xv, 354–93. The metaphor had an impact. As a Google n-gram search indicates, usage of the term artwork took off in the early 1940s.

31 *Ibid.*, 357.

White observes that the search for similarities lies at the heart of what a designer does.<sup>25</sup> The imagination is the mental machine that finds similarities in things that outwardly appear to be conspicuously different. This is why, as White puts it, design can take a good deal of time. Such similarities do not immediately present themselves.<sup>26</sup> In creative design, Platonic geometries are one of the means of making seemingly dissimilar things – such as big and small, hot and cold, repetition and change – into similar things. Analogy, metaphor, and simile do approximately the same. As both Plato and Aristotle concluded, thinking by ratio allows us to equate things that otherwise are unlike each other.<sup>27</sup> Comparably, the faculty of the imagination makes what is dissimilar similar. Ratio and metaphor both allow us to conceive of one thing in terms of another. In so doing, they create effects that are humorous, uncanny, surprising, unexpected, or enigmatic. That, in turn, means that they create things that are memorable.

### Pragmatic and Postmodern Aesthetic Epistemologies

The aesthetic epistemology of the imagination is one kind of aesthetic epistemology. There are others. In the past century, there have been two key challenges to the classic model of the imagination – one from the epistemology of pragmatism, the other from the epistemology of postmodernism. The former emerged from the philosophical writings of John Dewey in the 1920s and 1930s, the latter from a variety of Continental philosophies – most notably that of Jacques Derrida. The influence of postmodernism spread widely after 1970, especially in the universities. For a time, it pushed to one side both Platonic and pragmatic epistemologies.

Pragmatism's key epistemological category is that of experience. Dewey argued that in a fully formed experience, human beings complete a course of action. They begin with an end-in-view. They define a project, organize materials, plan the expected outcome using abstract symbols, and coordinate the means to achieve the end. To do so successfully, they have to forge effective unions of opposites. To realize their goals, people have to combine the "precarious, novel, irregular with the settled, assured and uniform."<sup>28</sup> Such combinations are not easy. Dewey observed that, in fact, much of ordinary human experience is inchoate and fragmented. It does not achieve solvent unions. It cannot reconcile the contingent with the continuous or the conspicuous with the hidden. It is unable to square stability with uncertainty. Consequently, it does not manage much in the way of consummation.

Dewey reckoned that the experience of creating an artwork, in contrast, is cohesive and integrated. It represents experience in the strongest sense. It ends in a consummation – a completed artwork. To get to that point, each part of the artwork and the art process has to fit together. The experience may involve undergoing or suffering – as opposing parts are gradually resolved into a whole and means are adjusted to an end-in-view. But suffering is overcome by doing. The result – the consummation – is fulfilling. Fulfillment, however, does not last. Soon, the artist begins a new work, and the process starts all over again. In important ways, Dewey's pragmatism was a philosophy of production. The spell of the Calvinist work ethic lay behind it.<sup>29</sup> It conceived human action as a kind of productive effort. This extended to the arts.

In *Experience and Nature*, Dewey defined art as a process of production.<sup>30</sup> The ancient Greeks, he argued, thought that the arts existed principally for appreciation and contemplation. The arts, he agreed, do have an important taste dimension. Audiences and critics, buyers and consumers alike are appreciative. They respond to the aesthetics of design works. But, of necessity, appreciation has to be preceded by productivity and creativity.<sup>31</sup> The fine arts, Dewey thought, prioritized aesthetic

reception over productive impulse, while the industrial arts reversed this order. Dewey's affection for the industrial arts percolates through his work. Pragmatism, in effect, models action on production. Producing an artwork requires creating one thing out of many, and entails an intense effort to unify divergent qualities and forces – including utility and beauty.

Dewey, though, did little to explain how such powerful, interpenetrating blends come about. From time to time he discusses the imagination, but not its synthetic power. He observes that art – along with experience more generally – is obliged to forge unions of opposites. Necessity and freedom, the generic and the particular, the sensuous and the ideal, the predictable and the unexpected have to be coalesced. But he does not explain the mechanisms that make such solvent unions possible. In contrast, the classic Platonic-Aristotelian model does. For the most part, Dewey dismissed this. “The presence in art, whether as an act or a product, of proportion, economy, order, symmetry, composition,” he says at one point in *Experience and Nature*, “is such a commonplace that it does not need to be dwelt upon.”<sup>32</sup> At the eleventh hour, in his later work *Art as Experience*,<sup>33</sup> Dewey changed his mind on this point. In that book, he argues that rhythm and symmetry are important in achieving the unity in variety and the reconciliation of opposites that are necessary for a successful artwork.<sup>34</sup>

In the decades after 1970, pragmatic epistemology was partly displaced by postmodern theories. Postmodernism rejected the idea that there is a unifying character to aesthetic experience. Dewey regarded aesthetic experience as a struggle – with means and parts – that resolves itself. The person who creates an artwork experiences flux, change, and disequilibrium. In time, though, these divergent forces are unified in works that are fulfilling. For the practicing artist, the consummation of the artwork causes the phase of artistic disunity and conflicted identity to be superseded by a phase of creative unity and coherent identity. Postmodern epistemologies typically suppose that flux, change, and conflict do not resolve themselves. There is no coherent identity, harmony, or equilibrium that crystallize in either the artwork or the artist's experience. Rather, there is only resistance, tension, disturbance, transformation, and conflict. The admired artwork is incomplete, ephemeral, confrontational, defiant, or disputatious. Consequently, the artist's experience is dominated by suffering rather than doing. Beauty, harmony, and equilibrium have no place in this aesthetic epistemology. Centering is replaced by marginality, the whole by fragmented parts, loveliness by ugliness, long-lastingness by transience, and fulfillment by dissatisfaction.

There is a parallel of this postmodern epistemology in Dewey's *Reconstruction in Philosophy*.<sup>35</sup> That book argues – at times vociferously – against the classical notion of aesthetic contemplation. Dewey rejects the idea of art or life that focuses on fixed ends or fixed forms. He argues that there is no room in modern life for finality, completion, or self-sufficiency. He rejects the Platonic-Aristotelian concepts of limits, finality, and happiness or satisfaction. Experience in modernity, he contends, does not end in a state of stillness or restfulness. Rather than rest, it aspires to restless exploration. Its desire is not to attain perfection, but rather to ceaselessly find flaws in life and art and improve on them. The modern spirit advances rather than concludes. No matter how beautiful they might be, the artworks of contemplative epochs – he had classical antiquity in mind – end up repeating themselves. Their creators lack the impulse to invent, improve, experiment, or create novelties. To know something, Dewey contends, is to induce a change in it. Against the preference for permanent things, Dewey argues in favor of absence and instability.<sup>36</sup> The resemblance of this to postmodernism is unmistakable. The momentary, transient, and fleeting are eulogized. Alteration, becoming, and perishing are mobilized against the metaphysics of permanent being. Othering, diversity, and multiplicity

32 *Ibid.*, 359.

33 John Dewey, *Art as Experience* (1934; New York: Penguin, 1980).

34 He also mentions, in passing, color complementarity—hues opposite each other on the color wheel—and aesthetic economy as mechanisms to achieve a unified and thus meaningful work.

35 John Dewey, *Reconstruction in Philosophy*, enlarged ed. (1948/1920; Boston: Beacon Press, 1957).

36 See in particular Dewey, *Reconstruction in Philosophy*, 106–13.

37 Dewey, *Experience and Nature*, 47.

38 Ibid., 48.

39 Ibid., 58.

40 Ibid., 62.

41 Ibid., 66.

42 Wendy Doniger, introduction to *Myth and Meaning: Cracking the Code of Culture*, by Claude Lévi-Strauss (1978; Toronto: University of Toronto Press, 1995), viii–ix.

43 “An opposition of metaphysical concepts (speech/writing, presence/absence, etc.) is never the face-to-face of two terms, but a hierarchy and an order of subordination.” Jacques Derrida, *Monolingualism of the Other, or, the Prothesis of Origin*, trans. Patrick Mensah, 2nd ed. (Stanford: Stanford University Press, 1998), 195; “In a traditional philosophical opposition we have not a peaceful coexistence of facing terms but a violent hierarchy. One of the terms dominates the other (axiologically, logically, etc.), occupies the commanding position. To deconstruct the opposition is above all, at a particular moment, to reverse the hierarchy.” Jacques Derrida, *Positions*, trans. Alan Bass (Chicago: The University of Chicago Press, 1981), 41.

44 Natasha Lushetich, *Fluxus: The Practice of Non-duality* (Amsterdam: Rodopi, 2014), 8.

overshadow the unities of work, life, and identity.

In *Experience and Nature* – written nearly a decade later – Dewey’s vehemence for contingency disappears. Instead, he reflects on the paradoxical character of all things. He observes that “qualities have defects as necessary conditions of their excellences,” while “change gives meaning to permanence and recurrence makes novelty possible,” sounding for a moment like G.K. Chesterton.<sup>37</sup> Aristotle, Dewey thought, was still at fault. But this was not because Aristotle ignored contingency. Rather, he was biased in favor of the fixed, certain, and finished.<sup>38</sup> How, then, not to be biased? Dewey recommends abandoning the separation between contingency and necessity.<sup>39</sup> He urges the creation of unions of incompleteness and recurrence.<sup>40</sup> Fully formed experience requires people to move from a state of difference to one of unity – and from confusion to system.<sup>41</sup>

What is not clear from Dewey is how we might bridge such oppositions. How do we integrate and unify the opposing forces of rest and motion, striving and stability, opening and closing? These are not just philosophical questions. They are also practical design problems. The designer, like the philosopher, has three options: choose one side or the other – choose flux *or* continuity; blend the opposites – evoke stability *with* a strong accent of dynamism; or do as postmodern epistemologists recommend, and think of each dyadic opposition as a hierarchy – and then reverse the hierarchy.

Postmodern epistemologies began in the late 1960s as a reaction against structuralism and its theory of binary oppositions. Claude Lévi-Strauss, for example, concluded from the study of the myths and legends of hundreds of societies that human beings make sense of the world through the lenses of binary oppositions – things like raw and cooked or moist and parched. Wendy Doniger neatly sums this up in her introduction to Lévi-Strauss’s *Myth and Meaning* when she says

“Myth is a form of language, and language itself predisposes us to attempt to understand ourselves and our world by superimposing dialectics, dichotomies, or dualistic grids upon data that may in fact be entirely integrated. And underneath language lies the binary nature of the brain itself. Right and left, good and evil, life and death – these are inevitable dichotomies produced by the brain that has two lobes and controls two eyes, two hands. We are split creatures literally by nature, and we organize data like a simple digital machine. Our common sense is binary; the simplest and most efficient way to process experience seems to be by dividing it in half, and then to divide the halves in half, reformulating every question so that there are only two possible answers to it, yes or no.”<sup>42</sup>

What structuralism missed, however, was the connective element – the use of form and metaphor, pattern and paradox, to pass between those oppositions. Post-structuralism, on the other hand, held that binary oppositions were hierarchies that merited reversal.<sup>43</sup> Binaries implied preferences for one polarity over another. This meant an untoward preference for men rather than women, speech rather than writing, the center rather than the margins, the West rather than the East, and so on. Post-structuralism sought to invert these polarities. That also implied that the dark should be preferred to the light and evil to good.

The premise of structuralism – binary opposition – obscured the mechanisms of the imagination that translate the terms of one binary into another via analogic and pattern thinking. Creation that is enacted via the imagination is non-dualistic or non-binary in nature. It is an interweaving, interpenetrating process that involves, as Natasha Lushetich puts it, perpetual mutual structuration and the cross-pollination of numerous forces and factors.<sup>44</sup> According to Lushetich, it operates paradoxically. It preserves thesis and antithesis in tension and thereby creates



bi-conditional relations – what Koestler called bisociations – in place of binary oppositions. This involves a transpositional framing in which polar opposites become co-implicative rather than separated.<sup>45</sup> A classic example from science is the quantum particle that behaves in certain circumstances like a wave.

Design routinely exhibits such cross-pollinations – consider the light beer bottle designed to resemble a light bulb, or the ketchup bottle designed to look like a stack of sliced tomatoes. The imagination is a type of cognitive stretching. More ordinary designs associate near concepts, such as the trash can/recycle bin icon used to represent deleted file storage on your computer. While functional, it is not especially imaginative. The more imagination applied, the more distant the conceptual associations. A graphic artist designs a cigarette-in-hand to cast a gun-in-hand shadow – these two, both killers, are not that remote. Then there is the design image of a loaf of bread cut to look uncannily like a shoe – these two are a bit further removed from each other. An image combining a necktie with a noose melds the sensations of life and death – these are still further removed. The more successful the merging of the polarities, and at the same time the greater the distance between those polarities, the more profound the act of imagination becomes – and the more difficult it is to pull off.

### Imagination and Explanation

Our ability to thread oppositions together in productive ways is central to our human identity. As John Locke observed, identity is the durable part of the human personality.<sup>46</sup> No functional identity can be created out of one single psychological pole, even if that pole is fashionably subaltern. Successful identity formation requires each person to create a durable ratio between polar opposites. Action and reflection, concreteness and abstraction, introversion and sociability, past and present, present and future, and so on, all have to be synthesized. Postmodernism turned away sharply from this kind of imaginative synthesis and replaced it with an emphasis on fragmentation and difference, collage and hybridity. That turn was followed by a gusto for upending hierarchical binaries – in other words, reversing their polarity by inverting what were presumed to be the negative, subordinate, or oppressed poles of social and aesthetic dyads.

Postmodern terminology dominates most contemporary aesthetic self-descriptions. This is true even of the commercial art world. Dewey's pragmatic model has by no means disappeared – it has become subterranean. Take the case of the universities. Today, public aesthetic works in design, art, and architecture are often created for exhibition under the umbrella of graduate research programs. This mode of operating expanded significantly in the postmodern era after 1970. As it grew, it adopted the concept of practice-based research.<sup>47</sup> Correspondingly, the idea of a terminal, practitioner-style Master's degree – undertaken principally for professional certification purposes – fell out of favor. The terminal degree did not possess the status of the research degree. But what, then, did research mean in the creative arts? One answer to this gnarly question was practice-based research. This was the idea that an aesthetic work combined with a textual exegesis of the work could satisfy the expectations of a Ph.D. or Master's-level graduate program, or satisfy university expectations for faculty research.

A majority of doctoral exegeses and faculty articles produced today under the practice-based banner are conceived in broadly postmodern terms. In abstracts and catalog descriptions, the work is typically presented as defiant, discordant, or in some way disorderly. Inchoate, incomplete, mutable, fluid, and unstable are common terms used by practice-based researchers to describe their work. This would appear to take them out of the orbit of Dewey's pragmatic epistemology. The

45 Ibid., 18.

46 John Locke, "Identity and Diversity," in *An Essay Concerning Human Understanding*, ed. Roger Woolhouse (1689; London: Penguin, 1997), 296–314.

47 For multiple archived examples of practice-based thesis work as well as descriptions and advocacy of this style of research, see the Creative Practice Research Portal <https://practice-research.com/>.

48 This is echoed in theories of art that treat art and artworks in terms of the milieu and institutions of art worlds. See Arthur C. Danto, *The Transfiguration of the Commonplace: A Philosophy of Art* (Cambridge: Harvard University Press, 1981); and Howard S. Becker, *Art worlds* (Berkeley: University of California Press, 1982).

49 The epistemological distinction between nomothetic and idiographic was introduced by the neo-Kantian philosopher Wilhelm Windelband (1848–1915).

irony is that this is not at all the case. Rather, the aspirations for consummation have been simply displaced from the artwork of the practice-based researcher onto the Ph.D. or the published journal article. Instead of aesthetic consummation, we now have institutional consummation.<sup>48</sup> In Dewey's terms, the end-in-view to be achieved is the thesis or the article that couples exhibited design or artwork with exegetical commentary. The consummation of the design or art process is not, then, a work in which the whole is greater than the parts or the various means of artistic creation are seamlessly integrated – it is the institutional artwork-exegesis hybrid. This is the aesthetics of a bureaucratic world in which the end of art in all its manifestations is institutional recognition. The mandarin-style, high-status Ph.D. becomes the end-in-view of the practitioner. In the exegesis, the practitioner represents the work undertaken as subversive, destabilizing, undermining, disrupting, or dislocating. But the contextual end-in-view of the artwork or design work is the higher degree or the academic promotion. The end of the art, in other words, is an institutionally bestowed status and the economic rewards that flow from that status.

The means to this end – the artwork-exegesis Ph.D. – is a postmodern hybrid that barely hangs together. It displays little internal coherence or imaginative synthesis. The thing that most often ties it together – if only minimally – is ideography. This is when the artwork and the commentary pivot on a biographical-style search for the authentic aesthetic self. Time and again, practice-based researchers present their work as a study in uniqueness. Common advice given to these researchers reinforces this ideography. It presents self-reflection as a mode of research. In this view, research is the external aesthetic expression of internalized, embodied, tacit knowledge. Research is normally nomothetic in nature. In this case, though, it is intensely idiographic.<sup>49</sup> It is a self-proposition.

In the case of research that is a self-proposition, the artistic self is the focus of inquiry. Both the creative work and the exegesis supposedly serve to reveal hidden, neglected, and covered-over layers of the self through a struggle with aesthetic themes, materials, and morphologies – or else with the surrounding oppressive society. This struggle, however, does not end in a Dewey-style consummation where divergent inputs are eventually unified into a coherent finished object before a new project is started. Instead, the true work remains relatively incomplete and, in some fundamental way, unconsummated. This means in effect that the partial, unfinished, piecemeal, or inadequate work gains legitimacy as long as it can present itself as a revelatory self-proposition.

The problem with this is that research is not an act of self-revelation – it is one of explanation. Research reasons, elucidates, and argues. Its primary media are papers, chapters, articles, books, and theses. The purpose of research is to explain natural, social, or aesthetic phenomena by giving systematic accounts of them. Extended written arguments, reasons, and deductions serve the purpose of explanation. Practice-based researchers tend to treat written work as an afterthought. Interest is focused on mapping, collecting, exhibiting, capturing, or documenting practical work. Such materials may usefully illustrate a written work. But, in the case of research, illustration is not a substitute for explanation. Much of the motivating impulse of practitioner Ph.D.s is exhibition or installation – not explanation. The write-up is an obligatory afterthought.

The practice-based design researcher produces an artifact in the way that a scientist conducts an experiment. In both cases, the practical work cannot constitute research until it is written up as a methodical intellectual explanation and defense of a claim. The argument sometimes made is that research can be communicated through constructions and fabrications in place of explanatory justifications, explications, and elucidations. But a construction or a fabrication – no matter how

interesting or compelling it may be as an aesthetic object – is not research. Research is not an act of cultural communication or aesthetic objectivation. Rather it is a very specific, tightly structured, elaborated act of explanation.

In his *Uses of Argument*, the philosopher Stephen Toulmin developed a lucid model of how explanation works.<sup>50</sup> Various kinds of reasons – principally grounds, claims, warrants, and backings – are deployed systematically. Explanation is not an act of self-presentation or self-proposition. It is not an authentication of the self. It does not exist to validate the self by uncovering its struggles with disintegrating meaning, centrifugal confusion, and what results from that: vertiginous aesthetic suffering. Explanation is centripetal. It even makes chaos seem more orderly. Human beings seek explanations when their world is disturbed in some way. Explanations assure individuals that the world is meaningful. That is to say, even when bad things occur we look to reasons that help us make sense of what has happened by placing events and actions in a context of grounds, warrants, and backings.

Many explanations turn out to be poor or feeble. Some are even delusional. But others are enlightening, elucidating, and clarifying. The quality of explanations varies. But, good or bad, they are part of the way that human beings produce meaning. Meaning is the human faculty of putting one thing in terms of another. To take a very elementary example, the dictionary meaning of a word is its near-resemblance to other words. At the other end of the scale, imaginative meanings put things together that are very far apart – as in the case of anthropomorphic gods, or the mythological part-human part-beast. Meaning is the translation of one semantic unit – be it an image, shape, color, taste, touch, word, or concept – into another. In the act of generating meaning there is a passage between one unit and another.

There are several meaning-generating cognitive processes. The most demanding of these – the imagination – creates a passage between antonyms. Passages also occur between closely related semantic units (synonyms). On the spectrum of meanings, explanations sit halfway between dictionary definitions and mythopoeitic thoughts. They generate meaning by putting a thesis or claim in terms of something else, namely evidence – grounds, facts, and data. This also requires the person explaining things to produce (if pressed) a warrant. Warrants justify putting one thing – a claim – in terms of something different – grounds. At times, warranting the cognitive leap between thesis and evidence can be difficult. In those cases, warrants have to be supported by backings that warrant the warrants.

In each of these steps – from claim to evidence to warrant to backing – the terms of one thing is translated into the terms of another thing. The following is an example from Toulmin's *Uses of Argument*.

*Thesis* I am a British citizen.

*Evidence* I was born in Bermuda.

*Warrant* Persons born in Bermuda are by law British citizens.

*Backing* I am a solicitor and I know the law.<sup>51</sup>

Reasoning, or explanation, is a way of connecting words and thoughts. In Toulmin's example, a lattice-like pattern of connection emerges between the sentences. The terms *British citizen*, *Bermuda*, and *law* tie the tiers of sentences together. Explanations become full-fledged arguments when they are questioned. Other persons rebut the argument. Rebuttals are then followed by qualifications that expand the argument and deal with the rebuttals. To understand how this applies to an artwork or design work, consider the following example.

*Thesis* Light beer=light bulb images are creative works.<sup>52</sup>

*Evidence* They fuse the ambiguous concept of light – light in weight and light in

50 Stephen E. Toulmin, *The Uses of Argument* (Cambridge: Cambridge University Press, 1958). See also Stephen Toulmin, Richard D. Rieke and Allan Janik, *An Introduction to Reasoning* (New York: Macmillan, 1978).

51 Bermudians are British Overseas Territory citizens by birth.

52 For example, see *Incandescent Lightbulb with Beer Inside Isolated over White*, <https://www.shutterstock.com/image-photo/incandescent-lightbulb-beer-inside-isolated-over-28629799>. The creator, Trinacria Photography, is the Schenectady NY-based husband and wife team of Vincent and Fran Giordano.

53 Paul Ricoeur, "Creativity in Language: Word, Polysemy, Metaphor," in *The Philosophy of Paul Ricoeur: An Anthology of His Work*, ed. Charles E. Reagan and David Stewart (Boston: Beacon Press, 1978), 120–33.

illumination.

*Warrant* Language and thought contain many ambidextrous words whose double meaning allows us to associate things that are normally remote from each other.

*Backing* Ricoeur discusses the polysemy of language in *The Philosophy of Paul Ricoeur* (see Chapter nine).<sup>53</sup>

*Rebuttal* But that's just language! You are confusing design with poetics.

*Qualification 1* The photographic metaphor is a visual metaphor not a linguistic one.

*Warrant* Metaphors – visual, linguistic, haptic, and auditory – meld two or more frames of reference.

*Backing* Barbara Stratford's *Visual Analogy* explains this, so does Koestler in his *Act of Creation*.

*Qualification 2* The light beer=light bulb image turns white light into white froth above amber liquid, and the bulb's grey steel fitting into the foot of a glass bulb-styled tumbler.

*Warrant* Pattern-forms integrate contrasts into meaningful units. Lighter-darker, steel-glass, foam-liquid, liquid-solid are organized into a well-proportioned contrastive structure made up of a tripartite, tightly-coiled metallic base, an unfolding-expanding liquid middle, and a receding globe-like spherical head.

*Backing* The theory of antithetical qualities and forces interwoven via the media of ratio and proportionality begins with the Pre-Socratics. Plato and Aristotle take it up in different ways. Over the 2,500 years that have followed, there have been numerous political, social, economic, and aesthetic applications of the theory.

What we have just seen is the way an argument develops. In this simple example, one rebuttal has produced multiple qualifications that, in turn, generate further evidence, warrants, and backings for the initial claim. Readers, I am sure, can imagine for themselves multiple other rebuttals. Those rebuttals would then serve to expand the argument still further. Just as, in the same way, further qualifications to the original explanation can be added. For example

*Qualification 3* The shape of the beer-bulb resembles an upside-down Anglo-Saxon beaker from 600 AD.

*Qualification 4* The shape of an electric-light-beer-bulb is the analog of a plant bulb. Both contain food or nutrition.

And so goes explanation, on and on and on – the point being that academic articles are composed of thousands of words. Books and theses are made up of multiple tens of thousands of words. Research entails reasoning on a large-scale. It rests on an elaborate architecture of evidence, warrants, and backings. This means that a research thesis, article, or book cannot just be a study in self-revelation or the description of a design or art procedure. The collection, exhibition, and documentation of creative artifacts, likewise, lack the explanatory structure of research. Descriptive labels in exhibitions or documentary voice-overs do not provide explanations in the sense of claims, evidence, warrants, and backings. That is not their function or role.

At the same time, warrants and backings provide a good opportunity to bridge the gap between reason and aesthesis. Design works can be reasoned about historically or socio-scientifically. But what about artistically? Arguably the best design research reasons about the "design-i-ness" of design. Just as Paul Ricoeur anchored

explanations about the nature of speech and writing in characterizations of the polysemy of language, the most compelling design research is able to anchor its explanations in warrants or backings that set out the deep-seated structural principles and aesthetic forms and shapes that underpin design work. If legal knowledge provides warrants and backings for explanations and arguments about citizenship, then aesthetic concepts – such as balance, alignment, repetition, contrast – play a similar role in design explanations. A commercial firm pitching to a client might rely on atmospheric labels to communicate the idea behind a design project. But in research, the act of explanation is necessarily built on design’s fundamental, essential, and elemental pattern thinking. Whatever its circumlocutions, compelling design research, like design work, begins and ends in pattern recognition and cognition.<sup>54</sup>

## Design Research

Good explanation in the sciences and the arts always has a point. There is something specific to be explained. In the case of design, it is the creative act or process. The primary objective of design research is to make explicit the obscure workings of the imagination. It explains how striking and interesting visual objects and arrangements are produced via forms and metaphors and related phenomena. When we look at a successful design, the intuitive part of our brain lights up. We recognize a visual paradox or diagrammatic metaphor without necessarily being able to explain it or explain how the work was created. We just enjoy it for its enigmatic or puzzle-like power. Research, on the other hand, has to explain how the work was created, how the brain interprets it, and so on. It does this via a multi-layered pattern of reasoning.

Exegetical texts that lack systematic, large-scale structures of explanation end in waffle. Recognizable art terms, concepts, vocabularies, jargons, and nomenclatures are used. Strung together, they make little sense. This is because they are not woven into the cascading, lattice-like structural form of an argument. In serious work, such forms may extend from fifty to a hundred thousand words. To do this successfully requires great architectonic discipline. That said, there is a demand for artists and designers who can label their works, and that demand continues to grow. It follows Arthur Danto’s dictum that art is whatever the art world says it is.<sup>55</sup> Nowadays, anything that is theorized as art becomes art. Design firms attach tags, brochures, descriptors, categorizations, and classifications to their work. Documentary tickets, plaques, signs, inscriptions, plates, panels, manifestos, declarations, programs, catalogs, and leaflets mediate between the designed artifact and the customer, and between the artwork and the world. A language game has grown to service this need. It is largely conceptual in nature. It draws heavily on art school theories. Nevertheless, the language game of art documentation is not explanation, nor is the equivalent language game of practice-as-research that some design schools play (under different rubrics, including “practice-based research”). These do not function as explanation does – that is, through the medium of elaborated, well-structured justifications, reasoning, critiques, defenses, and arguments.

Design, like art and architecture, does not need explanation to work.<sup>56</sup> We do not have to have the reasons why the Parthenon is captivating or a Cézanne painting is absorbing explained to us. We do not need someone to spell out the reasons why Massimo Vignelli’s classic 1970s NYC transit map is a visually compelling abstraction, or Paul Rand’s logos for ABC and UPS were instantly memorable, or Alexey Brodovitch’s kinetic artwork for *Harper’s Bazaar* brought its magazine pages alive. Explanation, well done, can add to our enjoyment of those objects and to our understanding of things that are interesting, exciting, or important in life. But if

54 For a similar proposition in the case of architecture, see Christopher Alexander, Sara Ishikawa, and Murray Silverstein, *A Pattern Language: Towns, Buildings, Construction* (Oxford: Oxford University Press, 1977).

55 For example, “without the artworld there is no art,” Danto, *The Transfiguration of the Commonplace*, 125.

56 Joshua Reynolds put it this way, “There is in the commerce of life, as in art, a sagacity which is far from being contradictory to right reason, and is superior to any occasional exercise of that faculty which supersedes it; and does not wait for the slow progress of deduction, but goes at once, by what appears a kind of intuition, to the conclusion. A man endowed with this faculty feels and acknowledges the truth, though it is not always in his power, perhaps, to give a reason for it; because he cannot recollect and bring before him all the materials that gave birth to his opinion; for very many and very intricate considerations may unite to form the principle, even of small and minute parts, involved in, or dependent on, a great system of things; though these in process of time are forgotten, the right impression still remains fixed in his mind.” Joshua Reynolds, *Discourses* (London: Penguin, 1992), 284.

things are explained, they need to be well explained. That means that the write-up of the creative process has to match the imaginative act embodied in a successful design object. That is a tall order. It requires imagination in the act of design creation and imagination in the act of writing. Not many people achieve both. In my experience, good writers are usually poor designers, and vice-versa.

As Ken Friedman observes, the exposure to explanatory writing is least common in the Anglo-Australian and Continental European systems of design education.<sup>57</sup> North American undergraduate design students tend to get more exposure to the discipline of writing because of the greater number of general studies subjects in their degrees. Writing on an extended scale is essential to research, which includes arts research. The key is that writing is a durable external object that can be rebutted. Rebuttal is neither a kind of art criticism nor is it a corrective master-apprentice dialogue. After two millennia, we still rebut and defend, qualify and extend the arguments of Aristotle and Plato. This is the way we advance knowledge. Knowledge is not an expression of the soul. It is the fruit of claim and counter-claim, refutation and justification.

That being said, not all writing is explanatory. Most of it is not. Writing also describes, labels, documents, tags, categorizes, identifies, depicts, and communicates without engaging in the kind of elaborated argument that is characteristic of research. Contemporary design firms and organizations place a lot of value on the documentary labeling of artifacts. Undergraduate programs in art and design schools mirror this expectation. Labeling draws heavily on the art theories and concepts taught in the programs of art and design schools. But the categorization and classification of a designed artifact or an artwork – no matter how atmospheric this might be – is not the same as explanation of a research kind. The modest research essay in an undergraduate program is the first step toward structured, disciplined, and elaborated explanations. This is followed by minor and then major dissertations. On this continuum, the Ph.D. scales explanatory reasoning to the length of a book, a work of formidable magnitude.

This is not to suppose that all writers are good writers. In fact, much explanation is sterile because it lacks imagination. It fails to interpolate into discursive reasoning vivid pattern contrasts, metaphors, paradoxes, ironies, and so on. What results, then, is discursive writing that is bland, lame, and unilluminating. Such writing can follow along a chain of argument successfully, yet not reveal anything significant about the world. This also reminds us that discourse is not the same as discovery. In the act of discovery is buried the act of creation. We discover things by making leaps of imagination that we simultaneously anchor within the explanatory framework of reason. Discursive reason presupposes premises. If the premises are uninteresting then so will be the conclusions. Interesting premises require a vivid imagination. The imagination sees paradoxes, contrasts that resemble each other, and points of comparison that act as connecting tissue. In short, to work well, explanations need a spark of imagination – a leavening of pattern contrasts and metaphoric similitudes. Reason ends up being sterile unless it is able to interpolate rich, productive, and illuminating contrastive-resemblances into its discursive and explanatory structures.

Without the interpolating of imagination into reason, reason lacks the power of illumination. It casts shadows where there should be light. Stripped of the paradoxical structure of contrast-and-likeness, research of all kinds frequently fails. It does so because it separates imaginative thinking from discursive reasoning. In the case of practice-based research, the imagination is typically exiled to the artistic artifact. In this case, imagination is supposed to be confined to the artistic or design object. It is expatriated outside of the written work.

Design research has a purpose – to explain creation. Practice-based design

research tends to substitute description for explanation. Exegeses often describe at some length the operations that led to the making of a design artifact – whether it was digital or physical, what materials were used, what technologies were employed, what the steps in the production of the artifact were, what the artifact was trying to communicate, what design traditions or figures or theories (minimalism, for example) influenced the artifact-idea, and so on. Such descriptions, to differing degrees, may be interesting – but none of them explain the act of creation. None of them explain via an extended argument the imaginative process lying behind the design work or activity. None of them elaborate via a compelling architecture of reasons, rebuttals, justifications, and refutations the hows and whys of the designer’s act of creation anchored in an act of visual irony, paradox, metaphor, witty incongruity, interstitial contrariety, ingenious symmetry, or any other of the many kinds of contrastive-resemblances that lie beneath human creation and fuel the powerhouse of the human imagination.

Suppose that one of the chapters of a design Ph.D. is a methodology chapter. In light of that, the question arises: what methods are most fertile for creative design research? The parallel field of music provides a guide. There, the most successful studies by artists use structural methods of analysis. Aaron Copeland’s *What to Listen For in Music* and Igor Stravinsky’s *Poetics of Music* are cases in point.<sup>58</sup> The oldest systemic method of creative research is the statistical analysis of biographical data.<sup>59</sup> The least useful methods are self-interpretations.<sup>60</sup> These are subject-centered self-descriptions based on introspection, recollection, and self-reporting. The artist’s motives, planning, expressive drive, self-understanding, and experiential feelings are common themes. Self-descriptions – especially of the ways that artists suffer the world or operationally plan their art – are foregrounded. Explanations of the structural characteristics of the artwork recede into the background. Strategies of introspection, the interrogation of the self, scrutiny of one’s own thought emerge as common research techniques,<sup>61</sup> along with responses to felt needs and urges to create.<sup>62</sup> Self-critical awareness, monitoring of self-progress in the creative process, self-reflexivity, self-fashioning, self-portraits,<sup>63</sup> alongside self-reflexive mapping, the private-self enacting the world, maps of subjectivity, self-addressing, autobiographical memoir, self-research, self-narrative, and so on – all are examples of idiographic techniques.<sup>64</sup> The focus is on the designer, not the design work.

Structural methods of analysis align most closely with theories of creation.<sup>65</sup> This is because acts of imagination – the most potent medium of aesthetic creation – are structural in nature. They bridge between antitheses. The most crucial task of a design researcher is to identify which of the many models of creation best accounts for – in an explanatory rather than descriptive fashion – the structural act of imagination interpolated in the design artifacts, processes, or phenomena chosen by the researcher for analysis. Whether the design objects are the researcher’s own or not, the same norm applies. What act of creation best explains the design work? Is its imaginative substratum configurative, metaphorical, ironic, humorous, or what? How does such a creative medium operate? What are its essential characteristics? How are those characteristics manifest in the design work, process, or phenomenon studied by the researcher?

In short, the overriding purpose of design research is to analyze acts of creation and explain how they work. How is one cognitive frame of reference bolted onto a different one to generate the kind of memorable, absorbing, intriguing, attention-grabbing, or uncanny effect typical of the successful creative act? Such explanations are difficult because the act of creation is obscure.<sup>66</sup> The workings of the imagination are opaque – not least of all to the practicing designer. The same is true of writers. Many explain their best work with the statement that “God took

58 Aaron Copeland, *What to Listen For in Music* (1939; New York: McGraw-Hill, 1957); Igor Stravinsky, *Poetics of Music in the Form of Six Lessons* (Cambridge, MA: Harvard University Press, 1970). See also works such as Deryck Cooke, *The Language of Music* (1959; Oxford: Oxford University Press, 1963) and Robin Maconie, *The Concept of Music* (Oxford: Oxford University Press, 1990).

59 The method was pioneered by Francis Galton in *Hereditary Genius* (New York: D.Appleton & CO., 1870).

60 As Stravinsky put it, “It is ... very difficult to observe one’s self.” Indeed, biographical terms such as emotional disturbance or inspiration serve only to “keep us from seeing clearly in a field where everything is balance and calculation.” Stravinsky, *Poetics of Music*, 50.

61 Brent Allpress, Robyn Barnacle, Lesley Duxbury, and Elizabeth Grierson, eds., *Supervising Practices for Postgraduate Research in Art, Architecture and Design* (Rotterdam: Sense Publishers, 2012), 56, 76, 124, 141, 145, also available at <https://www.sensepublishers.com/media/1417-supervising-practices.pdf>.

62 Carol Gray and Julian Malins, *Research Procedures/Methodology for Artists & Designers* (Aberdeen, Scotland: OpenAIR@RGU, Robert Gordon University, 1993), accessed October 12, 2017, <https://openair.rgu.ac.uk/bitstream/handle/10059/640/Malins%20CRIAD%201993.pdf?sequence=1&isAllowed=y>.

63 Hazel Smith and Roger T. Dean, eds., *Practice-Led Research, Research-Led Practice in the Creative Arts* (Edinburgh: Edinburgh University Press, 2009).

64 Estelle Barrett and Barbara Bolt, eds., *Practice as Research: Approaches to Creative Arts Enquiry* (London: I.B.Taurus, 2010).

65 A serious and substantial literature on creation exists. Despite that fact, as Ken Friedman observed “design and architecture professionals continue to overlook many of these contributions on creativity, or simply assume that they

already understand the nature of creativity. Those who appeal to such innate forms of knowledge occasionally argue that no useful research in creativity exists, and that we must therefore invent this wheel ourselves—as though a century of research... in psychology, sociology, anthropology, and the human sciences did not exist.” Ken Friedman, “Heuristic Reflections on Assessing Creativity in the Design Disciplines,” in *Creativity, Design and Education: Theories, Positions and Challenges*, ed. Anthony Williams, Michael J. Ostwald, and Hedda Haugen Askland (Strawberry Hills: Australian Learning and Teaching Council, 2010), 172.

66 “When many designers and architects discuss creativity, they echo St. Augustine’s ... words on the subject of time: ‘I know well enough what it is, provided that nobody asks me; but if I am asked what it is and try to explain, I am baffled.’ Where Augustine admits his perplexity, however, those in design and architecture education who cannot explain creativity tend to ascribe their lack of words to tacit knowledge or to a form of internalized expertise that requires no explanation.” Friedman, “Heuristic Reflections,” 172.

67 It expresses a creative humility which acknowledges that aesthetic creation is more than volitional and relies heavily on the seeming semi-automaticity of the imagination whose cognitive processes are still little understood.

68 Carl G. Hempel and Paul Oppenheim, “Studies in the Logic of Explanation,” *Philosophy of Science* 15, no. 2 (1948): 135–75, DOI: <https://doi.org/10.1086/286983>.

over and did the writing through me” – a metaphor for the hidden structural operations of the imagination.<sup>67</sup> Designers at their peak, like writers at their best, typically work fast – so fast that the workings of their imaginations appear to be automatic. Creation just pours out of them.

If the principal role of design research is to analyze acts of creation and explain how they work, then, schematically, the plan of a design Ph.D. would look something like this:

*First*, the research question: how does design Y creatively treat A in terms of contra-A?

*Second*, the review: how have similar creative design problems previously been solved?

*Third*, the methodology: what structural theories best explain how to coalesce A and contra-A?

*Fourth*, the substance: in Y, what new solution is introduced to coalesce A and contra-A?

The new solution may draw on the researcher’s own design experiments or practice – or on a larger body of experiment and practice. But these trials and investigations are not synonymous with the substance of a design Ph.D., any more than a scientist’s lab work or experimental notes constitute the explanatory substance of a science Ph.D. Practice, trial-and-error, and artistic experimentation, along with exhibition and installation, are not explanatory. They are things to be explained. In short, they are the *explanandum* not the *explanans* of design research.<sup>68</sup> The fatal temptation of practice-based research in the postmodern era, mesmerized as it was by the inversion of binaries, was to reverse *explanandum* and *explanans*. In doing so, it rendered explanation – the very point of research – null and void.