UNPACKING “IDEAS” IN CREATIVE WORK:
A MULTIDISCIPLINARY REVIEW

MEL HUA 华莹莹
INSEAD

SARAH HARVEY
University College London

ERIC F. RIETZSCHEL
University of Groningen

New ideas are central to a wide array of organizational phenomena and research that involve creativity and innovation. Yet, there is little consensus on what the concept of ‘ideas’ means, with a broad range of creative outputs being conceptualized as ideas. This fragmentation makes it challenging to compare studies and build a cumulative base of knowledge. To integrate different streams of organizational research, we reviewed papers across the creativity, innovation, entrepreneurship, design, knowledge creation, and network literatures. We propose a “wave-particle duality” framework of ideas to synthesize two distinct but complementary approaches to understanding and studying ideas. Our framework offers guidance on how to approach the study of ideas, reconciles apparent conflicts in the literature, and suggests opportunities for advancing our understanding of ideas in creative work.

Ideas have been central to human history. They are at the heart of our scientific and technological achievements (Kuhn, 1962), our artistic endeavors (Gardner, 2011), and our ability to move through the situations of everyday life (Weisberg, 2006), as well as the less ordinary problems we face (Weaver, 1948). Arguably, ideas are so fundamental to our humanity that we cannot conceive of our existence without them. Ideas have therefore been discussed by philosophers, psychologists, and political and legal scholars since the beginnings of their respective disciplines.

In most organizations and organizational research, ideas are similarly central. Ideas drive change and therefore organizational performance and survival (Amabile, 1988; Kanter, 1988). Since Guilford’s (1950) seminal paper on the psychology and measurement of creativity, ideas have become a central unit of analysis in organizational creativity and inquiry for many areas of organizational research.

The subdisciplines of research on brainstorming, creativity, innovation, knowledge creation, design, networks, entrepreneurship, and creative work, all of which aim to study how something new comes to exist in the world, have grown around understanding the role and consequences of ideas and the processes through which ideas arise (e.g., Amabile, 1998; Burt, 2004; Fleming, Mingo, & Chen, 2007; Grimes, 2018; Guilford, 1950; Nonaka, 1994; Sutton & Hargadon, 1996). However, it is not always clear what scholars mean when they use the word “idea” (Nie & Dalsgaard, 2017; Sukhov, Magnusson, & Netz, 2019). Ideas are understood as the outcome of a creative process (Amabile, 1988)—that is, the result of purposeful effort toward generating some form of novelty (Ford, 1996; Grimes, 2018; Long-Lingo & Tepper, 2013). However, the concepts of “creativity” and “ideas” are often used interchangeably, where creativity is a process that produces ideas and ideas are, tautologically, the products of a creative process (e.g., Litchfield, Gilson, & Gilson, 2015; Unsworth, 2001). Research has often taken an “I know it when I see it” approach, deeming it self-evident when and whether something is an idea (e.g., Runco & Chand, 1995). Researchers have typically explained what they mean by a high-quality or highly creative idea (often one high in novelty and...
usefulness, e.g., Litchfield et al., 2015), without defining what they mean by an idea in the first place.

This lacuna in the literature has been noted by others. For example, Inie and Dalsgaard (2017: 393) pointed out that design ideas "are commonly used as an indicator of success of design methods and processes, yet it is very rarely defined what precisely constitutes ‘an idea,’ and how such an idea manifests itself to the researcher.” Similarly, Sukhov et al. (2019: 30) noted that “despite the existing body of literature on the front end of innovation, there is surprisingly little written about the definition of an idea.” Although both of those papers sought to remedy the problem with a definition or typology, their discussions focused on the domains of design and innovation, respectively. Given the breadth of usage and research about ideas across multiple fields in organizational research, the lack of a common definition or framework remains to be fully resolved.

The goal of the present paper is to address the question: what is an idea? This question is pressing because without agreement on this core construct, creativity research risks “the error of assuming that two or more phenomena . . . are identical merely because they bear the same name” (Thorndike, 1904: 2), which may affect the reproducibility of research results (Lilienfeld & Strrother, 2020). Ideas in prior studies have included very diverse output, such as concrete creative products like drawings (Harvey, 2013; Ward, 1994), songs (Long-Lingo & O’Mahony, 2010), new ventures (Grimes, 2018), and patents (Singh & Fleming, 2010); abstract representations like concepts for a new type of restaurant (Goncalo & Staw, 2006), solutions to problems, like ways to address a series of corporate human resource issues (Shalley, 1995); and high-level shifts in perspective, like moving to a fundamentally new technology (Anderson & Tushman, 1990) or new categories of knowledge (Tsoukas, 2009). All of these outcomes have been treated as ideas for the sake of building theory and testing hypotheses, but they vary substantially in terms of their properties, as well as in the way they are studied. In addition, studies may disagree on whether the same thing is an example of an idea; for example, some studies consider new ways of understanding existing knowledge or products (e.g., modifying medical IV bags for use in shoe design) as ideas (Hargadon & Bechky, 2006), but others do not (Harvey, 2014).

In other words, simply because multiple studies have called something an idea does not mean that they all studied the same phenomenon. Consider, for example, a television show—where would we look for ideas here? A broad review would suggest that different literatures may identify different aspects of the show as ideas: brainstorming studies may view the concept behind the show as an idea generated and elaborated in response to a task or prompt (e.g., Berg, 2019); studies of creative work may suggest that an idea is the script for a specific episode that emerged through interactions in the writers’ room and during rehearsals, as it is enacted during the recording of the show (e.g., Sawyer & DeZutter, 2009); and innovation studies may consider a new genre of television to be an idea that resulted from combining diverse sources of knowledge (e.g., Taylor & Greve, 2006).

The boundaries of ideas are thus often drawn inconsistently—not only across studies, but also across literatures, with the same concept being considered an idea in one body of literature but not in another. For example, creativity and brainstorming research has often focused on ideas that are relatively abstract and early-stage representations of cognitive concepts that can be communicated to researchers in a simple statement, such as suggestions for a new type of restaurant (Goncalo & Staw, 2006) and ways to improve one’s university program (Rietzschel, Nijstad, & Stroebe, 2010). This means that it has often ignored more distant outcomes that have been recognized by adjacent disciplines as primary units of analysis, including more concrete outcomes of creative processes, like songs (Long-Lingo & O’Mahony, 2010), and discarded less proximal parts of the process that may be instrumental for identifying and understanding the new idea, such as metaphors like “electric wires” used by a chemist to help collaborators make sense of an unknown material (Biscaro & Comacchio, 2018), synthesized frameworks from which ideas can spring (Harvey, 2014), and high-level shifts in perspective (Anderson & Tushman, 1990; Tsoukas, 2009).

Such inconsistency in the conceptualization and operationalization of ideas fragments our understanding of the concept, resulting in a cascade of three core problems for the organizational literature. One problem is that it leads researchers to ask different questions and treat ideas differently in their studies, so that different paradigms emerge for studying ideas. Returning to the example of a television show, concepts can be captured and compared with one another, and researchers could ask creators to write or share a list of concepts and ask judges to assess their inherent creativity. Each concept can be treated as a distinct entity, separate from other concepts on the list. The process for eliciting those ideas implies
that they originate in the creator’s mind. In contrast, an enacted script cannot be so easily elicited or captured as it requires context. Scripts originate in writers’ and actors’ interactions with each other and with the material and derive their value from the content, how they are enacted, and an audience’s response. The point at which the script stops evolving is unclear, as it is shaped during writing, rehearsal, and acting; moreover, one scene or piece of dialogue may require an understanding of story or character from a previous episode to contextualize it. Researchers would thus need to observe the development of a script as it emerged over time during creative work. Differences in where and how ideas originate and the ways researchers observe them mean that studies of television show concepts versus studies of scripts are likely to produce different research traditions with fundamentally different understandings of what ideas are.

A second core problem follows from the existence of different paradigms for studying ideas: inherent conflicts develop between literatures, but because they exist within different traditions, and researchers in each tradition hold implicit assumptions about ideas, those conflicts are rarely surfaced or addressed. This can be seen, for instance, in the way the creativity literature diverges on whether researchers should prioritize creative products or the processes that lead to them (Cronin & Loewenstein, 2018; Drazin, Glynn, & Kazanjian, 1999; Simonton, 2003). Whereas ideas as an outcome (e.g., Fleming, Mingo & Chen, 2007; Uzzi & Spiro, 2005) and the processes involved in dealing with ideas during creative work (e.g., Long-Lingo & O’Mahony, 2010; Obstfeld, 2005; Tsoukas, 2009) have both garnered substantial research interest, those literatures have often failed to speak directly to one another, so that the processes that have emerged from studies of creative work have not mirrored the processes assumed or implied by studies of creative outcomes. Similarly, creativity is seen both as a routine problem-solving act that produces everyday solutions and insights and as a qualitatively distinct activity that results in radical departures from the status quo (Kauffmann & Beghetto, 2009; Gilson & Madjar, 2011; Tushman & Anderson, 1986), but there has been little research on how to reconcile those views.

That fragmentation leads to a third core problem, which is how to develop practical interventions to help the generation, development, or implementation of ideas. To follow our earlier example, a concept for a television show will benefit from different kinds of support, elaboration, and feedback than a concrete draft for a plot twist or a sketch for a storyboard (Perry-Smith & Mannucci, 2017). The processes involved in these different ideas probably draw on different traits, skills, and expertise, and they are thus likely to be stimulated by different states, contexts, or interventions. For example, Smith (1998) classified the “active ingredients” of 172 idea-generation techniques into broad categories. Whereas some categories may be helpful for the generation of all kinds of ideas, others—like using physical objects as stimulation materials or refraining from stating the problem at the outset of a process—may only apply in certain settings. Organizational practices aimed at stimulating idea work thus lack a clear and coherent body of knowledge to draw on.

The purpose of our review, therefore, is to systematically explore and integrate research across communities where ideas are central. We will build a core definition of ideas, trace how ideas have been used across organizational subdisciplines, and offer ways for researchers to move toward a more consistent and holistic understanding of the construct. To do so, we draw on literatures where a critical mass of scholars has discussed ideas in a substantive way, even if they used different conceptual language to refer to and describe ideas (Cronin & George, 2020). Specifically, we review the study of ideas in the subdisciplines of creativity, brainstorming, creative work, innovation, entrepreneurship, knowledge creation, networks, and design thinking (see Table 1 for an overview of literatures reviewed). Although these “idea-centered” subdisciplines are concerned with developing or producing ideas, ideas are not always made explicit or measured in studies. For example, a study on creative work may investigate how teams collaboratively develop ideas but use a measure of collaboration as the dependent variable, rather than ideas themselves. Moreover, even when ideas are focused on, results have typically revolved around some aspect of ideas (e.g., quantity) rather than the nature of the ideas themselves. As such, we focus not on the findings of studies per se but on how ideas are conceptualized, as evidenced by how ideas are treated or observed.

We will first trace the historical roots of the concept of ideas and induce a working definition of ideas as provisional, communicable representations. We develop this definition through a chronological review of how the usage of ideas has evolved from a technical term in philosophy to recently becoming the domain of creativity and innovation research, such that the word “idea” is now almost synonymous with new idea. In the second section, we test the validity of the working definition in current
<table>
<thead>
<tr>
<th>Literatures</th>
<th>Key Research Question Relating to Ideas</th>
<th>Role and Importance of Ideas</th>
<th>Synonyms for Ideas</th>
<th>Exemplars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>What factors help or hinder creative performance in terms of generating and evaluating ideas?</td>
<td>Ideas are the unit of performance and counted or coded, or ideas are stimulus materials presented to participants, or idea generation is assessed globally as a measure of (job) performance.</td>
<td>Final concept, solution, insight, enlightenment</td>
<td>Amabile, 1996; Berg, 2019; Mueller, Melwani, &amp; Goncalo, 2012; Shalley, Zhou, &amp; Oldham, 2004</td>
</tr>
<tr>
<td>Brainstorming</td>
<td>Which factors increase or decrease ideational fluency (the number of ideas generated)?</td>
<td>Ideas are the unit of performance and counted as a measure of fluency, or coded (for originality, feasibility, semantic diversity) as a measure of quality, or ideas are stimulus materials presented to participants.</td>
<td>Solution</td>
<td>Diehl &amp; Stroebe, 1987; Dugosh &amp; Paulus, 2005; Rietzschel et al., 2007</td>
</tr>
<tr>
<td>Creative Work</td>
<td>How does the process of generating novelty unfold in individuals and groups engaged in creative work?</td>
<td>Ideas themselves are often not the topic of focus but intertwined with processes and thus observed over the time period of the study.</td>
<td>Narrative, improvised action, interactions</td>
<td>Elsbach &amp; Kramer, 2003; Harrison &amp; Rouse, 2014; Long-Lingo &amp; O’Mahony, 2010; Sawyer &amp; DeZutter, 2009</td>
</tr>
<tr>
<td>Innovation</td>
<td>What factors lead to the emergence, implementation, and diffusion of novel ideas?</td>
<td>Ideas are the raw material that eventually become innovations.</td>
<td>Discovery, prototype, framework, artifact</td>
<td>De Dreu &amp; West, 2001; Taylor &amp; Greve, 2006; Utterback, 1971; Van de Ven, Polley, Garud, &amp; Venkataraman, 1999</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>How are opportunities created, identified, and developed?</td>
<td>Ideas are the means, ends, or means–ends relationship that take advantage of opportunities.</td>
<td>Vision, opportunity</td>
<td>Baron &amp; Ensley, 2006; Grégoire, Barr, &amp; Shepherd, 2010; Grimes, 2018; Shane &amp; Venkataraman, 2018; Stigliani &amp; Ravasi, 2018</td>
</tr>
<tr>
<td>Design</td>
<td>How do designers generate, communicate, and interact with ideas to solve design problems?</td>
<td>Ideas are presented, discussed, and developed throughout the design process.</td>
<td>Mood, improvised action, prototype</td>
<td>Elsbach &amp; Flynn, 2013; Ewenstein &amp; Whyte, 2007; Inie &amp; Dalsgaard, 2017; Stigliani &amp; Ravasi, 2018</td>
</tr>
<tr>
<td>Knowledge Creation</td>
<td>How is new knowledge created, particularly in small, cross-disciplinary innovation groups?</td>
<td>Ideas, among other things, are the output of knowledge creation processes.</td>
<td>Perspective shift, epistemic object, framework, artifact</td>
<td>Ben-Menahem, Von Krogh, Erden, &amp; Schneider, 2016; Biscaro &amp; Comacchio, 2018; Majchrzak, More, &amp; Faraj, 2012; Nonaka, 1994; Tsoukas, 2009</td>
</tr>
<tr>
<td>Networks</td>
<td>How does the network structure, or the network position individuals occupy, affect the likelihood of innovation and having new ideas?</td>
<td>Quantity and quality of ideas are treated as beneficial outcomes of certain network structure or positions.</td>
<td>Combination</td>
<td>Burt, 2004; Obstfeld, 2005; Perry-Smith &amp; Shalley, 2003; Uzzi &amp; Spiro, 2005; Vedres &amp; Stark, 2010</td>
</tr>
</tbody>
</table>
organizational research on ideas and in doing so highlight that while the conceptualization of ideas as provisional, communicable representations is prevalent in research today, there are two distinct ways in which ideas can act as representations, be provisional, and be communicated. To explain these two interpretations, we introduce the metaphor of wave–particle duality. We show that some researchers have adopted a particle view, in which ideas are discrete entities with independent existence, while others have adopted a wave view, treating ideas as emergent, continuous, and highly dependent on context. Methodologically, these two views are incompatible as they lead to fundamentally different research questions, which in turn require fundamentally different methods. Conceptually, however, the two views are complementary, in that capturing “the totality of the phenomenon” (Bohr, 1927, cited in Holton, 1970) requires studying ideas from both views, with each view contributing unique information and insights. Recognizing this complementarity, along with the methodological incompatibility of the wave and particle views, provides the basis for surfacing and reconciling conflicts in the literature and expanding our understanding of ideas. We address the implications of this duality for future research across organizational studies.

A HISTORICAL OVERVIEW OF IDEAS

Theorizing about ideas is a tradition almost as old as philosophy itself, but usage of the term has evolved over the centuries. To make sense of the diverse use of the term idea across disciplines today, we review the concept across time periods and domains from early philosophy to modern psychology, to derive a general working definition that encompasses the breadth of the concept. Although philosophers and other scholars have disagreed (and sometimes still disagree) on the question of what ideas are, our review reveals three successive developments in thought about ideas that give rise to our definition—with ideas moving from being conceptualized as representations in classical philosophy, provisional in modern philosophy, and finally, communicable in early psychology. Thus, ideas stand for something (like a concept, category, object, property, action, etc.) but are not the thing itself; they are neither absolute nor unchangeable; and they have the potential to lead to some utterance, description, or action. This definition captures the essence of ideas; yet, our review will subsequently show that it is also broad enough to accommodate a variety of interpretations and approaches to ideas.

The Concept of Ideas in History

Ideas in classical philosophy: Ideas as representations. Ideas were viewed by early philosophers as mental representations of objects of cognition or perception (i.e., the mental state or concept corresponding to an object, rather than the object itself). Ideas in early antiquity were considered to be eternal and to occupy a separate plane of existence. For example, in philosophizing about the relationship between reality and the way people think about reality, Plato’s theory of Ideas (or Forms) addressed questions concerning how people perceive reality, how it is possible to think about objects other than through direct perception, and the relation between thoughts and external reality (e.g., Russell, 2009; Urmsom, 2006). The Platonic Idea of a “cat” is separate from the (or indeed any) physical cat we encounter, and the Idea is argued to be more real, more grounded fundamentally in reality, whereas the particular cats we may encounter are considered imitations or imperfect exemplars of the Idea. Thus, a Platonic Idea is different from our common contemporary understanding of the word idea as a thought or a notion in the mind; instead, an Idea is closer in meaning to what we would understand today as ideals (Urmsom, 2006). In fact, the English word idea is a transliteration of the Greek word ἰδέα (idea, “form, pattern”) (Liddell & Scott, 1940). For instance, it is the Idea of beauty that makes it possible for us to regard any particular picture as beautiful (Boas, 1974: 543). Thus, early understandings of ideas emphasized that they are not the thing we perceive, although they are related to it.

While ideas were initially seen as eternal, ideal objects that occupy a separate plane of existence, they became linked more to human thought and perception in later antiquity and the Middle Ages (Boas, 1974; Russell, 2009; Urmsom, 2006). For example, Aristotle argued that our ideas or concepts are abstractions derived from the real world (Blackburn, 2016). In a significant modification and development of the Platonic view, ideas came to be understood as the thoughts of God, paving the way for ideas to be broadly understood as cognitive. For example, Peter Abelard, a 12th-century French scholastic philosopher, argued that Platonic Ideas occupy the divine mind as patterns of creation and are, in fact, God’s concepts (Russell, 2009). From here, the understanding of ideas extended to include all human thoughts about concrete things or actions. Ideas were understood as the mental form, representation, or even a plan of something that exists or can exist in the external reality. For instance, Thomas
Aquinas noted that “the word ‘idea’ implies that there is a form thought about by an agent who intends to produce an external object that resembles it. A builder, for instance, first has the form of a house in mind, which is a sort of idea of the house to be made out of matter” (Nevitt & Davies, 2020: 339). Aquinas’ use of the word “implies” suggests that this nondivine and concrete meaning of idea as a form or plan in (human) thought was already in common use by then. When the word idea moved into the French and English vernacular in the 16th and 17th centuries, it was used to refer to both an exemplar or pattern and a thought in the mind in lay usage as well as by philosophers. The term “mental image” (Urmson, 2006) captured the view that an idea was a direct image in the mind that corresponded to some external object—the mental picture we have in our minds when we think about something. An illustration of this is René Descartes’ description of ideas in Meditations (1641, as cited in Urmson, 2006): “Some of my thoughts are as it were the images of things, and it is only in these cases that the term ‘idea’ is strictly appropriate—for example, when I think of a man, or a chimera, or the sky, or an angel, or God.” The view of ideas as corresponding to external experience and reality was further developed by the British empiricists, most notably John Locke, who said that “ideas are . . . the immediate objects of our mind” (Locke, 1689, as cited in McRae, 1965). David Hume similarly thought that “all our simple ideas are derived from impressions which exactly represent them” (Hume, 1739, as cited in Russell, 2009). This was known as the “image theory” of thinking, in which the mind was thought to be furnished with its raw materials through perception (Blackburn, 2016). Correspondingly, we can build new complex ideas, but only by recombining the basic elements that already exist (Blackburn, 2016). Eventually, the “image theory” was considered inadequate, as other philosophers such as Descartes acknowledged our ability to have ideas about things we cannot directly perceive, thus paving the way for the next major development in the conceptualization of ideas.

Modern philosophy: Ideas as provisional. A major development in the conceptualization of ideas was that they lost their absolute connotation and instead took on a more provisional aspect related to individual human thought. Ideas became increasingly conceptualized as disconnected from direct sensory experience or its results, so that they no longer corresponded to some external object, event, or category. Exemplifying this shift, Kant described ideas as “a necessary concept of reason to which no corresponding object can be given in sensation” (Kant, 1781, as cited in Urmson, 2006). As they became less tied to concrete reality, ideas were increasingly understood as provisional possibilities. There were hints of provisionality even in earlier writings—for example, Thomas Aquinas suggested that “there are as many divine ideas as there are ways of thinking about the divine essence” (Nevitt & Davies, 2020: 339), pointing out that different ideas about the same thing could exist, even in the mind of God. Thus, any idea is one of multiple possible ways for representing something, and many different ideas may exist about a particular object of cognition or perception (Borghi, Binkofski, Castelfranchi, Cimatti, Scorollì, & Tummolini, 2017). At the same time, ideas could guide human action, being both abstractions derived from perception and the ends or purposes guiding them (Boas, 1974). For example, an artist may have an idea for a sculpture and what it should look like. In that sense, ideas are not final but a starting point for action. The notion of provisionality, in the sense of ideas being neither absolute nor objective representations, persists to the current day—for example, we talk of a person’s idea or conception, implying that the idea indicates that person’s way of understanding (OED, 2022).

As ideas became central to the pragmatist school of philosophy in the United States in the late 19th century, they became strongly linked to action. For example, Dewey (1938: 109) wrote of ideas: “An idea is first of all an anticipation of something that may happen; it marks a possibility.” As such, the notion of ideas as provisional representations had become firmly entrenched in philosophical thought, in the sense of ideas representing possibilities (e.g., for action). Further, Dewey (1938: 110) wrote that “every idea originates as a suggestion, but not every suggestion is an idea. The suggestion becomes an idea when it is examined with reference . . . to its capacity as means of resolving the given situation.” This highlights the shift from early debates on the metaphysics and nature of ideas to a focus on the functionality of ideas. Dewey’s pragmatic theory of inquiry as action and ideas as tools for directing our activities continues to influence research on innovation and creativity today (e.g., Carlile, 2002; Stark, 2009).

Early and present-day psychology: Ideas as communicable. With the advent of experimental psychology, ideas further came to be understood as communicable mental products—representations that could be externalized, either verbally or nonverbally and could be shared with others (Rothberg,
This shift was driven by the advent of operationism in psychology as well as the rising prominence of assessment psychology due to the two World Wars. This is partly due to methodology; for mental concepts to be empirically studied, they must be expressed or communicated somehow, even if just to the experimenter or to some other data-gathering device, like a questionnaire. Similarly, the notion that ideas can act as a blueprint for behavior (as described by Thomas Aquinas) or spur on action (as described in the pragmatist school of thought) presupposes that ideas can be verbalized, drawn, or otherwise communicated.

One decisive development in this regard was the advent of operationalism in psychology. Originating in physics in the early 20th century as the view that we can only know about any concept, process, or entity if we have a way of measuring it (Bridgman, 1927), operationalism became a dominant approach in psychology with the rise of the behaviorist tradition. Pitting itself against traditional psychological approaches like introspection, that relied on one’s ability to report thoughts or sensations, behaviorism aimed to reshape psychology by studying behavior without the need to resort to invisible or unobservable constructs or processes. That overcame one of the complications of introspective psychology—it did not seem possible to isolate single ideas from what James (1890) called the stream of consciousness. In his seminal work The Principles of Psychology, he diverged from the earlier empiricist notion of ideas as he wrote: “mental atoms or molecules [of consciousness] are what Locke called ‘simple ideas’...it is often convenient to formulate mental facts in an atomistic sort of way...but a permanently existing ‘idea’...is as mythological an entity as the Jack of Spades” (James, 1890: 277). Despite the move toward operationalism, adequate operationalization of such theoretical constructs has remained a crucial challenge for psychological research.

An important related development was the rising prominence of assessment psychology that followed the two World Wars. Psychometric development emphasized quantification and the development of reliable and valid measurements of previously intangible constructs, such as intelligence and potential. The influence of this approach on the study of ideas is most visible in Guilford’s (1950) seminal article, generally considered the starting point of modern creativity research. In the article, Guilford (1950: 444) remarked that “definitions of an operational type are much to be preferred” and suggested that creativity (and ideas) should be theorized and studied in terms of observable behaviors that would allow tests of the underlying factors and processes. He further argued that analysis or description of creativity in terms of, for example, genius, intuition, inspiration, and incubation “tells us almost nothing about the mental operations that actually occur” (Guilford, 1950: 451); what is necessary is some way of studying the observable results or consequences of creative abilities or personalities. Guilford’s psychometric approach, which was strongly oriented toward developing reliable and valid ways to quantify creative ability or performance, has shaped much of the subsequent empirical and theoretical work on creativity, and many current measures of creativity are derived directly from his work.

Ideas in Creativity and Innovation

Today, the term idea is increasingly borrowed and discussed by organizational researchers in the narrower context of creativity and innovation. The ideas that organizational studies deal with are typically new ideas; that is, ideas that imply some novelty or change, such as new product ideas or ideas for organizational improvements. This aspect of novelty was implied by ideas being provisional but only became a dominant characteristic of ideas in the 20th century, as ideas became more popular in everyday usage.

Following the economic expansion in the United States after World War II, creativity and innovation (as opposed to traditional factors such as labor and capital) were identified as the drivers of this unprecedented economic growth (e.g., Solow, 1957). This had two consequences. The first was a surge of popular (business) writing that used ideas interchangeably with creativity, imbuing the term with a normative connotation lacking through most of history. In Osborn’s (1963: 5) influential Applied Imagination, for instance, he frequently made statements such as “agricultural ideas have made far richer the rich soil of our country” and “ideas are the keys to better employee relations.” It is clear that the author was interested in and referring to only a subset of ideas: valuable, creative ideas. In other words, the kinds of ideas that are worth seeking (and studying) are new ideas.

The second, related consequence was that ideas came to be viewed as economic goods. This is perhaps best exemplified in the writings of economist Paul Romer (1992), who argued that “using ideas and producing ideas” are key strategies for economic growth. Similarly, in his controversial book The Rise
of the Creative Class, Florida (2002: 37) claimed that creative workers control “the means of production because it is inside their heads.” This marked a shift in the language we use to discuss ideas. Today, it is taken for granted that one can use phrases such as “producing ideas” or “generating ideas,” but the notion that ideas could be produced would have been a radical proposition before the aforementioned social and economic changes took place. Although the associationist school of philosophy, which we discussed earlier, allowed for the production of new ideas through the combination of existing, perception-derived ideas, the focus there was never on the production on new ideas in the sense of creative or innovative ideas. In fact, Godin (2015) argued that “innovation” had a negative meaning of something undesirable for most of human history and only became something to strive for in the course of the 20th century.

The rise of ideas as new ideas that are produced by people was accompanied (and perhaps made possible) by the development of intellectual property law and the intellectual changes underscoring it. The notion that it is the individual (rather than, say, a god, a force of nature, or a muse) who creates ideas, information, and technical principles only began taking root during the Enlightenment of the 18th century (Woodmansee, 1984). In Renaissance Venice, for instance, protection under the law for new printing techniques or images was granted on a first-come, first-served basis, instead of rewarding the “originator” (Nard & Morris, 2006). Only toward the end of the century did a construct of “possessive individualism” evolve, wherein the author or inventor creates new ideas through their mental labor and is seen as the owner of their intellectual creation (Bracha, 2016: 3). The elevation of the value of ideas and the individual’s mind as being the source of creativity and innovation is also evident in other areas, such as the emergence of conceptual art in the 1960s. Sol LeWitt, a prominent artist in the movement, argued that “in conceptual art the idea or concept is the most important aspect of the work . . . and the execution is a perfunctory affair” (LeWitt, 1968).

**Working definition.** In sum, having traced the evolution of the concept of ideas over time, we identify the three defining features of ideas: *ideas are provisional and communicable representations*. Ideas are representations—they stand for something, such as a concept, a category, an object, or an action (or series of actions). Ideas are provisional, because they are changeable and subjective—they are not a matter of direct perception, nor of absolute truth. Finally, ideas are communicable—they can be communicated, shared, or enacted in words, visually, in a tangible form, or through actions. As outlined above, following a long historical evolution, ideas are now largely discussed in the context of creativity, innovation, and the production of knowledge in modern scholarly and popular discourse, such that they have become a fundamental unit of study in organizational research. At this point, we therefore narrow our review to focus on how ideas have been conceptualized and used in organizational research.

### REVIEW OF IDEAS IN ORGANIZATIONAL RESEARCH

We identified eight subdisciplines within organizational research concerned with the study of ideas, which we describe as “idea centered”: creativity, brainstorming, innovation, networks, entrepreneurship, creative work, design, and knowledge creation. Broadly, research on creativity, brainstorming, innovation, networks, and entrepreneurship has treated ideas as a unit of performance or an input into a unit of performance (such as a final product or innovation) and examined factors that facilitate or hinder that performance, whereas research on creative work, design, and knowledge creation has treated the production of ideas as the focus of individual or collective efforts and studied the idea work involved in the production of ideas. We provide a brief overview of the subdisciplines in Table 1.

Reviewing the subdisciplines reveals a puzzle. Across the subdisciplines, there is substantial consistency between our working definition of ideas as provisional, communicable representations, the few available explicit definitions of ideas (see Table 2 for a selective set of definitions), and the nature of ideas as implied by their usage. It appears that the idea centered subdisciplines agree in their understanding of ideas.

Yet, a number of studies scattered across those literatures have also presented different ways of interpreting the working definition. Thus, if we were to use the full breadth of studies that have dealt with ideas to test our working definition, we would find many cases where the dimensions of our definitions apply in more nuanced and varied ways than we would expect. While it may be tempting to dismiss those studies as not actually capturing ideas, the roots of alternative ways of interpreting what ideas are can be seen in early philosophical and psychological writing on ideas. For example, in medieval times, there was no stark divide between mind and
Maier, Suarasan, & Knudsen (2007: 8) suggested that the form of an idea varies with the functional basis (a clearly defined and tested language for expressing design functions).

Linsey et al. (2010: 5) defined an idea as ‘something that stimulates’—the functional basis—distinctions are made between different forms of ideas: conceptual, technological, and economic.

Montoya-Weiss & Driscoll (2000: 145) defined an idea as a ‘conceptualization’—a new or improved product, service, or process within an organization.

Proctor (1991: 225) defined an idea as a ‘conceptualization’—a new or improved product, service, or process within an organization.

Rhodes (1961: 309) defined an idea as a ‘conceptualization’—a new or improved product, service, or process within an organization.

Riedl et al. (2009: 2) defined an idea as a ‘conceptualization’—a new or improved product, service, or process within an organization.

Rubenstein (2016: 627) defined an idea as a ‘conceptualization’—a new or improved product, service, or process within an organization.

Sukhov et al. (2019: 40) defined an idea as a ‘conceptualization’—a new or improved product, service, or process within an organization.

Thorleuchter & Van den Poel (2015: 27) defined an idea as a ‘conceptualization’—a new or improved product, service, or process within an organization.

TABLE 2
Selective Summary of Idea Definitions Used in Current Research

<table>
<thead>
<tr>
<th>Source</th>
<th>Idea Definition (Emphasis Added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brem &amp; Voigt (2009: 360)</td>
<td>“In general, the company differs between a ‘trend’ and an ‘idea’: A trend identifies ‘something new’ and distinguishes it from ‘something existing;’ an idea is a proposal for an action, which either reacts to recent developments or proactively utilizes them.”</td>
</tr>
<tr>
<td>Cray &amp; Schroeder (2015: 762)</td>
<td>“Ideas are systems of causal-historically related token mental states of the same type. An idea is generated when a person (or group of people) comes to have a novel token (contentful) mental state.”</td>
</tr>
<tr>
<td>Gurteen (1998: 6)</td>
<td>“What is an idea? An idea is simply something that is unrealized, unproven or untested. It can take many subtle forms. It could be an unrealized goal: ‘Let’s go to Mars.’ It could be an unrealized product: ‘Let’s build a Mars ship.’ It could be an unrealized service: ‘Let’s lay on charter flights to Mars.’ It could be an unproven insight into the nature of things: ‘Maybe there is a stream of particles flowing out from the sun.’ Or it could be a new unproven concept of how something might work based on new knowledge of a natural, social, or business phenomenon: ‘The solar wind could power the ship.”</td>
</tr>
<tr>
<td>Knudsen (2007: 124)</td>
<td>“In defining the idea stage, the respondent was instructed that ideas are general concepts of what might be technically or economically feasible.”</td>
</tr>
<tr>
<td>Linsey et al. (2010: 5)</td>
<td>“Our basic definition for an idea is something that solves one or more functions of the design, as defined by the functional basis (a clearly defined and tested language for expressing design functions).”</td>
</tr>
<tr>
<td>Maier, Suarasan, &amp; Nicoara (2012: 482)</td>
<td>“An idea is defined as an any conception existing in the mind as a result of a mental understanding, of awareness or activity” . . . This new idea can be a recombination of old ideas, a new pattern which represents a challenge for the actual order, a formula or a unique approach that is perceived as new by the stakeholders . . . Since an invention is something new and original by definition, an idea could be the usage of an invention in a new environment.”</td>
</tr>
<tr>
<td>Montoya-Weiss &amp; O’Driscoll (2000: 145)</td>
<td>“An idea is defined as the initial, most embryonic form of a new product or service idea—typically a one-line description accompanied by a high-level technical diagram. A concept, on the other hand, is defined as a form, technology, plus a clear statement of customer benefit.”</td>
</tr>
<tr>
<td>Proctor (1991: 225)</td>
<td>“One might, indeed, think of ideas as the sentence of thought. Ideas are mental phenomena which somehow drift into the mind, wander through and often vanish into obscurity, never to be recalled again.”</td>
</tr>
<tr>
<td>Rhodes (1961: 309)</td>
<td>“The word idea refers to a thought which has been communicated to other people in the form of words, paint, clay, metal, stone, fabric, or other material.”</td>
</tr>
<tr>
<td>Riedl et al. (2009: 2)</td>
<td>“We informally define ideas as an explicit description of an invention or problem solution with the intention of implementation as a new or improved product, service, or process within an organization.”</td>
</tr>
<tr>
<td>Rubenstein (2016: 627)</td>
<td>“Suggestions or recommendations for work which have not yet been formally designated as projects or programs.”</td>
</tr>
<tr>
<td>Sukhov et al. (2019: 40)</td>
<td>“Based on the existing literature, we define an idea for innovation as a scenario in a specific context that is deemed unsatisfactory by an actor who explains how this scenario can be improved by applying appropriate resources. In the early stages of an innovation process, an idea is thus a combination of a problem and solution that is communicated as a narrative between the idea creator and the idea assessor.”</td>
</tr>
<tr>
<td>Thorleuchter &amp; Van den Poel (2015: 27)</td>
<td>“Idea mining is based on technique philosophy where an idea is defined as a means together with a corresponding end. Means and ends are seen as textual patterns that consist of several technical terms (words) occurring together. Thus, an idea is defined as a textual pattern where terms describing a means and a corresponding end co-occur.”</td>
</tr>
</tbody>
</table>

body, so that ideas were not understood as exclusively cognitive structures (for a discussion, see Gläveanu & Kaufman, 2019). Similarly, in early psychological work on creativity, Guilford (1967: 8) suggested that the form of an idea “depend[s] upon the media in which the person is working,” implying a material aspect to ideas. Those alternative understandings seem to be resurfacing and becoming increasingly prevalent in idea centered subdisciplines. This compels us to reconsider how to make sense of the nature of ideas in those studies. Our approach in this review is therefore to use those studies to expand our understanding of the defining features of ideas. In the sections below, we show how each element of the working definition—representation, provisional, communicable—is present across the subdisciplines but interpreted in two distinct ways.

There is abundant evidence that ideas have been considered representations in current organizational research, as they have been understood to stand for an object rather than the object itself. The dominant view has been that ideas are mental representations. For example: “An idea is an object of thought . . . intangible, and evidenced indirectly. While an idea cannot be seen, it can be represented,
discussed and symbolized” (Rothberg, 2004: 1060). However, some studies explored ideas that exist in physical or material form, such as a dancer’s movement (Harrison & Rouse, 2015) or a designer’s sketches (Stigliani & Ravasi, 2018). These are not considered mere expressions of an idea but the idea itself (Heracleous & Jacobs, 2008). This way of understanding representations in a physical or embodied sense has recently gained momentum in some strands of research, particularly studies of creative work (e.g., Biscaro & Commachio, 2018; Harrison & Rouse, 2015; Stigliani & Ravasi, 2018; Sutton & Hargadon, 1996).

**Provisionality** has been strongly represented in explicit definitions of ideas, as evidenced by words like “embryonic,” “suggestion,” and “initial,” as well as the dominant use of novelty as a defining characteristic. In most studies, ideas have been presented as provisional because they are early-stage or vague representations that need to be elaborated with details (Berg, 2019; Finke, Ward, & Smith, 1992). Elaboration is sometimes proposed as one measure of idea quality (beside originality and usefulness). Yet, studies scattered across the subdisciplines have explored how ideas remain provisional when individuals working together on an idea, such as in cross-functional groups, interpret the idea in different ways (e.g., Carlile, 2002; Drazin et al., 1999; Majchrzak et al., 2012). Provisionality, in this case, arises due to a lack of agreement about the idea, rather than the dominant understanding of provisional as a lack of finality.

Finally, explicit definitions have indicated that ideas are **communicable**. Some studies have referred to ideas as verbal descriptions, while others have pointed out that they could be diagrams or even physical objects, implying that for the most part, ideas are communicable in that they can be transmitted from one person to another. Thus, definitions have used words and phrases like “textual pattern,” “represented,” “discussed,” or “narrative.” For example, Rhodes (1961: 309) explicitly defined an idea as “a thought which has been communicated to other people in the form of words, paint, clay, metal, stone, fabric, or other material.” In contrast, more recent work has described ideas as “creative material” (Uzzi & Spiro, 2005: 448) that can only be communicated through action and interaction. This parallels the notion of tacit knowledge, which has a personal and implicit quality that makes it hard to formalize and communicate and is deeply rooted in action, commitment, and involvement in a specific context (Nonaka, 1994; Polanyi, 1966). From that view, ideas are procedures or schemas for actions that cannot be passed from one person to another; they can only be understood when another observes or responds to the idea.

In sum, the dominant view that emerges from reviewing current organizational research related to ideas coheres with the historical view of ideas as provisional, communicable representations. However, a growing number of studies also challenge us to expand our understanding of those defining features to incorporate material or embodied representations that are provisional in the sense of being open to interpretation and that can be communicated through action and interaction. The alternative interpretations of the characteristics may be particularly relevant in organizational contexts, where creative work is typically collective and working on ideas requires materializing them, where each person may hold different interpretations of an idea, and where ideas naturally evolve through interaction. Although this view is more dispersed than the dominant view, we argue that exploring both views provides an opportunity to deepen our understanding about the nature of ideas in organizational studies.

**Introducing a Wave–Particle Duality Framework for Understanding Ideas**

Our review uncovered that interpretations of the three defining features of ideas have tended to cluster into two distinct groups. Studies that viewed ideas as mental representations tended to also treat ideas as unelaborated and transmittable; studies that viewed ideas as physical representations tended to also treat ideas as interpretable and communicated through action. To summarize and encapsulate these two views, we therefore introduce two broad ways of understanding ideas, each of which draws on different interpretations of the three defining features.

**Ideas as Particles and Waves**

The dominant view of ideas presents ideas as **particles**. In this view, ideas are treated as identifiable, discrete entities, such as specific mental representations or mental states, propositions or proposals, concepts or solutions, or sometimes even products like sketches or drawings. One could think of particle ideas as being studied like billiard balls, in that all balls (ideas) are identifiable objects that can be counted, coded, judged, collected, and stored. One
can arrange the balls into new patterns (e.g., a triangle, a circle, etc.), hit one ball with another, and change their relative positions, but it is still possible to tell where each ball begins and ends. Similarly, “particle ideas” may change and exist within a larger context, but they remain distinct entities. The particle view of ideas represents the dominant interpretation of the working definition—particle ideas are mental representations, provisional because they are tentative and require elaboration, and communicable in that their meaning can be retained during transmission.

Importantly, the particle view goes hand in hand with capturing and measuring ideas in a way that makes them act like particles. This is evident in, for example, brainstorming studies that ask participants to write down their ideas one at a time, but also in organizations, when people are asked to pitch their ideas to management (e.g., using suggestion boxes), or when a specific deadline is set for delivering ideas or concepts. Measuring creativity in terms of the quantity or quality of ideas requires the ability to identify individual ideas and their properties, which in turn leads to the creation or use of tasks and measures that elicit particle-like ideas. The modern ideas-as-particle approach is, as we discussed in the historical overview, entwined with a strong focus on a quantitative measurement of ideas.

However, an alternative view that emerges when the dispersed studies from across the idea centered subdisciplines are brought together is that of ideas as waves. This view arises from a practice- and process-based approach associated with developing ideas. In the wave view, ideas are continuous and emergent over time and embedded in actions and relationships. Studies in this vein have emphasized that ideas cannot be recognized or understood without taking context into account, with scholars arguing that ideas “have no independent existence in themselves [and are] nothing if not worked on” (Coldevin, Carlsen, Clegg, Pitsis, & Antonacopoulou, 2018: 1371). Ideas exist, then, in ideating. Wave ideas are like the “waves” performed by fans in a stadium, where the wave moves through the crowd but is not any particular person. Indeed, if we focused on one person standing up and sitting down, we would not observe the wave at all. Waves cannot be understood by looking at one static position or moment; they can only be understood and described holistically and in motion. This can be seen in studies of creative work that have described how ideas change or are shaped as creators move through an interaction or performance (e.g., Harrison & Rouse, 2015; Sawyer & DeZutter, 2009). In contrast to the dominant “particle” interpretation of the working definition, wave ideas present an alternative interpretation of the representation, provisional, communicable framework, with ideas represented through physical embodiments, being provisional because they can be interpreted in multiple ways, and communicated through action and interaction.

To bring these together in the context of current research on ideas, consider the following example. Imagine a group of friends discussing ideas for what they should do today. From the particle view, their suggestions for activities would constitute distinct ideas; for example, they could suggest that they see a movie, go for a meal, or go dancing. Each of those could be captured, coded, counted, and evaluated. One friend may then say, “well, the weather is nice today.” From the particle view, this would not be considered an idea, since it is not a response to the question of what to do. Yet, it may be intended by the speaker as a suggestion that they not do any of the previous alternatives and instead do something outside, and it may be immediately followed by another member of the group saying, “that’s true, let’s go play football at the park!” While the particle view would then capture this as a new and distinct idea, from a wave view, it is less clear whether that second speaker had the idea or whether the idea actually occurred when the first group member commented on the weather—indeed, from a wave view, the two cannot readily be distinguished. Now imagine that this group of friends regularly plays football at the park when it is sunny. In that case, the comment on the weather seems even more likely to constitute the idea because all group members would likely interpret it the same way: the weather is nice, we should go outside and play football. Yet, it would be overlooked from a particle approach, because its meaning is not clear in the absence of contextual knowledge.

While we identified two ways of thinking about ideas that are grounded in empirical research, it is important to note that they are not explicitly recognized as cohesive frameworks by the subdisciplines. A key challenge across the idea centered subdisciplines is that researchers are not always cognizant of their assumptions about ideas. In addition, these two ways of thinking about ideas are not equally prevalent—the particle view dominates mainstream creativity and innovation research, and the wave view, although evident across several literatures, such as studies of creative process and design thinking, is more dispersed.
An Integrating Framework for Understanding Ideas: Wave–Particle Duality

To make sense of these different conceptualizations and their interrelation, we draw on the metaphor of the wave–particle duality from quantum physics. Traditionally, the views of energy as “waves” or “particles” were thought to be mutually exclusive and in competition. In other words, energy (e.g., light) might be described either as a particle or a wave, and only one of the two was thought to be accurate. However, theoretical and empirical work on quantum physics has shown that each view by itself is insufficient to fully describe the phenomenon, whereas together they do (also known as the Copenhagen interpretation of quantum physics [see, e.g., Rychlak, 1993]). This duality is often referred to in more general terms as complementarity, where “incompatible questions provide different views for understanding the world, and these different views are needed for a complete understanding of the world” (Bruza, Wang, & Busemeyer, 2015: 384). One particularly relevant aspect of this duality is the issue of methodology or measurement. Libben (2017: 53) pointed out that “one of the most important early insights in quantum physics was that it is almost impossible to separate the method of observation from that which is observed.” We argue that a similar duality and complementarity holds for ideas.

We propose that research to date has supported viewing ideas as both particles—discrete entities with inherent features—and waves—processes that are entangled, contextualized, and inextricably connected. Both views fit with the definition of ideas as provisional, communicable representations, albeit in different ways. They are phenomenologically complementary, in that they both show a different part of the whole phenomenon and so are both necessary to understand it. Yet, the approaches are methodologically incompatible, as the two approaches focus on different aspects of the phenomenon of ideas. They ask different research questions, drawing on different ontologies of the world and research traditions. It is no surprise, then, that studies from the two different approaches seem to have little in common with each other and produce findings that often appear incompatible.

The Wave–Particle Duality of Ideas in Organizational Research

Although both views (particle and wave) are evident throughout the literature on ideas, they are not evenly distributed across subdisciplines. We found the particle view most evident in literatures on brainstorming, organizational creativity, networks, entrepreneurship, and innovation. While those literatures are diverse, they tended to address two broad topics. One is how ideas are generated and judged. For example, factors that increase the production of ideas during creative idea generation (e.g., Paulus, Larey, & Ortega, 1995; Rietzschel, Nijstad, & Stroebe, 2014), cognitive processes of entrepreneurs developing venture ideas (e.g., Perry-Smith & Coff, 2011), and how employee creativity is evaluated in organizations (e.g., Shalley & Gilson, 2004). A second topic is how ideas act as raw materials or a starting point around which other processes occur. For example, these literatures have considered ideas as a result of network structure (e.g., Capaldo, 2007) or occupying an advantageous network position (e.g., Burt, 2004), examined the identification of entrepreneurial market opportunities (e.g., Shane, 2012), and shown how ideas are implemented and exploited through innovation processes (e.g., Laursen & Salter, 2006). These studies have typically utilized deductive quantitative methodological tools, such as online or laboratory behavioral experiments in the case of brainstorming (e.g., Diehl & Stroebe, 1987; Paulus, Larey, and Ortega, 1995; Taylor, Berry, & Block, 1958); surveys, field studies, and experiments in the case of organizational creativity and entrepreneurship (e.g., Berg, 2019; Dailey & Mumford, 2006; Mueller et al., 2012; Somech & Drach-Zahavy, 2013); and patents, outcomes, or revenue data in the case of innovation and network studies (e.g., Laursen & Salter, 2006; Oldham & Cummings, 1996).

In contrast, the wave view can be found in a growing number of studies of creative work (e.g., Harrison & Rouse, 2014; Long-Lingo & O’Mahony, 2010; Sawyer & DeZutter, 2009), design (e.g., Stigliani & Ravasi, 2018), knowledge creation (e.g., Ewenstein & Whyte, 2007) and parts of the innovation literature (e.g., Garud, Tuertscher, & Van de Ven, 2013). Compared to the particle approach, the wave approach does not share a clear paradigm and is more diffused across research areas. It therefore addresses a broader array of research questions, including how novelty is produced (e.g., Harrison & Rouse, 2015; Harvey & Kou, 2013, Fisher, Pillemer, & Amabile, 2018), how new knowledge is created across disciplines or boundaries (e.g., Bereiter & Scardamalia, 2014; Hargadon & Sutton, 1997; Tsoukas, 2009), and the role of materials in the design process (e.g., Ewenstein & Whyte, 2007; Sutton & Hargadon, 1996). These studies have tended to be inductive and qualitative and thus capturing ideas in different phases of development and
in different forms. They evade consensus on a set of specific questions, but share a set of underlying understandings and implications about the nature of ideas that can be usefully contrasted with studies of brainstorming, organizational creativity, innovation, networks, and entrepreneurship.

Our survey of the idea centered literatures revealed four key topics on which the different research paradigms of the particle and wave approaches produce apparently contradictory implications about the nature of ideas: (a) the boundaries of ideas, (b) the origin of ideas, (c) the location of ideas, and (d) the value of ideas. As we will see, these four aspects of ideas are central to our analysis because they capture the duality in how ideas are studied, as well as how they are dealt with in organizational practice. Representationality, provisionality, and communicability are mutually linked in specific ways within these two views. For example, the particle view, that ideas can be transmitted unambiguously from one person to another, implies that ideas have clear boundaries and fixed representational meanings. In contrast, a wave view, that ideas are located in and contextualized by action and interaction, implies that it is hard to define boundaries between ideas, that they cannot be separated from the process and context through which they emerge, and that their value thus depend on the domain they are in. These examples show that because the wave and particle views differ in how they think ideas exist, they answer the key questions posed in the literature about ideas differently. We review these differences in detail below.

The Boundaries of Ideas

Ideas as discrete entities. Many studies have observed or elicited ideas and then counted, evaluated, and compared ideas, which implies that ideas are discrete entities with clear boundaries and can be separated from one another. Describing these studies in terms of our working definition, ideas in these studies are distinct representations of, for example, identifiable products or ways of doing things, that can be communicated verbally or pictorially, with provisionality usually residing in the idea’s novelty and tentativeness. For example, in the field of creativity, brainstorming studies have usually counted participants’ ideas to derive measures of ideational fluency (Osborn, 1963). The fluency factor, as first theorized by Guilford (1950: 452), referred to the degree to which people were “capable of producing a large number of ideas per unit of time,” and necessarily assumed that ideas can be counted individually and summed. Brainstorming was designed as an idea-finding technique in the highly applied context of advertising and organizational problem-solving, with the goal of coming up with tentative ideas as possible leads. In this line of research, ideational fluency has traditionally been the dependent variable of interest (for a historical overview, see Stroebe, Nijstad, & Rietzschel, 2010). The experimental setup is such that participants are instructed to input their ideas in discrete spaces, for example, writing down one idea per line on a page or per piece of paper (e.g., Rietzschel, Nijstad, & Stroebe, 2006), and this way of capturing ideas assumes (and indeed, tries to enforce) that the boundaries between one idea and the next are clear, separating the ideas into meaningful, discrete entities. Another classic creativity task that approaches (and elicits) ideas as discrete entities is the Unusual Uses Task (Torrance, 1962), where participants are asked to generate as many unusual ways to use a well-known object (such as a brick or a cardboard box) as they can. The task was originally designed as an assessment instrument for people’s creative potential, and in line with Guilford’s (1950) suggestions for the operationalization of creativity, performance on the task is measured by counting and coding (e.g., for novelty) the uses generated. Many experimental studies on creativity have used some variant of brainstorming or the Unusual Uses Task, thus treating ideas as discrete entities (e.g., Baer, 1988; Beaty & Silvia, 2012; Berg, 2019; Lindauer, 1990; Lissitz & Willhoft, 1985; Rietzschel, Nijstad, & Stroebe, 2007; Silvia, Nusbaum, & Beaty, 2017; Van Kleef, Anastasopoulou, & Nijstad, 2010; Van Leeuwen & Baas, 2017).

The assumption that ideas are discrete entities is also evident in contemporary models of creativity, which have typically represented ideas moving through a journey, resulting in mental representations that can then be elaborated, assessed, and implemented (Amabile, 1988; Guilford, 1950; Perry-Smith & Mannucci, 2017). To apply operations such as elaboration and assessment to ideas, it must first be possible to identify something as an idea. In other words, the idea needs to be bounded, or drawing boundaries around ideas needs to be straightforward.

This is similar in the subdiscipline of organizational creativity, where novel and useful ideas have been defined as the output of creative processes (Oldham & Cummings, 1996; Shalley & Gilson, 2004; Shalley et al., 2004; Woodman, Sawyer & Griffin, 1993). Studies have typically used supervisory ratings on items that assume supervisors are able to quantify or count ideas, such as assessing if employees generated novel
and useful ideas, tried new approaches, found new uses for something, or solved problems (e.g., Tierney, Farmer, & Graen, 1999). Alternatively, studies have used measures of creative performance deemed to be more objective, such as patents or ideas submitted to an organization (e.g., Oldham & Cummings, 1996). For performance-oriented measures, researchers may also collect the actual ideas generated by employees or teams in order to count or rate them (e.g., Somech & Drach-Zahavy, 2013).

The pattern of treating ideas as bounded is also mirrored in research on innovation and networks, where patents, research papers, or new products have been taken to indicate when ideas have occurred (e.g., Fleming, Mingo, & Chen, 2007; Uzzi & Spiro, 2005). For instance, in a study on network positions, Fleming and colleagues (2007) treated the categories that an inventor’s patents are classified under as evidence of having new ideas and combinations of ideas. In another example, Simonton (2003) treated research papers as the dependent variable and argued that each paper has one core idea, even though many concepts, thoughts, and insights go into that idea. Entrepreneurship research has also treated ideas as bounded. Entrepreneurial ideas have been defined as templates for ventures, which form new relationships between opportunities and products or solutions and which give direction to the venture (Bird, 1988; Shane & Venkataraman, 2000). Those templates can then be captured in the form of an entrepreneurial pitch (Clarke, Cornelissen, & Healey, 2019) or an initial public offering (IPO) prospectus (Martens, Jennings & Jennings, 2007).

**Ideas as continuous.** In contrast to the dominant view of ideas as discrete countable entities, research on design, knowledge creation, and in situ studies of people engaged in creative work has viewed ideas as intrinsically connected and the boundaries between them fuzzy. In this work, provisionality strongly characterizes the boundaries of ideas, since the ideas are subject to continuous change. Communicability of ideas has also been central in this line of research, since ideas often only take on form as they are transmitted between people. For instance, when group members propose and elaborate ideas in real time, the line blurs between the group’s original vision, group members’ suggestions, the integration of their comments, and the fully developed idea (Sutton & Hargadon, 1996). Combining existing ideas and building on ideas are key to the creative process (e.g., Kohn, Paulus, & Choi, 2011), but it is difficult to determine, for example, when an individual or group is building on an idea or is combining different ideas (Berg, 2014; Hagtvendt, Dossinger, Harrison, & Huang, 2019).

Moreover, it is often not possible to identify an idea in the beginning of a creative process because creative output emerges over time through the interactions of group members (Hargadon & Bechky, 2006; Long-Lingo & O’Mahony, 2010; Sawyer & DeZutter, 2009). For example, Harrison and Rouse (2014) showed how when dance groups collaboratively developed choreographies, there was no unitary idea with clear boundaries. Rather, the final creative product (the choreography) was composed of segments of movements, suggestions, and interpretations of movement prompts—it was difficult, if not impossible, to point to a particular thing and identify that as the idea. This understanding of ideas is consistent with creativity research that has adopted a process lens, where ideas are understood to continually develop, change, and evolve throughout the creative process or journey (Amabile, 1988; Lubart, 2001; Perry-Smith & Manucci, 2017). Yet, it also goes further—whereas many creative process studies have used a focal idea as the unit of analysis, the continuous nature of ideas means that drawing boundaries around something as a focal idea is itself a challenge. Correspondingly, rather than an idea moving through a journey, the idea is better thought of as the journey itself.

These studies have implied that rather than having clear boundaries, ideas are continuous. Studies in this vein have showed that ideas evolve over multiple iterations (Harrison & Rouse, 2014; Harvey & Mueller, 2021), often linking with one another in a nondirect or nonobvious way (Hagtvendt et al., 2019) or in a way that integrates multiple ideas into a whole (Long-Lingo & O’Mahony, 2010). This work also suggested that even when an idea seems to have reached a final, elaborated state—one that can be or is implemented—it is not necessarily complete or easily captured as a discrete entity because its interpretive use in a new context is also part of its journey (Baralou & Tsoukas, 2015). Thus, studying ideas as continuous implies that attempting to capture an idea at any point in its journey will produce an underspecified version of the idea.

Studies from outside the core organizational work on creativity and innovation have captured the continuous and evolving nature of ideas by focusing on places where people are working on ideas, rather than trying to pinpoint the idea as a unit of analysis (Obstfeld, 2012; Sawyer, 1992). For example, Obstfeld (2012) focused on creative projects—the means (in this case organizational routines) by which organizations pursue novelty, rather than the
journey of an idea. Since people are continuously changing what they are working on, it may make more sense to capture these dynamics over the course of a project. Similarly, during a musical improvisation, ideas can occur on different levels, ranging from single notes or even timbres of notes, to rhythmic patterns, to melodic phrases, to broader musical styles, such as “playing something like Miles Davis might” (Sawyer, 1992), and an idea cannot be captured by any one of those elements alone because it takes shape through action and interaction. For example, one musician may play a particular melodic phrase, but another musician may pick up on the rhythmic pattern instead of the melody. Scholars adopting this view have recognized that the idea is a continuous process of combining all of these levels in a way that is “impossible to segment” (Sawyer, 1992; 258). From this view, then, ideas are neither held within nor predictable by the parts from which they emerge (Sawyer, 2000). Ideas are thus not distinctly bounded from one another.

The Origin of Ideas

**Ideas as originating at a particular moment.** Corresponding to the notion that ideas are discrete bounded entities (associated with a particle view of ideas) is the implication that there is a specific point in time at which the entity begins to exist. Consistent with that, much of creativity research has studied how an act of generation brings an idea into existence. That question implies that there is an identifiable moment in time prior to which the idea does not exist and after which the idea exists (and is readily recognizable as such). The moment at which the idea comes into existence is thought to be the moment at which it becomes a communicable representation. This view is evident in common metaphors used by scholars about ideas being born (Mainemelis & Ronson, 2006) or bringing ideas to life (Berg, 2019). From this perspective, an idea begins in a creator’s mind and has no existence until the point at which it is generated (Campbell, 1960; Perry-Smith & Mannucci, 2017). Research adopting this view has therefore emphasized creators’ cognitive creative thinking skills (Amabile, 1996) and the ways in which ideas take on their shareable form.

Psychological perspectives of creativity have often viewed creative thinking as a type of problem-solving (Parnes & Meadow, 1959), and these approaches have implied that ideas are worked on in the mind through mental processes and operations (e.g., Finke et al., 1992). New ideas are thought to be the result of combining existing mental elements (Koestler, 1964), for instance, combining the concepts of “kill” and “joy” to form the new idea of “kill-joy” (Mednick, 1962). From this view, there is a clear “before,” where mental elements have not been combined, and an “after,” where now a new idea exists. Cognitive models of idea generation (e.g., Nijstad & Stroebe, 2006) have also often assumed that ideas are “born” through a process of retrieving and combining knowledge in novel ways. This is also evidenced by the inclusion of an incubation phase in traditional models of creativity (e.g., Wallas, 1945), where the mind is thought to be unconsciously forming associations before a point of illumination, where “the promising idea breaks through to conscious awareness” (Lubart, 2001: 296).

Although those models acknowledged the ongoing work of (possibly unconscious) cognitive processes in producing an idea, they portrayed ideas as arising at one specific moment, such as when people suddenly achieve a certain insight. This is captured in the oft-cited description of creative insight by mathematician Poincaré (1913: 182): “the idea came to me, with . . . brevity, suddenness and immediate certainty.” These kinds of insights have been studied experimentally with tasks such as the Duncker candle problem (Duncker, 1945). Typical of such “insight problems” is that they require a restructuring of the problem before they can be solved (for example, in the candle problem, participants need to change their interpretation of a box of tacks from a mere container to a potential platform), and that the solution arises suddenly (in an eureka moment) after an initial impasse (Sternberg & Davidson, 1995).

The nature of ideas as cognitions formed at specific points in time is also evident in organizational theories that deal with ideas. For instance, network research has described how brokers synthesize disconnected and diverse information into new mental representations (e.g., Burt, 2004). This stream of research has emphasized that good ideas will be generated when one occupies advantageous positions that allows access to diverse information. However, they do not directly examine or elaborate on the process of combining information or ideas and, indeed, many studies have adopted existing paradigms and techniques from the brainstorming literature (e.g., Burt, 2004; Fleming, Mingo & Chen, 2007). Even though the gathering of information may take place over a period of time, the crystallization of an idea is still momentary. That ideas will appear in an instantaneous, categorical manner is also evident in the premise, adopted by some network studies, that ideas are formed through “reconfiguring known approaches.”
(Perry-Smith & Shalley, 2003: 90). In entrepreneurship research, the recognition of ideas or opportunities has similarly been viewed as “discovered” when new information triggers some association with complementary information one already possesses (Shane & Venkataraman, 2000) and the idea is suddenly recognizable. Finally, in innovation, ideas are seen as the result of recombination of conceptual and physical materials that were previously in existence (e.g., Nelson & Winter, 1982). This literature has focused on the search for existing materials rather than the process of recombination (e.g., Fleming, 2001), implying that if the materials or configuration of materials are right, the idea will click into place. Thus, while ideas are often seen as the result of some combinatorial process or a process of reframing or redefining (parts of) the problem, they are thought to come into existence in a specific point in time—at one moment, the idea is not there, and at the next moment it is.

**Ideas as emerging over time.** While the dominant view has treated ideas as originating at a particular moment, other studies have argued that there is no clear moment that marks the existence of an idea. Instead, these studies have suggested that ideas emerge throughout the creative process and hence cannot be separated from the process of ideating. When looking back in time, it may be possible to identify a crucial moment in the rise of an idea, but in the process of working on ideas, each utterance or act provides a range of creative options with the potential to result in radically different end points (Sawyer, 2000; Tsoukas, 2009). As such, the communicability and provisionality of ideas are what shapes them throughout the process. For example, when a chef experiments with a technique for producing part of a dish, it may produce an unusual texture that triggers an idea for a new flavor to combine with the dish and so be seen as the beginning of the idea for a new dish; equally, it may leave the food uncooked and inedible but trigger a thought for a different technique to try; or it may produce no change to the dish at all. It is only in retrospect that we can understand whether trying the technique was the beginning of an idea. Similarly, if a group member suggests during a brainstorming session, “what if we thought about it this way?” we can only know whether that will be viewed as an idea if it turns out to be productive for the group. In our earlier example of “the weather is nice,” its status as an idea depended to a large degree on the other group members’ reaction to it. Thus, viewing ideas as what exist at the end of the creative process implies that ideas are emergent throughout, where it is not possible to know whether something is an idea in the process; this in turn implies that it makes no sense to try to identify the particular moment when an idea comes into existence or what it represents at that particular moment.

Ideas are emergent because they come together over time, so elaborations on the idea cannot be understood in isolation from the process. Even knowing all of the elaborations and additions in isolation cannot add up to a complete understanding of the idea without understanding how they unfolded over time (Cronin & Loewenstein, 2018; Tsoukas, 2009)—the sequence in which each elaboration and addition occurred, and the way that it responded to something that came before, are all relevant to understanding the idea. This is evident, for example, when ideas are considered more complex discoveries or changes in perspective, such as scientific theories. Research on scientific discoveries (Ben-Menahem et al., 2016; Wuchty, Jones, & Uzzi, 2007) has taken the idea as a final manifestation of a creative process where multiple thoughts, concepts, or associations may have been generated and one idea has been selected, or a set of smaller components has been integrated to form the idea. New knowledge, for instance, is thought to result from “building up a structure of ideas,” as is the case with a theory or a complex design (Bereiter & Scardamalia, 2014: 35). As such, this view has suggested that we can only know an idea if we understand what came before, and indeed after, in the process.

The view of ideas as emergent implies that ideas are not reducible to component parts. Ideas can exist at different levels of complexity or completeness, but the relationship between ideas is not compositional—that is, one idea is not made up of recognizable constituents in the form of other (simpler) ideas. For example, Hagtvedt and colleagues (2019) showed that aspects of early ideas become input or inspiration for subsequent ideas which can then take on new directions. In this case, earlier ideas are provisional “stepping stones,” but subsequent ideas are not a summation of earlier ideas. Consequently, ideas can neither be described as a mere combination of other ideas nor as a holistic idea from the beginning (the parts of which are made clear through elaboration).

The view of ideas as emergent is evident in studies of how shifts in perspective or paradigm unfold over time. The notion of shifting perspective (for instance, by shifting from one category or way of understanding to another) is fundamental to theories of how ideas are created and developed (e.g., Duncker, 1945; Guilford, 1950; Kuhn, 1962). For instance, when faced with the question of how to improve or redesign a hospital
chair, a shift in perspective would be a new way to think about what a hospital chair could be—a shift, for example, from it being functional or convenient to being cozy or fashionable (Stigliani & Ravassi, 2018). Yet, in this approach, the notion to make a chair cozy or fashionable is not itself an idea; its “idea-ness” comes from the way that it responds to what came before. A historical example described by Hofstadter and Sander (2013) is Galileo’s discovery of the moons of Jupiter. The crucial idea, they argued, was not the observation of objects orbiting a distant heavenly body but Galileo’s novel representation of these objects as moons (i.e., as members of a category), a word that until then had only been used in a singular sense (“the moon”). It was thus Galileo’s reframing (or invention) of a category that was the idea. Reflecting this view, some literatures on creative cognition, design thinking, and knowledge creation has been devoted to understanding how people and collectives shift between one way of understanding and another, and reframing problems is a core skill for creative thinking (e.g., Getzels, 1975; Reiter-Palmon & Robinson, 2009). These studies imply that both the frame and how it is changed are core to understanding the idea.

The Location of Ideas

**Ideas as having an independent existence.** The particle view assumes that ideas have independent existence, which means that they can be separated and distinct from the context in which they occur and correspondingly that they can be owned and transferred. This relates strongly to the representational and communicable aspects of ideas: they can be written down, verbalized, drawn, or otherwise communicated in a form that lends itself to storage and possession. This is evidenced in research that has explored the psychological and legal effects of ownership over ideas. Only if ideas have an independent existence can they be owned by an individual who is not their creator. This is the premise of studies on the psychological experiences of ownership, which have shown how generating ideas is experienced as disclosing information about or aspects of oneself (Goncalo & Katz, 2019), that psychological ownership affects how people adopt others’ suggestions for change (Baer & Brown, 2012), and the extent to which they elaborate information (Knight & Baer, 2014). Similarly, the premise of research on idea management (Vandenbosch, Saatcioglu, & Fay, 2006) is that ideas can be treated like a collection of objects (e.g., Litchfield & Gilson, 2013). This further implies that ideas have existence and meaning in and of themselves that can be captured in the form of intellectual property, such as patents or copyrights.

Having a source and allowing for ownership, ideas are often seen as items that are produced (e.g., by employees), which in turn means that it makes sense to attempt to stimulate, organize, and reward this production through managerial actions (e.g., Ambile, 1988; Baer, Oldham, & Cummings, 2003), just as is done for other forms of job performance and productivity. Thus, this view of ideas has given rise to management strategies aimed at measuring idea-generating productivity and necessitates a way to deal with idea ownership and the recognition of contributions. In addition, if ideas can exist independently, without necessarily requiring context to be understood, it implies that ideas can be stored and can be transmitted between individuals, groups, and organizations. For example, research on scientific discoveries (Ben-Menahem et al., 2016; Wuchty, Jones, & Uzzi, 2007) has taken an idea as a final manifestation of a creative process, where the discovery can be written down or told to other researchers (e.g., Singh & Fleming, 2010). The view that ideas can be transmitted between people is perhaps most evident in network research, where ideas are conceptualized as moving through the network to different agents (e.g., Burt, 1992). Similarly, in the innovation literature, Sukhov and colleagues (2019) suggested that an idea is a brief description of a solution that can be passed on to users, customers, and other creators. This approach is also in line with work in brainstorming and other creativity experiments, where participants are typically asked to write down their ideas as a response to questions on how certain things can be improved or how certain problems can be solved (e.g., Diehl & Stroebe, 1987).

**Ideas as embedded in action and relationships.** A growing body of work has suggested that rather than having an independent existence, ideas are embedded in actions and relationships. In other words, ideas cannot be understood without the (often interpersonal) context they are created in, from which they derive their meaning. Thus, in terms of our working definition, the representational aspect of these ideas is provisional as the meaning of these ideas is not fixed. Ideas more often take on their meaning at the moment that they are being communicated (i.e., expressed). For example, Sawyer and DeZutter (2009) suggested that “parts” of an idea are distributed between collaborators. This does not mean that multiple people are directly involved in generating an idea, as we may typically assume; rather, because ideas are embedded
and contained in what came before, they are shaped by the social environment both directly—for instance, through conversation (e.g., Harvey & Kou, 2013; Fisher et al., 2018; Sawyer, 2000; Tsoukas, 2009) and the way that creators interact with their materials (Ewenstein & Whyte, 2007)—and indirectly—for instance, by assumptions and paradigms (e.g., Amabile, 1996; Csikszentmihalyi, 1999; Drazin et al., 1999). Ewenstein and Whyte (2007: 698) described how, in creating new architectural designs, the ideas are not located in a designer’s mind as a concept, nor as an accumulation of sketches and illustrations, but rather emerge through “a conversation between the designer and the drawing.” Similarly, Tsoukas (2009) described how new understandings or new meanings emerge through dialogue, where (similarly to our earlier example of “the weather is nice”) it is the response in the context of an initial statement or utterance that contains the meaning, but not the initial statement or the response itself. Being representations, ideas always carry some meaning, but this meaning will often be revealed and moreover shaped by the conversation, group interaction, the actions of those involved in the larger project, and so on, rather than being a matter of a particular creator’s intention, as captured in a description.

From that view, ideas are procedures or schemas for actions and so cannot be simply passed from one person to another; rather, they can only be understood when the other observes or responds to the idea. The meaning is contained, or even created, in the interaction—the initial action and the response together (Tsoukas, 2009). This parallels the notion of tacit knowledge, which is hard to formalize and communicate and is deeply rooted in action and involvement in a specific context (Nonaka, 1994; Polanyi, 1966). For example, in a study of improvisation in work teams, Vera and Crossan (2005) discussed exchanging and building on each other’s ideas as central to team improvisation. In this sense, ideas are distributed across different creators or parts of a system; they are the concepts that can be combined, or smaller insights that lead to creative breakthrough when brought together through interaction.

Studies done from this view have shown that actions and interactions during creative work change and shape what the idea is. For example, in an inductive study of perfume making, Endrissat and Noppeney (2013) described how a visual collage was used to capture the emotion of “trust” and how the collage was used in developing the perfume. Rather than viewing the concept of trust or the visual collage itself as the idea, the different responses of the group members to the visual collage (for example, laurel leaves meaning a Sunday roast for one creative worker and the Roman Empire for another) are part of the idea. That is, to understand what the idea is, one must look at both how people are relating to the collage and to each other, because only in those relations and understandings can the meaning of the idea be found. Further exemplifying this, Withagen and van der Kamp (2018: 1) viewed creativity as “the discovery and creation of unconventional affordances (action possibilities) of objects and materials,” defining ideas as representations of possibilities for action rather than cognitive concepts. Following that approach, research has described how aesthetic knowledge, derived through bodily sensations, becomes incorporated in creative work (Sawyer, 2000; Stephens, 2020). That sentiment is echoed in organizational research on design by Stigliani and Ravasi (2018: 749), who noted that “the production of sketches, drawings, and prototypes not only is a way to represent provisional design ideas, but also central to how these ideas are developed intuitively in the first place.” Heracleous and Jacobs (2008) similarly described material ideas as “embodied metaphors,” arguing that embodiment shapes our experiences and perceptions, which in turn influences how we interpret more abstract entities.

Interestingly, because ideas need not be located (or even originate) in an individual’s mind, some ideas can, contrary to conventional understanding, start out in a physical, material, or visual form and develop into a mental representation. For example, Stigliani and Ravasi (2018) described how designers move from a “mood,” which may be captured in tangible representations on a mood board, to a mental concept encapsulating that mood. Scholars adopting this view have suggested that there is something physical about these ideas themselves, or at least that there is no clear dividing line between the mental and embodied aspects of ideas, and that something crucial about the idea occurs at the interface of the material and the person dealing with that material (Bechky, 2003; Carlile, 2002; also see Withagen & van der Kamp, 2018). For instance, a dancer may move in a way that invokes the feeling of an animal (Harrison & Rouse, 2015). In doing so, the dancer’s idea is the movement, and the movement represents a particular feeling, which in turn shapes our experience and how we interpret more abstract entities (Heracleous & Jacobs, 2008). This body of work has studied the interaction between creative workers and various material forms, including sketches,
images, prototypes, mood boards, visual collages, physical movements, and performances (Biscaro & Commachio, 2018; Endrissat & Noppeney, 2013; Harrison & Rouse, 2015; Stigliani & Ravassi, 2018; Sutton & Hargadon, 1996).

The Value of Ideas

Ideas have inherent qualities. Organizational creativity is typically defined as “the production of new and useful ideas concerning products, services, processes, and procedures” (Shalley & Gilson, 2004: 34; see also Oldham & Cummings, 1996; Shalley et al., 2004; Woodman, Sawyer & Griffin, 1993). That literature is strongly output- or product-focused, because the value of ideas is thought to lie in their novelty and usefulness, which ultimately (it is hoped) translates into organizational performance or profit (e.g., Katila, 2002; Luo, 2014; West, 2002). This approach is strongly tied up with a particle view of ideas.

Studies in this tradition have typically used consensus, expert ratings, or quantifiable output to judge the value of ideas, and the use of these methods assumes that an idea has some inherent qualities that can be observed or uncovered. The representational content of an idea can be clearly communicated, and this enables a judgment or rating of the idea’s provisional value. In other words, various aspects, such as the originality, feasibility, or semantic content, of ideas are attributes of the idea that can be measured—if not objectively, then at least with a high degree of intersubjective agreement (Amabile, 1982). In experimental research, ideas (such as those generated in a brainstorming task) are usually coded (e.g., for novelty, feasibility, or “creativity”) by multiple raters who are expected (and usually found) to substantially agree on different ideas’ relative qualities. In organizational studies, supervisory ratings, or other measures of creative performance, such as patents, have been considered adequate measures of ideas (e.g., Oldham & Cummings, 1996). The rating measures usually ask supervisors to indicate how often employees contribute creative ideas (e.g., Janssen, 2000). For performance-oriented measures, researchers may also collect the actual ideas generated by employees or teams (e.g., Somech & Drach-Zahavy, 2013) in order to count or rate them. Like experimental work on brainstorming, then, this research has implicitly adopted a view of ideas as quantifiable “products” generated by employees, the quality of which can be meaningfully assessed by raters who themselves are not part of the creative process. In innovation and network research, scholars have often used quantifiable metrics such as patent counts (e.g., Katila & Ahuja, 2002), paper citations (Uzzi, Mukherjee, Stringer, & Jones, 2013), and revenue (Uzzi & Spiro, 2005) as indicators of the quality of ideas.

More recently, researchers have shifted their attention toward what Zhou, Wang, Bavato, Tasselli, and Wu (2019) called “the receiving side of creativity,” that is, the way people, teams, and organizations respond to, evaluate, select, or act upon ideas. These studies have often compiled a set of stimulus ideas to present to participants, with most using ideas as they would be (or actually were) generated during typical idea-generation tasks (e.g., Herman & Reiter-Palmon, 2011; Rietzschel, Nijstad, & Stroebe, 2006; Runco & Smith, 1992; Zhu, Ritter, Müller, & Dijksterhuis, 2017). In other studies, however, researchers have created stimulus ideas, and these have tended to be somewhat more elaborated and detailed than those typically produced in idea-generation tasks, which tend to be short (because participants are expected to generate as many as possible). Examples of this are Mueller, Melwani, and Goncalo’s (2012) running shoe product idea, Dailey and Mumford’s (2006) use of project proposals as ideas to be evaluated, and Berg’s (2016) video recordings of ideas for new circus acts. These studies emphasized manipulating or varying input (i.e., the idea), implying that variation in quality stems from the ideas themselves and that in an ideal scenario with perfect information (i.e., no uncertainty), people would be able to discern an idea’s true value.

The qualities of ideas treated as constructed. While most research has focused on finding objective assessments of idea quality, asking the question “what is the quality of an idea?” an alternative approach views ideas as having no inherent quality and asks instead “where is the value?” In this approach, there has been an emphasis on the importance of systems and domain in understanding what an idea means and hence its value, as well as the view that an idea does not exist unless it is being evaluated (or at least observed).

As mentioned earlier, the provisionality of ideas in this approach is tied to their meaning and hence their quality. Scholars in this tradition have been emphatic that something new has no meaning (and hence no specific “quality” or value) without taking into account the old (i.e., what already exists in a domain) (Bailin, 1994; Csikszentmihalyi, 1999). For instance, Csikszentmihalyi (1999) proposed a systems model of creativity, arguing that what is recognized as a new idea is constructed through interactions between producer and audience; evaluation does
not happen through individuals merely uncovering some inherent qualities of ideas but through social systems making sense of and valuing products. In other words, asking about the qualities of ideas, such as their novelty and value, raises the question of, “relative to what?” Some authors have also referred to novelty as a consequence (rather than a property) of ideas. For example, Sukhov and colleagues (2019: 29) mentioned that one function of ideas is to “trigger new associations and give rise to new ideas,” and Proctor (1991: 225) mentioned that ideas (or insights) “can lead to a restructuring of that problem and the development of further insights into the solution of the problem.” Echoing this view, Harvey and Kou (2013) examined the evaluation of ideas not as a static decision in the creative process but as an ongoing and situated, as an idea becomes collective (i.e., the collective idea exists) in these moments of evaluation. Similarly, Coldevin and colleagues (2018: 1371) showed how, in collaborative creative work, ideas are constituted on an ongoing basis by group members actively locating them in relation to other ideas or the broader domain, showing that “ideas of what to do were linked to ideas of what is worth doing.” Further, addressing the question whether people are discerning or able to recognize their best ideas, Silvia (2008: 141) said: “I suspect that most creativity researchers, in their heart of hearts (or brain of brains), would agree that there is no gold standard for creativity,” and argued that “creative products probably do not have a true, innate level of creativeness,” recommending a focus on agreement rather than accuracy, with high agreement between self-ratings and other external criteria, reflecting high discernment. This again points to a more systems view of idea quality, where the quality of the idea is not thought to reside in the idea itself but rather in what happens to an idea (e.g., in terms of appreciation or success) in the world.

Not only is the value of ideas determined by systems and domain, as we have argued above, but the value of ideas is also seen as changing across time as well as people. For example, Cronin and Loewenstein (2018) illustrated how the same statement can be part of one person’s standard repertoire (and therefore not a new idea to them), but every time this person shares it with someone who has not heard it before, it can trigger new insight or revelations for them. In historical case studies of collaborative creative work, Farrell (2001) showed that artistic styles that did not seem creative at first (or that were even rejected outright) could, over time, come to be considered creative. For example, this was the case with the French Impressionism, which was initially derided as being common or uncultured compared to the fine art of the Old Masters. The inverse is also often true, with ideas deemed creative at one point becoming the new status quo. For example, Cirque du Soleil pioneered a modern format of circus that was seen as radical in its time and was even used as the case study for how to come up with groundbreaking organizational strategies (Kim & Mauborgne, 2014), but the very same format is today seen as “tired” (Vincent, 2015). These examples show that the value and meaning of ideas can be extremely fluid.

**AN ILLUSTRATION OF THE WAVE–PARTICLE DUALITY FRAMEWORK**

**Particles and Waves on the Receiving Side of Creativity**

Having discussed how the boundaries, origin, location, and value of ideas differ in research adopting a wave or particle view of ideas, this section aims to illustrate the use and limitations of each view. We discuss two examples from our own research on the “receiving side of creativity” (Zhou et al., 2019): a study on idea selection in brainstorming groups (Rietzschel, Nijstad, & Stroebe, 2006), and a study on idea evaluation in healthcare policy groups (Harvey & Kou, 2013). After a long period of prioritizing idea generation, research attention has recently begun to examine how individuals and groups receive creators and creative ideas. This includes judgments about the novelty and usefulness of ideas, decisions to accept or reject ideas, forecasts of the success of ideas, and choices regarding the implementation of ideas (for a review, see Zhou et al., 2019). A foundational assumption of this stream of research is that there is a target (usually an idea) that can be evaluated, selected, or implemented (Zhou et al., 2019). Thus, research to date has predominantly taken a particle view of ideas.

**Limitations of the particle view: An example.**

One example of studying the receiving side of creativity from a strong particle view is the study on idea selection by Rietzschel, Nijstad, and Stroebe (2006). In this work, the main question was whether the lower productivity of interactive, as compared to nominal, brainstorming groups would affect the quality of idea selection. The results showed that nominal and interactive groups performed similarly, and both at chance level (i.e., groups did not select ideas that were more original and feasible than their average generated idea).

The particle view is highly evident in several aspects of this work, with the research question and...
method both strongly informed by a particle view of ideas as discrete entities that could be elicited, counted, coded, and subsequently compared along specific dimensions by use of standardized procedures and materials. For example, in terms of location, ideas are treated as discrete entities, as evidenced by selection taken to consist of making a choice out of previously generated ideas. The operationalization of generation and selection performance was aimed at coding ideas as individual entities, participants were instructed to generate ideas and then make a selection from their ideas, ideas were to be written down on sheets of paper divided into separate sections to facilitate identification and counting of individual ideas, participants received a specific problem for idea generation (“how can education at the Department of Psychology be improved?”), and ideas were only counted and coded as ideas if they provided an intelligible answer or solution to that question.

The strong particle nature of the study may have limited our findings in several ways. For example, because we were interested in the creative value of ideas as they were generated and selected (that is, value as a stable characteristic of particle ideas), participants were not given opportunities or options to redefine the problem, unless this was accompanied by an idea that the researchers could clearly code. Thus, if a participant would have written down a general question like “what is education for?” we might have not counted or coded this idea, and in fact we might even have been a bit annoyed at the participant for “not following instructions.” From a wave view, however, such a question would have been particularly interesting, because it represents a reframing of the problem in a fundamental way (if we want to improve education, it does make sense to think about which goals education is supposed to serve). Given that creativity is often thought to crucially depend on the ability to question fundamental assumptions of one’s task or problem, this kind of behavior might be seen as interesting, rather than a complication.

Moreover, since we only wanted to count unique (i.e., nonoverlapping) ideas, two variants of the same idea (such as “more practical elements during lectures” and “practical demonstrations during lectures”) might have been considered identical and in that case would be counted only once. However, from a wave view, it would be interesting to see how (and why) these two versions of the “same idea” arose (e.g., this could reflect a kind of elaborative linking of ideas; e.g., Hagtvedt et al., 2019). Thus, such “errors” would have been an interesting opportunity for further inquiry.

Finally, on a more fundamental level, the issue of selection effectiveness is somewhat dubious from a wave view, since (at least in the way it is usually studied) it reduces effective selection to maximizing scores on some specific dimensions. From a wave view, however, the question is not so much under which circumstances participants make the best selection, but rather how people may make different selections under different circumstances, and how (or why) these different selections come about. For example, one of the assumptions behind the study was that people would be making a selection from their previously generated ideas (which was what we instructed people to do); yet, in practice, several groups wrote down ideas on their selection sheet that contained elements of multiple previously studied ideas. A wave-oriented researcher would probably have been particularly interested in these kinds of changes to and developments of ideas as they unfolded through the creative process. In fact, Glaveanu (2014b) argued that the separation of generation and implementation of ideas is a false dichotomy, where in reality the two go hand in hand as new ideas emerge through the process of implementation. Studying this using a strict particle approach, in this view, fails to do justice to a phenomenon that has inherent wave characteristics.

Limitations of the wave view: An example. Harvey and Kou’s (2013) study of the role of idea evaluation in healthcare policy groups explored the receiving side of creativity from a wave view. That paper used an inductive methodology to study how evaluation is situated in the ongoing interactions between group members during discussions of new ideas. A key finding of the paper was that groups evaluate ideas throughout generative processes—for example, by comparing them with one another as they are generated, by choosing to discuss them in detail as they occur, and even by allowing them to fall out of the group discussion. The paper concluded that collective creative processes are not all well described by the idea-generation-centric sequence of the creative process and proposed an evaluation-centric alternative.

The wave view was evident in the paper’s conceptual foundation, methods, and contributions. By tracing the discussion of ideas over group discussion, the paper assumed that ideas are emergent. Even though we were motivated by the wave insight that evaluations are embedded in a group’s discussion of ideas, we were still influenced by the dominant particle tradition to treat ideas discretely. This was evidenced in how we analyzed the data, by tracing ideas from when they first arose in a group
meeting until discussion about the idea was resolved. One of our early observations was that it was exceptionally difficult to tell where any idea began, or to capture with regularity how the idea changed over time. We dealt with this by focusing on how group members interacted with the idea (e.g., did they build on the idea or disagree with it) and theorized about the nature of interactions, consistent with the wave approach. Thus, a key conclusion of the paper is that generation and evaluation are deeply entwined, so that the one cannot be understood without the other, nor without the context of the group discussion.

Although the wave approach was productive for uncovering new insights about collective creativity, it also obscured differences that may have existed in the content of the idea and how the form of the idea changed. For instance, because we treated the origin of ideas as emerging over time rather than originating in a particular moment, we could not also capture snapshots of ideas at given points along the process. As such, we could not say whether, in the course of integrating ideas, group members drew on different mental categories to produce ideas or whether a final proposed idea actually integrated knowledge from members. Groups also discussed ideas that existed in different forms—in some cases, their proposed solutions were technological products; in others, they were recommendations to change regulation; in still others, they were new processes for delivering healthcare—but we did not capture those.

**Complementarity between the two studies.** As we have illustrated, both views have inherent limitations. For the “receiving side of creativity,” the particle approach is often appropriate as ideas being represented to evaluators will often be at a point where they do have clear boundaries and independent existence (e.g., a video of a performance). In other cases, however, generating ideas and judging them are intermingled (Harvey & Kou, 2013; Harvey & Mueller, 2021). This means that even within a group working on a seemingly unitary idea, the same idea can be experienced in different ways by different group members, because the idea is embedded within the group’s ongoing interaction and relationship. In that case, treating ideas as particles would produce a set of challenges because it is not clear which interpretation of an idea is being evaluated, selected, or otherwise responded to, and to what extent this interpretation incorporates only a response to the idea as it happens to be expressed at that moment. Applying a particle view to understand such processes may not be the best option. These two studies adopted different perspectives on the nature of ideas and hence used different methodologies and yielded distinct findings that appear incoherent or incompatible; however, a closer examination reveals that they offer insights into different aspects of the phenomenon and answer different types of questions. Applying the wave–particle framework to the literature helps us reconcile seeming incompatibilities between studies by highlighting how those studies, when taken together, give us a more complete understanding of ideas and the creative process.

**TOWARD AN AGENDA FOR ORGANIZATIONAL RESEARCH ON IDEAS**

Having first developed a historically grounded definition of ideas as provisional, communicable representations, we then argued that those three definitional features could be interpreted in two distinct ways, giving rise to two separate worlds of understanding about ideas as either particles or waves. Within those worlds, researchers ask distinct questions and use distinct approaches, intertwined with different assumptions about the boundaries, origins, location, and value of ideas. Since a researcher’s worldview determines and is determined by the questions they ask and the methods they employ, it is critical that, as a community, we employ both views to understand the “totality of the phenomenon” (Bohr, 1927). Thus, a primary contribution of introducing the wave–particle duality as a framework for understanding seemingly contradictory approaches and findings is to suggest that, rather than being in conflict, each view provides a window into different aspects of the phenomenon of ideas.

Below, we elaborate three sets of principles for drawing on the duality to move research on ideas forward: (a) the appropriate view should be used for capturing the part of the phenomenon that a researcher aims to study; (b) to avoid creating false dichotomies, researchers should position their findings relative to research in the same view, rather than in contrast to the alternative view; and (c) each view should be used to expand the other.

**Deciding Whether and When to Use a Particle or a Wave View**

The first principle we propose is that each view will be most valuable for asking distinct questions about ideas and for understanding different aspects
of the phenomenon, and that researchers should try to make appropriate choices when deciding which view to adopt. Our review showed that in their idealized forms, a particle view treats ideas as *separable* from each other (i.e., discrete and bounded), from the process for producing them (i.e., originating at a moment), from their context (i.e., having independent location), and from their domain (i.e., having inherent value); whereas a wave approach treats ideas as *inseparable* from each other (i.e., continuous with blurry boundaries), their process (i.e., originating emergently), their context (i.e., in an embedded location), and their domain (i.e., value is constructed). It may not always be easy or attractive to move back and forth between views, but researchers should consider whether the view they adopt is best suited to the questions they want to ask or the phenomena they want to study. For example, do they want to capture how ideas interact with their context or compare ideas to one another within a context? Do they want to identify a specific moment when a final idea can first be identified or capture the process through which an idea developed its final form?

While our review suggests that researchers usually implicitly adopt one of the views, this does not imply that they commonly adopt a 100% particle or 100% wave view—in fact, either would make research impossible. Past research has implicitly held one or more of these areas constant: boundaries, process, context, or domain. For example, although particle research has assumed that ideas can be meaningfully interpreted in and of themselves, any interpretation presupposes some context. At the very least, brainstorming researchers have treated ideas as responses to a problem or question presented to participants and interpreted (i.e., coded) ideas on the basis of their beliefs about participants’ intentions. Conversely, a wave researcher will adopt a highly contextualized view of the process of developing ideas, but assigning any interpretation to what happens during this process requires some “fixed point” or constant, without which everything would be unique and no pattern could ever be identified. Thus, we argue that researchers first need to be aware of the degree to which they adopt a particle or wave view, and second, make a deliberate or thoughtful choice about which elements to hold constant and which to allow to vary when developing new research questions and methods.

The particle view seems most appropriate for examining specific, regular, and important points in the creative process, when the development of an idea pauses and a snapshot can be taken of it that can be readily understood by those who view it. At that point, the idea is a mental representation that, while not fully developed, can be communicated. Further, a particle approach lends itself to differential and comparative questions where, for example, people’s creative output or the effectiveness of different procedures or settings need to be assessed or compared. In contrast, we suggest that the wave view is most appropriate for understanding how ideas develop, evolve, and change over time and how they may be interpreted and used in different ways. A wave view fits well with questions regarding interpersonal processes over time within or between groups. During those processes, ideas are enacted representations communicated through interaction that may be diversely interpreted or contested. Underlying these suggestions are two questions that determine when to apply a particle or a wave view: (a) whether we want to capture and study changes or stability in ideas; and (b) whether an idea can be commonly understood by various stakeholders, such as collaborators and audiences.

**Do we want to capture and study change or stability?** Researchers need to consider whether they want to capture ongoing evolution in an idea or whether the idea is in a relatively stable state. Our review of research on brainstorming, creativity, networks, entrepreneurial ventures, and innovation showed that by treating ideas as bounded and discrete, researchers have implied that there are points in the creative process when ideas are stable and can be captured. For researchers, it is important to identify points where ideas reach a natural resting point—for example, when an idea is first *generated* and expressed, as captured in brainstorming research that has asked participants to write ideas down; when it is *shared*, as captured in entrepreneurship research that has examined how entrepreneurs get feedback on pitches or resources from IPOs; when it is *materialized*, as captured in innovation research that has looked at tangible output, such as research papers or patents; or when it is *stored* for future use, as captured by idea and innovation management research. At those points, ideas can be compared because they are relatively stable and crystallized. For example, it makes sense to examine which entrepreneurial ventures are most likely to obtain investment at a given point in time based on their pitches, because the pitch represents the idea at a point when it is stable enough to be persuasively communicated.

Our review of research on design, knowledge creation, and creative work, in contrast, showed that
those subdisciplines are interested in processes and interactions that occur while ideas are in flux—for instance, before there is consensus about them or while creators are developing them. Those subdisciplines ask questions aimed at understanding the processes of emergence, of conflict and consensus building, and of change or development. For example, design research has aimed to understand how solutions to ill-defined problems evolve (Buchanan, 1992; Inie & Dalsgaard, 2017), often through how designers interact with material objects, like mood boards or drawings. It makes sense to explore such questions from a wave view because it is difficult to know at what point a sketch or drawing “becomes an idea.” Even if researchers took the finished sketch as a resting point, they could not observe how the idea developed from looking at it because the sketch “is also changed and developed, as the idea is being articulated and developed,” and what is observed is not a mere illustration of an idea but “a conversation between the designer and the drawing” (Ewenstein & Whyte, 2007: 698). In these studies, researchers need to be wary of applying a particle view to a wave research question, for example, by arbitrarily segmenting interactions or dialogues into ideas or becoming too fixated on ideas as focal objects at times when ideas do not have stable identities, thus missing the important activities around ideas. Instead, they would probably need to study the idea in flux. One challenge is for researchers with a predominant approach, who want to ask questions better suited to the alternative view, to supplement their understanding and learn to adequately adopt the other view. For instance, researchers across both approaches increasingly acknowledge the fundamental messiness of the creative process. Attempting to capture that messiness from a particle view is inherently limiting. However, adopting the questions and methods of the alternative view alone will not be enough to uncover the wholeness of the phenomenon. For example, a researcher embedded in the particle view who turns to questions about the process of idea development is likely to focus more narrowly on how ideas mature, as the particle view assumes that they become more elaborated and polished if and when they change over time (e.g., Berg, 2016). From a wave view, however, ideas can move in different directions—they may become more ambiguous or less well suited for a given problem over time. A particle-oriented researcher may not expect or look for those directions, and hence they might be missed, ignored, or considered errors or deviations. Likewise, even in an ongoing creative process that would typically be studied from a wave view, there will be moments when creators will engage with ideas in a more or less stable state. For example, theatrical or musical improvisations may eventually crystallize into drafts of pieces, which requires some decision-making as to which ideas to retain. This means that creators must be able to identify and discuss ideas. Studying these discussion and decision-making processes might benefit from adopting more of a particle view. As such, this situation is somewhat comparable to discourse analysis (e.g., Graesser, Millis, & Zwaan, 1997), where the emphasis is not on individual linguistic elements but on the whole of a conversation as it unfolds over time—and yet, sometimes individual speech acts are studied in isolation, and some questions can only be answered by focusing on specific utterances, or even discrete elements of utterances.

Importantly, it will not always be clear when it might be helpful or necessary to consider shifting to another view, because researchers may disregard certain phenomena as “errors” within their default paradigm. An example of this was discussed above (Rietzschel et al., 2006), where idea selection was studied from a strong particle view, thus posing difficulties when participants displayed behaviors (e.g., combining ideas into new ones during the selection phase) that did not fit this approach. Rather than treating this as an “error” or “noise” in the data, researchers confronted with such unruly responses might realize that these were instances of ideas in flux, and that a wave view might be more helpful in uncovering and describing the dynamics of those behaviors. Conversely, when working in a more wave-oriented tradition, ideas at rest may not seem the most interesting things to focus on, because these do not capture the dynamics of the process and thus stability might be mistaken for stasis. However, these temporarily stable ideas may contain crucial information about where the process is and may well play a decisive role in whether the process will go afterward—such as when a group or team takes stock of the ideas that have been floating around in various forms in order to decide which ones to drop or pursue.

**Can the idea be commonly understood by various stakeholders?** In deciding if the particle or wave view is more appropriate, researchers also need to consider whether people working on or considering the idea have (or can develop) a shared perception of the nature and content of the idea. A particle view is generally more suited for answering questions about creativity when this is indeed the case. For example, since in brainstorming studies ideas tend to be brief and specific statements (e.g., “make textbooks...
available online”), there is less ambiguity or less need to integrate different interpretations, and it is sensible to assume that an idea can be commonly understood. Our review showed how brainstorming studies often take this approach by asking a set of raters to judge and agree on their semantic content, novelty, or usefulness. Similarly, a particle approach can be useful where people receiving ideas can be assumed to have an equal ability to understand the idea. For example, innovation research that uses measures of impact like citation counts of published papers has assumed that other scientists have a similar understanding of those papers, even if their judgments of the value of the ideas may differ. Where those considering an idea similarly have a reasonable level of expertise in a given subject, that assumption is likely to hold—for example, organizational members from the same department, performing the same function, who make suggestions for a procedural change are likely to share a similar understanding of the idea.

Yet, organizational members who hold different specialized functions, and therefore have different levels of expertise in a domain, may not understand the idea in the same way. When there is no common understanding to guide people’s interpretation of an idea, it may be more appropriate to adopt a wave view, as is the case with many studies of creative work, design, and knowledge creation, which have viewed ideas as being located in the interactions between people, where those interactions shape and create new meaning. A wave view further implies that it is the very fact that people diverge in their understandings that allows new ideas to emerge (e.g., Majchrzak et al., 2012; Tsoukas, 2009). This view thus allows researchers to investigate research questions concerning how consensus is built and emerges around what the idea is (e.g., Drazin et al., 1999; Harvey & Mueller, 2021). In addition, questions around how ideas develop may be suited to a wave view, because while an idea is developing and creators disagree over it, they are unlikely to share a common understanding of it.

A challenge in deciding which view to adopt is that the extent to which an idea is open to interpretation is not often easily or cleanly determined, as it depends on many factors and can change during the creative process. For example, an idea for a piece of art may be more open to interpretation than an idea for a scientific manuscript. It will also vary depending on context; for example, the expertise of the audience will influence their ability to understand the idea. Similarly, where the idea is in its developmental trajectory will influence whether it can be commonly understood, with vague, emergent ideas being more open to interpretation than detailed ideas that are close to implementation. At some point, an idea becomes agreed upon, and at that point, it transitions to an outcome or product, like new knowledge that is articulated in a research paper, a stream of research that converges, or a finished prototype for a new product. However, the knowledge may transition back to an idea when an expert from another field challenges it, reopening the knowledge to interpretation. In deciding which view to utilize, the more interpretative degrees of freedom there are for a given idea, the more likely it is that a wave view is appropriate. Ideas that are highly open to interpretation (and which cannot be said to have one specific meaning or content) cannot as fruitfully be studied in isolation, nor can they be sensibly coded or rated (e.g., for content or quality) in a context- and rater-independent way.

Using the Duality to Reconcile Apparent Conflicts in the Literature

The second principle we propose for using the wave–particle duality is that, since both are necessary to understand the phenomenon, they should not be framed as competing views. There are instances where the literature may appear to be in conflict. For example, if we had assumed a dichotomy in our discussion above regarding when ideas are in flux and when they can be commonly understood, the particle and wave views would seem to be in competition. These issues are easily perceived or framed as conflicts when, in fact, it is the dual nature of ideas that creates a disconnect. This may also be partly because the wave view is often framed as a reaction against or as an alternative to the dominant particle view (Glaveanu, 2014b). That is limiting in at least two interrelated ways. First, it means that the wave view highlights what ideas are not (e.g., not discrete, not stable) rather than explaining what ideas are. Second, it makes it difficult to understand how particle researchers can use the wave view in their research. We elaborate two such disconnects below, revolving around (a) the product versus process view of creativity and innovation, and (b) comparing the magnitude of ideas.

Product versus process. Prior work has debated the value of focusing on the products that result from a creative process or on the process that produces them (Simonton, 2003). Our duality suggests that this is a false dichotomy, showing how both are critical for understanding ideas, but also disentangles the two. In its most extreme form, because the particle
view emphasizes capturing, measuring, and comparing ideas, it implies that the process for producing those particles need not be studied at all—that is, a meaningful understanding of ideas can be obtained by considering the ideas themselves, the inputs into them, and perhaps the context surrounding them. However, even where process is considered, research on creativity and innovation has assumed that only those processes that result in ideas judged to be creative or innovative are worth considering (e.g., Baer, 2012; Levitt, 1963). From a wave view, however, that exclusive focus does not make sense, because wave ideas cannot be readily captured, compared, and judged. Instead, the wave view suggests that whether an idea is in the process of developing itself is important, even if something judged to be creative never develops.

This means that as a community, we need to expand research to cover all processes of developing ideas, not only those for producing a creative idea. For instance, rather than asking how people generate and select ideas that are high in novelty and usefulness (e.g., Mueller et al., 2012; Rietzschel, Nijstad, & Stroebe, 2010), we should also ask how people engage in creative work in situ, as is more common in studies of creative work (e.g., Long-Lingo & O’Mahony, 2010; Svejenova, Planellas, & Vives, 2010). Expanding our understanding of process is important because that research has uncovered parts of the process that have not been previously theorized about or studied, such as collaboration (Harisson & Rouse, 2014; Vera & Crossan, 2005) and problem construction (Getzels, 1975). Those processes may be critical to ideas but less directly tied to specific ideas. They may therefore be obscured from studies of novel and useful ideas.

At the same time, however, once we expand our view of the processes involved in developing ideas, we may want to systematically capture and compare some aspects of those processes and how ideas associate with them at different stages. The particle view can thus subsequently expand the wave view to capture the fullness of this phenomenon. This calls for greater attention to how the particle and wave views can be productively combined, rather than cast against one another. This is illustrated by research on feedback. Dominant models of the creative process have omitted feedback as a stage in the creative process (e.g., Amabile, 1996). Studies on creative work (Harrison & Rouse, 2015) and entrepreneurship (Grimes, 2018) have shown that whereas feedback does not dominate any stage, it is intertwined throughout. Yet, how to incorporate it into stage models is unclear—including it as a distinct stage or treating it as an input to other stages of activity may not represent the phenomenon well. Instead, it may be that feedback is how the idea actually forms—it may be idea generation or evaluation, rather than something that fuels those processes. Research is needed to disentangle those options.

Comparing the magnitude of ideas. Scholars have also debated whether to study major, radical ideas that depart from the status quo or to include daily acts of creativity in research (Merrotsy, 2013). This debate revolves around the question of which creative expressions count as “ideas.” Individual moments of creative insight during a learning process, which Kaufman and Beghetto (2009) labeled “mini-c” creativity, have rarely been studied as ideas, yet they overlap considerably with a wave view of ideas. The duality framework suggests that whether some creative acts, insights, or experiences “count” as ideas presents a false dichotomy (see also Runco, 2014). Our review has revealed how, from a wave view, quotidian acts of creativity, such as reframing or reinterpreting another creator’s comment (Tsoukas, 2009), represent the development of an idea. Nonetheless, it does not make sense to compare the magnitude of such moments, because how can one know whether they are comparable? If we keep the wave–particle duality in mind, we can avoid comparing across things that are, in effect, incomparable. Moreover, if creativity is a judgment or reaction from others, then we can only see the magnitude of creative outputs when the wave has “finished” (and others have responded). Thus, to study whether something is big C or little c (or mini-c) is really to study the way that others have responded to and judged ideas (Csikszentmihalyi, 1999). The “meaning” and “quality” of an idea, in this view, are not exclusively located within the idea itself, but emerge from the interaction of the idea with other observers, co-creators, stakeholders, and so on.

Using the Duality Framework to Expand Our Understanding of Ideas

The third principle we propose in applying the wave–particle duality is that the two views should be used to expand the scope of research on ideas, creating new possibilities for research. We propose three ways that our understanding of ideas can be expanded: points considered in the creative process, forms of creativity studied, and expanded conversations with practitioners.
**Expanding the number of points studied in the creative process.** Applying the particle view to research that has adopted a wave view suggests that there may be additional points where ideas could be captured and meaningfully studied. Consider some particle ideas that existing research might examine—a novelist is inspired by a landscape and jots down a note for a book, an employee suggests a new training program during a conversation with a manager, and an improvisational group agrees on a theme for a performance. In each example, creators have reached a temporary end point—the note, the training program, and the theme could all be examined as particle ideas, and variance in their quantity or quality could be studied. Yet, there are more points to consider in the process than is typically recognized. The note is a resting point until the novelist returns to it, when it may get fleshed out into a full concept that is passed on to an agent; it then reaches another temporary resting point. The training program can be considered a particle when it is suggested or when it is recognized by the manager.

Ideas considered at different points lend themselves to different questions. For example, we can ask which of all the suggested ideas a manager takes into consideration, or we can ask which of the ideas are evaluated as novel or useful. Points worthy of study that have received less attention in prior research include moments when a problem is first presented, when creators begin to interact with materials (e.g., when they begin sketching an idea out), or when creative activity pauses (e.g., when there is a creative block). By considering the full range of places in the process where ideas are temporarily stable, future research can open up new points to study.

These examples also illustrate that researchers who have traditionally adopted a particle view should consider at what point they are capturing an idea. Our review has shown how prior research has captured ideas at different points in their development—innovation research has captured them when they are implemented in prototypes or products, creativity research has captured them when they are first discussed with managers or peers, and brainstorming research has captured them when they are first generated. For the purpose of theorizing about ideas, those points have been treated as if they are equal. For example, brainstorming research has typically treated the point at which groups move from generating ideas to implementation in a form like a sketch or prototype as the end of idea generation, whereas design research would consider sketching ideas or developing prototypes as part of the idea generating process. This is also evident across literatures—an idea considered ready for implementation can actually look very different in a creativity and an innovation study and are thus not necessarily comparable. These are different interim endpoints, and it is problematic to treat them as interchangeable.

**Expanding the forms and value of ideas studied.** One striking observation from our review is that ideas come in many forms, with some forms more prevalent in a particle view and others more so in a wave view. Attending to both views can lead to new insights on how ideas cycle through different forms and their influence on other organizationally important processes (e.g., different forms require different types of championing to be accepted). Among the studies we reviewed, forms include: vague intentions (e.g., Bird, 1988; Obstfeld, 2012), moods or feelings (e.g., Stephens, 2020; Stigliani & Ravasi, 2018), performances (e.g., Sawyer, 1992), new ways of seeing (e.g., Hargadon & Bechky, 2006; Uzzi & Spiro, 2005), and concrete outputs (e.g., Singh & Fleming, 2010). Some research has treated particular forms as distinct manifestations of creativity—for example, emphasizing the unique nature of improvisational creativity (Fisher & Barrett, 2019) or physical prototypes (Carlile, 2002). For the most part, however, differences in form have been described as elaborations that do not substantively change the idea.

Our review suggests that attending to differences in forms may be insightful for understanding ideas and their development, and provides a way to understand differences between forms as combinations of the defining features of ideas. For instance, research to date has generally focused on situations where the form of a final idea to be generated is known by creators—such as when creators are asked to produce an idea for a new product or service (e.g., Berg, 2019; Goncalo & Staw, 2006)—but it may be productive to consider situations where the task or goal is open-ended. For example, research may consider how not knowing the final form of an idea shapes the way creators engage with that idea. A further opportunity is to consider when, why, and how forms change over time.

Finally, existing research has excluded some potential ideas by focusing on new ideas and adopting a strong particle view of what ideas are. Whereas the strong consensus that creativity is the production of ideas that are both novel and useful has greatly benefited creativity research (Amabile, 1988; George, 2007; Hennessey, Amabile & Mueller, 2011; Woodman et al., 1993), it also implies that those ideas that
are not new have no value and are not worthy of study. Paradoxically, that criterion has devalued activities that are clearly in the domain of creativity or innovation but may struggle to meet the novelty criterion, including more mundane activities within the creative industries (e.g., Caves, 2000), personal expressions of creativity (e.g., McNiff, 2015), or activities that laypeople would consider to be creative (e.g., Gläveanu, 2014a). Indeed, much of what laypeople consider creative is craft that they are unfamiliar with (e.g., a novel and interesting sounding guitar solo may be an established scale or riff). Consider, for example, actors, singers, orchestra musicians, chefs, artisan bakers, choir members, and hobby knitters. Although all of these examples involve some novelty (such as interpreting and acting out a role, or choosing how to season a recipe one is reproducing), the dominant creativity paradigm would either not consider these to be ideas at all (e.g., a new musical composition is an idea, but one’s interpretation in playing an existing composition is not seen as an idea) or see them as incremental changes that may be uninteresting to study.

The wave–particle duality broadens the scope of where to look for ideas, demonstrating that creative endeavors involving creative expression rather than creative production also involve ideas. When one acts out a scene from Shakespeare, one embodies a representation of a character and an action that is open to interpretation as it is communicated to the audience; while knitting, one not only develops a material representation of a pattern that is unfinished until the final stitch is made, but also interacts with the physical materials in a way that may change one’s perception of the task and its outcome. These are all legitimate phenomena of study for understanding how ideas emerge, develop, and change, where they are located, and who develops them. A core finding of our work, then, is that ideas need not be novel—in fact, for most of history, novelty was not considered to be an important feature of ideas. Novelty has primarily been considered important because only novel ideas are thought to have economic value. Our review suggests a shift away from studying creativity toward studying ideas.

**Better informing research–practice conversations.** Much research in creativity and innovation has an applied focus. However, like other fields in psychology and management, a research–practice gap is visible here (e.g., Benedek et al., 2014; Rainone et al., 2021). Creativity researchers and practitioners, although their goals and interests are aligned, have not always approached the field with the same set of assumptions or questions. This can lead to an unsatisfactory mismatch in, for example, the way that research results are interpreted and used to inform practice—or the way creative techniques and interventions are assessed or studied. Being aware of, and making explicit, the wave or particle assumptions researchers and practitioners bring to their communications could lead to a more informed conversation and better progress on both sides of the divide.

A good example of a research–practice mismatch is the field of brainstorming. Ever since Osborn’s (1963) original claim that people would be more productive when working in a group than when working alone, researchers have been testing and refuting this claim and devising social-cognitive models of the process to explain productivity loss in groups (for an overview, see Stroebe, Nijstad, and Rietzschel, 2010). The general conclusion of this research is that group brainstorming does not work, since people are less productive when brainstorming in groups without measures to avoid production blocking, like electronic brainstorming. The underlying assumption is that the effectiveness of group brainstorming is best measured in terms of the number of ideas generated (a particle view), since this is what the technique was intended to stimulate, and is, by extension, presumably the reason practitioners use brainstorming. In practice, however, this is far from obvious. Sutton and Hargadon (1996) found that brainstorming was used for a variety of purposes, many of which did not link with ideational fluency, such as developing stronger group transactive memory. Isaksen (1998) argued that although research on group brainstorming has produced important insights regarding group processes and idea generation, most of this research does not constitute an actual test of brainstorming’s effectiveness as an ideational tool, since studies have differed so strongly from the way brainstorming is used in practice (for example, problems are presented to research participants, whereas they are usually discovered or developed in practice). These criticisms suggest that the research–practice gap in brainstorming may be partly due to the strong particle approach adopted in brainstorming research, which does not correspond with the more dynamic and process-based approach taken by practitioners. The result of this mismatch is that both researchers and practitioners seem dissatisfied with the state of things: researchers wonder why group brainstorming remains so popular, and practitioners wonder why researchers insist on using an impoverished version of the task.

The wave–particle duality could help to resolve such debates and mutual dissatisfaction because it
would allow both sides to identify their own and the other’s assumptions, as well as the limitations that result from these assumptions. A particle approach is highly suitable for testing claims regarding ideational fluency but may not work as well to assess effectiveness on other more process-based outcomes; moreover, adopting a particle approach requires structuring the creative task in such a way that ideas can be counted and coded. However, this may preclude more dynamic processes involving problem discovery and the combination, refinement, or development of ideas. Conversely, maintaining a strict wave view means that certain problems (such as production blocking in brainstorming groups, or differences in ideational fluency between groups working under different circumstances) are not—and probably cannot be—addressed, which can lead to missed opportunities for improving practice. Thus, a mutually informative conversation between research and practice could benefit from a more explicit consideration of the duality identified and analyzed in this paper.

CONCLUSION

In this review, we explored how ideas have been conceptualized and operationalized across disciplines. The wave–particle duality framework we developed to integrate across disciplines aims to further research on ideas and contribute to the development of sound practices for generating and assessing ideas. Creative ideas remain essential to any change process, be it organizational, personal, or societal. Just as builders need deep knowledge of the kinds of bricks they are working with (to employ a particle-oriented metaphor), those involved in creative change will benefit from a deeper understanding of the units of ideation they hope to encounter, elicit, encourage, and ultimately build upon. Our hope is that this review provides that foundation and helps to integrate research on ideas across the different fields of study.

REFERENCES


Harvey, S. 2013. A different perspective: The multiple effects of deep level diversity on group creativity.


---

Mel Hua 华莹莹 (mel.hua@insead.edu) is a research fellow at INSEAD and the World Economic Forum. She received her PhD from University College London. Her research interests lie at the intersection of creativity, innovation, and sustainability; focusing on how people interpret and assess the value of new ideas.

Sarah Harvey (sarah.r.harvey@ucl.ac.uk) is an associate professor in the Organizations and Innovation group at the UCL School of Management. She received her PhD from the London Business School. Her research focuses on creativity and the dynamic processes through which individuals and groups engage in creative work.

Eric Rietzschel (e.f.rietzschel@rug.nl) is an assistant professor in work and organizational psychology at the University of Groningen. His research interests revolve around creativity and innovation; he is particularly interested in what happens to creative ideas after they have been generated.