

INTRODUCTION

In this book I describe the nature of creative development of individuals engaged in creative endeavors. I define creative development to be the process of development and creative activities of an individual engaged in a creative endeavor, extending over a period of time, usually several years or longer. Creative development encompasses processes, experiences, and structures that lay the foundation for creativity, as well as the generation of creativity in its myriad forms — including ideas, insights, and discoveries, and the engagement in creative projects, leading to creative contributions.

The organizing principle and central theme of this book is that the creative development of an individual engaged in creative endeavors, across a wide range of fields, has a basic structure, which centers on, is based in, and grows out of his creative interests. More specifically, as I describe it, an individual's creative development is based in, centers on, and grows out of his creative interests, his conceptions of his creative interests, and conceptual structures he builds up in the domains of his interests which guide him in his development, are generative of his creativity, and are the basis for his creative projects, thus a fundamental source and basis of his creative contributions to society. Creative interests, as I describe them, are distinctive domains or topics that individuals define for themselves.

I describe and characterize creative interests and conceptions of creative interests; describe the formation of creative interests; and describe fundamental processes through which individuals develop their interests creatively — processes through which their interests and the conceptual structures they build up in the domains of their interests are generative of their creativity and creative projects, including ways in which they are guided in their development

2 by their conceptions of their interests and associated principles and values. Then I extend my description, describing project work, multiple interests as the basis for creativity, patterns of projects rooted in interests, and longer term processes of creative development, including the evolution of creative interests and conceptions of interests, and sequences of interests. Finally, I discuss difficulties of creative development, and the implications of my description for understanding and modeling cultural development.

Woven through my description I present many examples describing the creative developments of individuals whose developments I have analyzed, illustrating the description and providing evidence in support of it. These include individuals famous for their creative contributions whose creative developments I have analyzed drawing upon biographical and primary sources, including Virginia Woolf, John Maynard Keynes, Charles Darwin, Alexander Calder, Albert Einstein, Thomas Edison, Hannah Arendt, Hans Krebs, Galileo, William Faulkner, Ray Kroc, Tim Berners-Lee, Piet Mondrian, Pierre Omidyar, and others; and individuals drawn from several fields, mainly academic but not only so, whom I interviewed about their development, and for whom I also obtained and have drawn upon source materials. In the examples I describe individuals' creative interests and their conceptions of their interests, as they described them or I reconstruct them, and how their interests, conceptions of interests, and conceptual structures they built up in their interest domains were, and in some cases continue to be, the bases for their creativity and creative contributions. I also describe their formation of their interests and paths of development. I discuss the empirical basis for my description, including sources of information and information about the set of individuals I interviewed, later in this chapter, and list the individuals I interviewed and source materials I have drawn upon in analyzing their developments in the Appendix.

In describing creativity as based in and growing out of a process of development I follow and build on the great tradition of biography. I also follow and build on a smaller but important tradition in the literature on creativity describing and tracing individuals in their creative work over time, describing creativity as rooted in and emerging out of a process of development. What I add to both traditions is a conceptual framework for describing creative development — a theoretical structure that manifests and describes general features of creative development. In turn this enables the developments of different individuals, in different fields, to be described within a common framework.

Descriptions of creativity often focus on peak creative moments of insight, idea generation, and discovery, depicting creativity as a sudden flash of illumination or discovery. This continues to be the common view of creativity and dominant focus in the literature on creativity. Although peak creative moments

definitely do occur and are important, they are just one element in a larger process. To focus only on them, and ignore the larger, rich process in which they are embedded and out of which they emerge, skews our understanding of the nature of creativity, specifically its context and conceptual basis. The framework presented in this book delineates specific processes and structures of creative development that are the source and basis of generation of several principal forms of creativity leading to creative contributions. In particular it delineates and thus shows how individuals' ideas, insights, and contributions are rooted in creative interests they form, explore, and strive to develop creatively, including projects they undertake based in their interests, and conceptual structures they build up in the domains of their interests. These roots and bases are by no means evident on the surface: the creative interests that are the basis of individuals' creativity and contributions are often not clearly visible in their contributions, which emerge often through a long process of development, so that the importance of the interests that underlie them is masked. I have as a principal aim to manifest these linkages, to show that creative interests are the basis for creativity generation and creative contributions.

In the conceptual framework presented in this book individuals, through defining their own interests and pursuing the exploration and creative development of their interests, define, at least to a degree, their own paths of creative development. An individual's creative development is thus, at least to some degree, an autonomous activity — an important addendum being the importance of creative collaborations, and another being practical requirements, for example resources. Of course random events and experiences, such as chance encounters, have important roles, which I describe — but within a larger, self-defined, self-guided process. Further, the originality of individuals' contributions is rooted in their interests and the paths they define and follow pursuing their interests, thus in their own self-defined paths of development. As I describe, individuals' creative interests are generally distinctive, even unique — even within a field and a cohort of individuals in a field each individual typically forms a different, distinctive interest; the creative interests I present and describe as examples illustrate this point. In defining a distinctive interest or set of interests, then defining and following a unique path of development pursuing the exploration and creative development of his interests, an individual has a unique set of experiences and encounters, and builds up distinctive conceptual structures in the domains of his interests. These experiences and structures are the basis of his creativity — his ideas, insights, and discoveries, which in turn are the basis of his distinctive, original contributions. Thus an individual's creativity and the originality of his contributions is rooted in the distinctiveness of his interests and the path he follows pursuing their development.

4 The description of creative development in this book includes, as an important facet, channels through which individuals are influenced in their creative development by their culture and the world around them — channels that are not recognized or described in standard accounts of cultural transmission, at least not in the same way. The most distinctive channel of cultural transmission described in the book is that which occurs through individuals' formation of their creative interests. Creative interests originate in individuals' engagement with the world, sparked by specific experiences and elements they encounter. Cultural elements and experiences are the basis for many creative interests, making this a main pathway of cultural transmission and influence. Because these cultural elements and experiences influence an individual at such an early stage in his development, and their influence is transmitted indirectly, by and through his creative interests, their influence, important and pervasive as it is, is nonetheless often not readily apparent in his subsequent projects, ideas, and contributions. To identify these cultural linkages we must trace an individual's development with care, beginning far before his main contributions, at the time when he forms his main creative interests.

Additional channels of cultural transmission and influence I describe arise during exploration and development of interests. Notably, elements and experiences spark creative responses, and individuals build up rich conceptual structures in the domains of their interests out of elements they encounter, that in turn are generative of their ideas and insights.

Beyond describing channels of cultural transmission, the description in this book provides a basis for describing cultural development. Cultural development — the progress of civilization — has its primary source, ultimately, in creative contributions made by people in all walks of life. A well-grounded description of cultural development thus must be based in a description of individual creativity. The description in this book points towards such a description: a model describing cultural development based in individuals' creative developments and creative activities.

AN OVERVIEW OF THE DESCRIPTION OF CREATIVE DEVELOPMENT

The core of creative development consists of three steps: the formation of a creative interest, including a conception of the interest; the process of exploring the interest and developing it creatively; and, in the continuation of this second step, the defining and execution of projects rooted in the interest and growing out of its development, leading to creative works and contributions. I focus on describing the first two steps, then extend my description to include the third step and larger patterns of development. In this section I sketch main

features of my description, providing an overview of creative development as I describe it. At the end of the section I outline the organization of the book.

Individuals form their creative interests in and through their engagement with the world around them. In the course of their lives individuals have many experiences and encounter myriad elements of diverse kinds. They have many social interactions and personal experiences, witness and learn about many events, encounter and learn about a great variety of phenomena, are exposed to and learn or learn about a great multitude of concepts, facts, ideas, theories, beliefs, experiments and experimental results, methods, styles, and approaches, and are exposed to, learn about, and study the creative works and contributions of many people, both in their field and their culture. Out of the vast numbers of experiences they have and elements they encounter and learn about, a small number of distinct elements or experiences — or clusters of interrelated elements or experiences, or, in the case of complex experiences and elements, a particular aspect or a few component elements — catch their attention and stand out, spark their interest, and spark a response in them.¹ They form their creative interests in response to and based upon these experiences and elements.

Individuals are most open to forming interests during periods of their development when they are most open to the world and their experiences. Often this is just after they enter their chosen field or a new field, when they are actively learning about the field and encounter many elements in it that are new to them — they often form creative interests during these periods.

In forming their creative interests, especially in the initial stages responding to experiences and elements they encounter, individuals generally respond intuitively and spontaneously to what excites and interests them. Their responses are not rationally planned out, and often they know only a little bit about a topic or set of elements at the time they form an interest in or based upon the topic or elements. Interests are primarily rooted in and generated by intrinsic interest: individuals find their interests interesting, exciting, fascinating, challenging — that is why they form them as interests and wish to pursue them. I describe a variety of sources of intrinsic interest in Chapter 4. Extrinsic factors also have a role in the formation of interests, including individuals' decisions about which interests to pursue. The two main extrinsic factors are (1) the sense of openness and creative potential — the sense that an interest holds opportunities for fruitful creative development, and (2) the sense that an

¹Registers of meaning individuals have, based on previous life experiences, often contribute to the sparking of their interests. I discuss registers of meaning in Chapter 3.

6 interest is potentially important, that contributions generated through pursuing it are likely to be significant and important for one's field and society.

Beginning from their initial interests, individuals form more defined creative interests, which form the basis for their development going forward. A key step in the process of forming a more fully defined creative interest is forming a conception of one's interest. An individual may or may not form a conception of his interest at the time he forms an initial, incipient interest; if he does, it may well be quite rudimentary, or alternatively, as occurs in some cases, he may have a quite clear conception of his interest from early on. Over time, as an individual thinks about his interest, reflects upon it, makes connections among different concepts, ideas, images, works, phenomena, facts, and other elements that fit with it, and imagines it more fully, he develops his interest conceptually, and it becomes clearer, more integrative and more coherent; as part of this process, and generative of it, he forms a fuller conception of it.

In general an individual's conception of his interest develops together with his interest, each developing in stages. There are different patterns of development of interests and conceptions of interests. Thus, in many cases an individual's interest and conception begin as relatively simple and become richer. In some cases an individual's initial interest and conception are narrowly focused, centering on specific elements and experiences, then expand out to define a broader, richer domain; in other cases his interest begins as more general, then he narrows his focus.

Individuals conceive of their creative interests as domains filled with creative possibilities, filled with promise. They desire to learn about them and explore them, and to develop them creatively. They believe or at least hope that through exploring their interests and striving to develop them creatively they will be able to define and pursue creative projects and ultimately make contributions to their field and society. However, individuals do not at the time they form a creative interest have a clear sense for how they will go about developing their interest creatively, or what they will discover, what ideas they will generate, and what contributions they will ultimately come to make through pursuing it and striving to develop it. There are many possibilities, many possible paths of development they may follow; their interest is defined in a relatively open-ended way. Their conceptions reflect this, conveying, as they describe them, a sense of openness.

Creative interests have a striking combination of characteristics. They are distinctive, even unique. Yet they are also broad, broader than individual projects or ideas, defining domains that can be explored and developed in many different ways. These two characteristics, distinctiveness and breadth, are to some degree in tension with one another. The combination of the two

is central to defining creative interests as a theoretical construct, in particular defining creative interests as intermediate level conceptual structures; I describe what I mean by this in the next chapter. Distinctiveness and breadth are powerful in combination, and jointly they are integral to the central roles creative interests have in creative development. The many examples of creative interests presented in this book, in particular individuals' descriptions of their conceptions of their interests and my reconstructions of individuals' interests, exhibit distinctiveness and breadth, demonstrating that creative interests possess these characteristics.

My description of creative interests to a degree follows and builds upon the commonplace idea of an interest; however, it also challenges conventional ideas about interests and differs in significant respects from them. It is a commonplace that individuals engaged in creative endeavors have creative interests; indeed individuals engaged in creative endeavors frequently mention their creative interests in discussing their creative activities. The commonplace view of creative interests is valuable as a point of departure, in providing an intuitive sense of creative activity rooted in interests. However, it is also misleading and deficient in some important respects, and I believe as a result can hinder — and has done so — our understanding and appreciation of the true nature of creative interests and their role and significance in creative development.

There are two fundamental ways in which my description is distinct from conventional notions and goes beyond them. One is in the idea of a conception of a creative interest. I do not believe it has been widely understood that individuals form conceptions of their creative interests. In fact individuals do form such conceptions; I present many examples of individuals' descriptions of their conceptions of their interests. Further, their conceptions of their interests are central to their creative development, guiding them in their development, and are conceptual cores around which they form conceptual structures in their interest domains which are vital bases of their creativity generation. The other concerns the nature of interests. Conventionally interests are often viewed as being simple, conventional subjects. This intuition is misleading with regard to creative interests. I define creative interests somewhat differently, as distinctive topics that individuals define for themselves, thus inherently more creative. And I show how important such distinctive interests are as the basis of original ideas, discoveries, insights, and projects, leading to creative contributions; appreciating the distinctiveness of interests is thus critical for appreciating their role in creative development.

Having formed a creative interest or set of creative interests, and conceptions of his interests, an individual explores his interests and strives to develop

8 them creatively. His interests are the focus of his attention, thinking, and creative activity, at the core of his creative development.

Through exploring and learning about a creative interest an individual learns of and about many elements that fit in its domain or are connected with it — for example, creative works, ideas, concepts, theories, facts, phenomena, and images. His attention is drawn by elements, aspects of his experiences, and events that fit and connect with his interest, he notices and focuses on them, and forms internal representations of them. Through these processes of learning, attention, and internalization the individual builds up a conceptual structure in the domain of his interest. His conception of his interest sits at the center of this developing conceptual structure, guides his attention and learning, and is important in providing a core structure around which other elements coalesce, building associations and linkages, creating an integrative conceptual structure.

Individuals' creative interests, specifically the conceptual structures that encode their interests and that they build up in the domains of their interests, are a fundamental basis for their creativity generation. During periods when individuals are engaged in exploring their interests and seeking ways to develop them creatively, these structures are the principal basis for their creativity. A main process through which individuals generate ideas during these periods is through creative responses they make, sparked by specific experiences and elements they encounter that connect with their interests, thus responses mediated by the conceptual structures in their minds associated with their interests. Creative responses spark many important ideas and projects, generating creative opportunities individuals pursue. I present a series of examples of creative responses, including responses by Alexander Calder, Tim Berners-Lee, John Maynard Keynes, and several of the individuals I interviewed.

The conceptual structures that encode creative interests and that individuals build up in their interest domains mediate their creative responses through a combination of two processes. First, they guide individuals' attention, leading them to notice and focus on specific experiences and elements — or particular aspects of them — that connect in some way with one of their interests. Second, they are central for individuals' processing in the wake of an initial response, triggering associations and creative links of thinking leading to further creative ideas and insights. Individuals' creative interests, encoded in their minds, provide unique perspectives, enabling them to recognize and respond in distinctive ways to experiences and elements they encounter, to make creative connections that others fail to make, that are thus original. For example, an individual may recognize the importance of a particular aspect of a

phenomenon that others have overlooked, because it connects with one of his interests in an interesting way.

Individuals build up rich conceptual structures in the domains of their interests over time. These rich structures are generative of creativity through a variety of pathways. They are generative of creative responses; for example, Ray Kroc generated a creative response rooted in expertise he had built up over many years of work. They are also the basis for generalizations: noticing and recognizing a general pattern, principle, or relationship among a set of elements in one's interest domain. Charles Darwin's insight that the principle of transmutation of species might be a basis for explaining and modeling patterns of characteristics of allied and related species, and changes in species over time, is a classic example, described in Chapter 10. Finally, rich conceptual structures of creative interests are generative of creative connections among specific elements; a classic example is Samuel Taylor Coleridge's process of creation for his great poems, notably "The Rime of the Ancient Mariner," also described in Chapter 10. I call the rich conceptual reservoirs individuals build up in the domains of their interests creative expertise.

The third phase of creative development is engagement in creative projects. In general individuals develop their projects out of their creative interests. In many cases an individual develops an idea for a project through one of the processes described above. Thus, for example, one common pattern of development is for an individual to generate an idea for a project through a creative response. In some cases an individual develops a project based on an opportunity he uncovers exploring his interest. In other cases an individual is offered a project, for example by a manager or senior colleague, that fits with his interest — or that he modifies to fit with it — which he then pursues. Finally, individuals develop projects in collaboration with one another, in the overlap of their interests; such collaborative projects are often rooted in creative ideas generated through a form of creative response — two individuals encountering one another, their engagement sparking an idea. Making the transition from exploration of interests to projects is crucial and can be difficult, both because of the difficulty in defining a project one wishes to pursue and because in choosing to pursue a project one narrows one's focus and passes over many other possibilities.

Individuals who are actively engaged in projects are generally quite inwardly focused, far more so than in periods when they are forming interests and exploring their interests and seeking ways to develop them — they are focused on tasks and task completion. Thus they are less open to their environment, except insofar as it is useful to them in their projects, for example in solving a problem

10 they confront. Individuals can be extremely creative in project work. I discuss a number of creative processes that are important in project work. One is the generation of creative responses — having a project in mind, then having an experience or encountering an element that has a connection with the project, and triggers an idea for it. Other processes I describe are discovery, creative problem solving, and revisioning. I show by example that in many cases creativity generated through these processes is rooted, at least in part, in the creative interest that is the basis for the project, thus generating a link with the interest.

Projects are crucial to creative work: in the course of pursuing a project an individual is in many cases taken far beyond the interest that was the basis for the project, and beyond his original conception for the project, generating ideas and making discoveries he did not imagine. Yet regardless of how far beyond their interests individuals are led in pursuing their projects, their interests nevertheless are the basis of their projects. Thus, to understand how an individual comes to pursue a given project we must go back further, and identify his creative interest or interests that led him to come upon it or generate the idea for it.

In addition to their creative interests being generative of their creativity and the basis of their projects, individuals' conceptions of their interests are crucial in guiding them in their development. Their conceptions guide them in exploring their interests, and in their decision-making about which projects to undertake and, more broadly, which interests to pursue. Their conceptions also shape the way they conceive and define their projects and are important to their work on projects. Pierre Omidyar's values, connected with his interest in promoting and developing fair systems of exchange, were a vital factor in the way he developed his Internet auction site that became eBay. Piet Mondrian's conception of a new art form, rooted in philosophical ideals and principles, was crucial in guiding him in his artistic development.

In engaging in a creative endeavor an individual undertakes a process of development that is often fraught with uncertainty, following a path that has never been traveled before. To have the best chance of making contributions that fulfill his potential and the potential of his creative interests it is vital in many cases for him to manage his process of development, especially at certain junctures. Management includes decision-making about which interests to pursue and which projects to undertake, as noted above, as well as about when to abandon a line of development or a project. It also includes managing or at least being able to cope with one's emotions along what can be a rocky course.

In managing his development an individual is guided by his conceptions of his creative interests, and values and principles linked to his interests, which provide a context for him to think about his development. This larger context is important in motivating him and giving him a sense of purpose. It is also

important in evaluating the course of his development, which is crucial for guidance. A notable feature of creative development is the way individuals, at certain critical junctures, step back and reflect upon their course of development, for example, their interests or the outcomes of a series of projects they have engaged in, from a broader, meta-level perspective. Such meta-level thinking can be very important. For example, an individual may in reflecting upon his development conclude that he has wandered too far from his initial conception of his interest, and decide to engage in a midcourse correction, to steer himself back towards topics that fit better with it; or he may recognize a larger pattern that triggers an idea for a new approach. I provide examples of such thinking, showing its importance, in Chapter 11. In general I argue and show with examples that individuals engaged in creative development think about their development and manage it from a broader, more overarching perspective than has previously been described — specifically, reflect upon their development from the perspective of their interests, guided by their conceptions of their interests as well as associated principles and values.

Every individual who engages in a creative endeavor follows his or her own unique path of creative development. This path may be described most basically by the interests he forms, the projects he undertakes, the ideas he has and discoveries he makes, and the contributions he makes. More richly described, it includes his experiences and encounters, assessments he makes about his development, his decisions and emotions along his path of development, as well as his creative activities, such as exploration and problem solving and the presentation of his ideas and works to others in his field and society.

Patterns of creative development have a variety of forms. For many individuals, over medium spans of time their pattern of development resembles the branching structure of a tree — their core creative interests are like the trunk and their projects are like branches coming off of this trunk. Individuals whose development fits this pattern develop the ideas for their projects in the course of exploring their creative interests. During the time when they are focused on a project they temporarily set their interests aside; but as their project ends their attention returns to their interests, they resume exploration of them, and their new project generally develops out of their interests, not the project they have just ended. In other cases one project leads to the next, forming a chain. Over longer time spans individuals' creative interests change, as they learn and mature; also, their conceptions of their interests often become more sophisticated. These processes of change and maturation create complex, rich patterns of development. I describe two main patterns of this kind: evolution of interests and the formation of a sequence of linked interests over time. Two outstanding cases I present illustrating these patterns are the

- 12 developments of Hannah Arendt and John Maynard Keynes. Their examples show how through evolution of their interests and forming sequences of linked interests individuals can go far beyond where they begin in their creative development, to make outstanding contributions much later, following a long process of development.

The description in this book naturally extends to developing a description of cultural development. In particular, it provides the basis for describing a core process of cultural development. I sketch this core process here; I discuss development of models of cultural development rooted in the description in this book in Chapter 17.

The elements and experiences that influence individuals in their formation of their creative interests have a deep and pervasive influence on their creative development. Acting by and through their interests, such elements and experiences influence individuals' whole course of development — the paths they follow, what they encounter and learn about, hence the basis for their creativity generation, and the topics, questions, and problems they become interested in and pursue in their projects, leading ultimately to their creative contributions. Among all the different kinds of elements and experiences that influence individuals in forming their creative interests, the contributions and work of other people, especially their predecessors in their field and neighboring fields, are especially important — the main source of their interests in many cases. Individuals in many cases develop their interests out of their reactions to others' work, desiring to extend or apply the work of someone else, to challenge or refute it, or defining their interest in contrast to it, structuring their interest as a topic that is intentionally designed to be different. Even in cases in which an individual's interest develops around other kinds of elements the work of others is likely to have been crucial in exposing him to these elements and helping him recognize their significance; for example, when an individual develops an interest in a particular phenomenon in many cases he first learns about it through a description given by someone else. The adage that individuals "build on the work of their predecessors" is therefore true if it is understood to mean this: "individuals construct their interests and conceptions of interests in and out of their responses to the work of their predecessors."

This link between the contributions one generation makes and the creative interests formed by the next links the creative endeavors of successive generations in a two-step recursive process: the creative contributions made by the members of the preceding generation form the basis for the creative interests of the members of the current generation, who develop their interests creatively, producing their own creative contributions — which in turn become the basis for the creative interests of the members of the following generation.