

1. Introduction

Thomas had a dead-end job and wasn't happy with it. It was a perfectly respectable entry-level position but he didn't want the conventional life society laid out for him. His mother encouraged him to improve his education, but he wasn't happy with what was available in his home town, so when his older more world-weary cousin decided to bum around Europe, he went with him. After five years travelling around together, during which Thomas saw the world but didn't actually study much, he decided to go off on his own for a while. He drifted around for four more years before finally getting practical about his education, eventually becoming a teacher.

While this might sound like a lot of twenty-somethings these days, and a few midlifers as well, Thomas Platter was a *teenager* in sixteenth century Europe (Ariès, 1960/1962). He was a goat-herd until the age of nine. While the job was not glamorous, it was a perfectly respectable start to a career in manual labour. It's true his family felt he was intelligent enough to do better, and encouraged him to get an education. But it took him quite some time before he actually did so. He was ten when he went off with his cousin. They drifted in and out of various schools, begging for the money to support themselves (Thomas begged while his older cousin studied and gave Thomas the protection he needed to travel—they didn't have student loans back then, so that's what all the itinerant students did). At fifteen he was finally old enough to go off on his own (and get someone else to beg on his behalf as per procedure) but he still drifted more than he applied himself. He was nineteen when he went back home for a bit to learn to read, since being illiterate was starting to hold him back (!) and he couldn't afford to learn to read anywhere else. After that he went to Zürich to be a serious student and his career finally took off.

And yet, even though Thomas was a teenager rather than in his twenties or older, his situation was basically the same as what many quarterlifers (Robbins and Wilner, 2001) and midlifers face today. At nine he *was* old enough to be in the work force, by the standards of the time. It's not like he was a school drop-

out. Many people didn't go to school at all. They worked at home from age six or seven, then left home to work in apprentice-level versions of adult jobs by age ten to twelve. But instead of doing what most people around him were doing, Thomas chose to look for something else, something more. He chose to postpone taking on an adult social role by going to school. But at the same time it is not as if he went straight to school, studied hard, upgraded his skills, and started a new career. Part of the problem was that schools were out of date: they taught an old-style curriculum that didn't work very well anymore. But don't blame it all on the schools. Thomas could have learned to read before taking to the road, but he didn't. Instead he drifted around, seeing the world, and presumably learning about life, for close to a decade first. Then he learned how to read.

Now, I don't actually *know* what was going through Thomas Platter's mind. I've only read excerpts from his autobiography, not the whole thing. And I don't know if *he* even knew what he was going through. But it sure looks to me like he was going through something similar to what many young adults (and some older adults) are going through today, and for the same basic reasons.

Whenever a culture goes through a radical shift in its thinking, people need time to adjust. In Thomas's day, the printing press meant literacy rates were going up quickly. But literacy isn't just another skill. It can actually change the way you think about everything. The Renaissance was a period of rapid cultural change. The world it created, the world we live in now, is significantly different from what medieval Europe was like. If you just go out and live the same life your parents did, you can just copy them. But if you choose a new life, one that didn't even exist in your parents' day, it's going to take a while just to figure out what you have to do to get there. It doesn't help when the educational system is out of date, but there's more to it than that. A lot more. In the end, the shift from a culture where most people were illiterate to one with near-universal literacy meant adding about a decade of new-style education to the life cycle, before the usual training in practical work-related skills all cultures require. This extra decade or so of cultural training and basic skills education is something that every culture that modernizes from preliterate or semiliterate to literate needs to figure out. And it's always hardest for the first generation.

Today in the global village we are facing a similar situation. We don't just need to learn more, we need to learn differently, as the world gets more complicated. And we need time to adjust and learn a whole new world view, one our parents or grandparents probably never had to consider. And it's always hardest for the first generation.

How People Think

Jean Piaget (1896–1980) was a Swiss biologist, based at the Jean-Jacques Rousseau Institute at the University of Geneva, who spent his life playing games with kids (we should all have such a job) to see how their minds worked at different ages. He found that children reconstruct reality inside of their minds, instead of just memorizing it. They take in bits of information, and as the information builds up, they assemble it into logical patterns, which in turn become the building blocks of more complicated logical patterns. This is called cognitive development, and Piaget organized it into logical stages which formed the basis for future researchers and for this book. Piaget used Maria Montessori's (1870–1952) teaching tools as a starting point, and it is thanks to his research that we no longer have to sit at desks memorizing facts in elementary school anymore. Montessori got young kids away from the rows of desks, and introduced the conceptual learning approach, but Piaget systematized it and organized it into stages, so now teachers teach concepts when students are more-or-less ready, instead of force-feeding them facts they can't understand yet. Most of part I is based on his research.

Lawrence Kohlberg (1927–1987) was a University of Chicago and Harvard psychologist who was profoundly influenced by the Holocaust and its aftermath (he helped smuggle Jewish refugees into Palestine after the war). Inspired by Piaget, he studied moral development in boys over many years, giving them dilemmas, then analyzing their answers for logic. His most famous moral dilemma is the Heinz dilemma, set in post-war pre-medicare Europe.

In Europe, a woman was near death from a special kind of cancer. There was one drug that the doctors thought might save her. It was a form of radium that a druggist in the same town had recently discovered. The drug was expensive to make, but the druggist was charging ten times what the drug cost him to make. He paid \$400 for the radium and charged \$4,000 for a small dose of the drug. The sick woman's husband, Heinz, went to everyone he knew to borrow the money and tried every legal means, but he could only get together about \$2,000, which is half of what it cost. He told the druggist that his wife was dying, and asked him to sell it cheaper or let him pay later. But the druggist said, "No, I discovered the drug and I'm going to make money from it." So, having tried every legal means, Heinz gets desperate and considers breaking into the man's store to steal the drug for his wife.

Should Heinz steal the drug? Why or why not? [Kohlberg, 1984:640]

You're not allowed to call the media. It's a forced choice question. You have to decide whether Heinz should steal to save a life or not. Whether you answer

yes or no is irrelevant. What Kohlberg was analyzing was the level of sophistication in the reasoning. “Why or why not?” is the critical question.

Kohlberg was able to categorize children’s responses into stages paralleling Piaget’s developmental stages. Following Kohlberg, Robert Selman and James Fowler described similar stages in social and faith development. Kohlberg, Selman, and Fowler demonstrated that cognitive development doesn’t just affect when to study what in school, it affects how we live our lives. It affects how we think about ourselves and other people, and how we behave. Cognitive development isn’t about just learning more facts. Each new developmental stage actually amounts to a new world view.

It is possible to use cognitive developmental stages to categorize people’s thinking not only at different ages, but also *in* different ages. Thinking in primitive cultures is/was very different from thinking in classical and modern cultures. Classical and modern cultures are very similar in their thinking, but differ in the number of people who think at the highest level, since classical cultures do not have universal education and modern ones do, and education makes a big difference past a certain point.

Established cognitive developmental stages go as far as the highest level of linear abstract thinking and then stop. But other researchers have noted changes in behaviour and thinking that suggest that *new* cognitive developmental stages are emerging today that don’t bear any real resemblance to the linear logic of the past. They represent a radical new world view.

Until the modern era, most people in the West went straight from childhood to adulthood. Adolescence as an intervening stage of life didn’t really become official or commonplace until the early twentieth century, with universal schooling.

When young adults and students began behaving radically different and postponing adulthood in the 1960s, the Harvard/Yale sociologist Kenneth Keniston (1968, 1970) proposed yet another new stage of social development, on top of adolescence, which he called “youth”. Earlier generations typically saw adolescence and youth as optional periods of practical knowledge acquisition, with people in those stages thinking basically in the same way as adults, but less experienced. Keniston not only saw youth as a new life stage, he also saw it as a new way of thinking. He suggested that as childhood was associated with concrete thinking and adolescence with abstract thinking (true for the twentieth century at least), so youth would be associated with relativistic thinking. He saw youth as an optional stage for the better educated members of society, before they settled down into adult social roles. In Keniston’s model, adults used either abstract or relativistic reasoning, depending on how far they developed.

Building on Keniston’s theory and on his own research on the acquisition of concepts, the American psychoanalyst Clifford Anderson (1995) proposed yet

another cognitive developmental stage after relativistic thinking, involving what he called organic thinking. (The term organic thinking is ambiguous, and I will be using the term complex nonlinear thinking instead in this book, but he and I describe basically the same thing, albeit in different ways.) Anderson's sequence was childhood (concrete thinking) to adolescence (abstract thinking) to youth (relativistic thinking) to adulthood (organic thinking), with youth a compulsory stage and full maturity and true adulthood only arriving with organic thinking. He saw people with less than organic thinking as being in a state of developmental arrest: a culturally sanctioned developmental arrest, but developmental arrest nonetheless. Anderson recognized that organic thinking was emerging for the first time in history but thought that we are hard-wired for it and psychologically incomplete without it. He also thought that given the amount of time that it takes to master organic reasoning, true adulthood would not arrive before the early thirties even in optimal conditions.

My own research shows that relativism is a term better suited to late adolescence, and that today youth and early adulthood are often spent mastering the logic of complexity (what Anderson calls organic thinking), which is a whole different ball game. You might be tempted to call the new logic "postmodern", but postmodernism in the strict sense is still a form of modern thinking rather than the radical departure this new world view is. For lack of a better term I am calling the new world view that is emerging the "age of complexity" to differentiate it from modern and postmodern thinking.

This book gives a detailed description of the different levels of thinking, then documents them in literature written by adults for adults over the last three thousand years. In so doing I make a case that human society has gone through one radical cultural shift, from preliterate to literate, that resulted in higher order thinking and ten extra years of growing up before adulthood, that happened at different times in different places, and that we are now going through a second radical cultural shift that involves an even higher order of thinking and that will probably add yet another ten years or so to the growing-up period.

Some Concepts

There are some basic concepts you need before getting into the nitty-gritty. It is not necessary to master everything in part 1. You can just skim through it for a general impression, especially on the first read through. But you probably do need to get a handle on the material in this section in order to understand my basic argument.

Conceptual Knowledge and Practical Knowledge

There is raw intelligence, sort-of measured by IQ tests. Raw intelligence is largely genetic but can be modified up to a point by diet, environmental stimulation or deprivation, and brain injury.

Then there is knowledge. Knowledge is learned, not innate, though the drive to learn may be innate for some kinds of knowledge. There are two types of knowledge: conceptual knowledge and practical knowledge. Conceptual knowledge is understanding or “getting” a concept: it is a truth we discover. We don’t get it, we don’t get it, we don’t get it, then finally we get it, sometimes suddenly in a moment of clarity (an “aha” experience), sometimes more sluggishly in a dawning awareness. Practical knowledge, on the other hand, is knowledge we can memorize or invent: how to do something or what to call something. Putting four-legged animals that moo and four-legged animals that bark in separate categories is conceptual knowledge. (Categories are concepts.) Knowing that four-legged moo-ers are usually called “cows” in English while four-legged barkers are usually called “dogs” is practical knowledge. Understanding multiplication is conceptual knowledge. Memorizing the times table is practical knowledge. Knowing not to drive while drunk or sleepy is conceptual knowledge: it’s called responsibility. Knowing how to drive (or how to call a cab) is practical knowledge. Knowing that you can say “no” is conceptual knowledge (and is harder than you think). Knowing how to defend yourself from attack is practical knowledge. And so on.

The two types of knowledge interact. The more practical knowledge we have, the easier it is to master new concepts, because the information is there to be added up and reorganized in our minds. At the same time, it may not be possible to master certain types of practical knowledge without first having the relevant concepts. For example, you need a fair amount of linear logic in order to be able to design a rocket that will actually get into orbit (as opposed to one that will just sit there on the ground and look spiffy).

Piaget (1927/1951) called conceptual knowledge “logical intelligence” or “schemes” (sometimes translated as “schemas”), and the practical knowledge “motor intelligence” or “practical intelligence”. Anderson (1995) calls them type 1 and type 2 abilities. I will be calling them conceptual and practical knowledge. This book is primarily about conceptual knowledge.

Cognitive Development

Cognitive development is the development of conceptual knowledge. We acquire concepts. We become progressively more sophisticated. We organize information better in our minds. Basically, that's it.

Cognitive development happens in stages. We acquire both practical and conceptual knowledge a bit at a time. We reorganize it into more complex models in spurts. It's rather like buying things one at a time, then one day reaching critical mass and needing to reorganize the closet in order to be able to find them and use them better.

Reaching a higher stage in one area of your life does not mean you are automatically in that higher stage in all areas. It's not like upgrading the system on your computer, where it is upgraded across the board. It is more like having a separate copy of the new system for each program you use, only upgraded the next time you use that program, and then only if you think of it. So you may shift from one stage to the next in a basic logical kind of way, but it may not occur to you to apply this new logic to your social life, or to specific problems that don't seem to have much to do with the original problem where you had the insight. Typically, we don't apply our newfound logic until a problem comes along that we can no longer solve the old way. As a result, if this particular problem hasn't come up for a while, our thinking in that domain may be developmentally delayed, and we need to play catch up.

Social Role versus Cognitive Development

All cultures define a series of social role stages that people go through, from infancy to childhood to adulthood, that are based on physical maturation and social expectations. Babies are basically helpless and need to be protected, fed and cared for. Younger children can run and play but are too young to be given any responsibility. Older children are old enough to be given introductory level responsibilities, like farm chores or elementary education. Most cultures have a period of adolescence (regardless of whether they call it that or not), after puberty but before marriage, in which young people who are old enough to produce children are not allowed to until they have enough practical skills to support them. Adolescence in this sense often lasts longer for boys than for girls in traditional cultures, as they need more training. Youth, which is less common, may involve military service, apprenticeship or higher education (Schlegel and Barry, 1991). Life stage theories like those by Erik Erikson (1963, 1968, 1997), Daniel Levinson (1978, 1996), and Gail Sheehy (1995) describe social role stages.

Jeffrey Jensen Arnett (2004) makes a case that in the last generation, as compared to adults in the 1950s, the traditional adulthood markers of work, marriage and children have been replaced with accepting responsibility for yourself, making independent decisions, and becoming financially independent, now that many young people stay in school longer and wait to get married and have children, while still living away from their parents in their late teens and early twenties. However, *as he describes it*, this is still social role stages and not cognitive development (though there may have been some cognitive development going on in his subjects that he missed).

This book is not about social role stages. Being in a particular life stage does not guarantee a particular cognitive developmental level. If your culture does not need you to grow up beyond a mental age of seven, or twelve, or whatever, you may not bother, but you will still go through all the life stages because that is what people do as they grow older. You may still think like a teenager when you're sixty, but you're not going to act like one, not if you want to fit in. On the other hand, if your culture *does* require you to reach a particular mental age beyond the basics, as ours does more and more today, you do have to go through extra growing-up stages before you can become an adult. So adolescence and youth become more than just "something to do before marriage" or "something to do while you're waiting for the job market to get better". They become necessary stages that you feel compelled to go through before you are even ready to consider making permanent adult commitments. Social role stages may be optional, depending on life circumstances. Cognitive developmental stages are necessary in order to be able to function like an adult in mind as well as in body.

Economics versus Cognitive Development

This book is also not about how cultures are organized economically and socially, though obviously there may be an interaction with cognitive development. Anthropologists use a cultural evolutionary typology (Johnson and Earle, 2000) based on the economic base and size of communities: family-level groups living off the land as foragers or hunter-gatherers in camps or hamlets sometimes of up to 25–50 people; local groups consisting of villages of up to 300–500 people, where relationships are negotiated on an individual by individual or family basis; and regional polities (chiefdoms or states, including modern countries), living in larger settled communities in established territories, with more established leadership and more sophisticated economic investments (e.g. irrigation, trade). Traditionally, there has been a strong association between the economic and social organization of a culture and their level of sophistication, in that populations in larger more

complex cultures tended to be more sophisticated. However, it is theoretically possible for a hunter-gatherer community today to have access to satellite television and the internet, send their children to school, and yet still maintain a hunter-gatherer economic base. The economic base in a particular region will shape how people choose to live and the size of their communities, but does not require them to remain less sophisticated. On the other hand, having access to an education and the increasing sophistication that results continues to allow people to live in larger more complex settlements and economies if they so wish. In other words, less cognitive development dictates less sophisticated cultures and economies, but greater cognitive development does not require people to live an urban industrial lifestyle if they do not wish to.

The Stages

There are four periods of cognitive development that we go through today on the way to proper adulthood: the sensorimotor period, the representational period (usually called preoperational), the linear period (concrete and formal operations); and the complex nonlinear period (table 1.1). These correspond respectively to the social stages of infancy; early and middle childhood; late childhood and adolescence; and youth and adulthood. Each period breaks down into three stages, the first two usually having the social stage names I've just listed, with the third stage in each period being a summing-up stage. I have organized Piaget's traditional stages somewhat differently than he did on the basis of the cultural data. Piaget divided the sensorimotor period into six stages, which I've grouped into three to parallel the other periods. He also kept concrete and formal operations separate but my research indicates they should be lumped together as stages in a linear period. In addition, researchers have described the sensorimotor and linear syntheses (without calling them that) but not the representational synthesis because it doesn't stand out in modern cultures the way it does in primitive ones.

Intra/Inter/Trans

The first stage of each period is the last stage of the previous period. If you look at the cognitive development of apes, it looks like they are in the first stage of the representational period. They are at the highest level of the sensorimotor period, a stage most animals don't reach. This is the same as the first stage of the representational period, except for one difference. In the last stage of one period, you rest on your laurels and feel smug. You can do this highest level of skills, but you don't build anything on it. It is like you are looking backwards. In the first stage of the next period, you stay in the same

TABLE 1.1. *The cognitive developmental stages as described in this book.*

Period	Stage	Social Stage
1: Sensorimotor period		infancy
	1a: Piaget's sensorimotor stages 1–3	
	1b: Piaget's sensorimotor stages 4–5	
	1c: Piaget's sensorimotor stage 6	
2: Representational period		
	2a: representational thinking	early childhood
	2b: simple comparisons	middle childhood
	2c: representational synthesis	–
3: Linear period		
	3a: concrete operations/concrete logic	late childhood
	3b: formal operations/abstract logic	adolescence
	3c: linear synthesis	–
4: Complex nonlinear period		
	4a: complex nonlinear logic	youth
	4b: complex nonlinear logic	early adulthood
	4c: complex nonlinear synthesis	adulthood

spot, but you turn around and face in the opposite direction. You take what you have learned and try to build something new with it. The difference between being in the last stage of one period and the first stage of the next is that in the last stage of one period you can do something, which is nice, but in the first stage of the next period *you experiment with what you can do*. Piaget and Rolando Garcia (1983/1989) called these stages “intra-”, “inter-” and “trans-”. For example the first stage of the representational period is the intra-representational stage, where you experiment with one representation at a time; the second is the inter-representational stage, where you play with two or three representations at a time; and the third the trans-representational stage, where you move beyond representations by organizing many representations into a set. You don't do anything with the set yet, though. That doesn't happen until you shift directions, switch to linear thinking, and move into the intra-linear stage. Then you experiment with a single set to see what you can do with it.

How Cognitive Development Works

At the beginning of each stage, you know how to do something automatically, without thinking. You apply it to new situations and practice it, and along the

way you discover new applications for this old skill. Out of this emerges new skills, which are practiced until they become automatic. And so on. We know how this works for physical skills like riding a bike. At first we're terrible (at least I was), then we get better with practice, and eventually we don't have to think about it any more. This automation also happens with mental processes, though we don't notice it as much (Ochse, 1990).

For example in the sensorimotor period infants are born with an understanding of individual events. They practice watching events, and gradually the experience builds up. They start noticing patterns, which allows them to compare events. With practice these comparisons become automatic, and eventually they get so good at tracking events they can combine sets of events into the concept of objects. An object concept is a chunking or batching of information on a set of events that tend to go together. It is an internally ordered set of events that can be treated as a unit. Once this batching or chunking is automatic, the infant (who is now no longer an infant but a small child) can concentrate on other things, like what to do with this new mental skill.

In childhood, children understand objects and situations. They spend a lot of time practicing situations (for example in pretend play) and playing with objects. Over time the experience builds up and they notice patterns. With practice they can compare different situations and eventually they get so good at it that they can chunk situations or objects that tend to occur together into sets (what Piaget called "groupements", translated as "groupings"). A set is an internally ordered set of objects or situations that can be treated as a larger unit.

Similarly, sets get chunked into systems, and systems into organisms. At each stage concepts are practiced and experimented with until they become automatic. Novel data is gathered until it starts to form patterns and the patterns become chunked to form new concepts. At each stage a layer of logic is discovered, practiced, and automated. Once a layer of logic is automated, it can be applied to new situations, and the next layer can be discovered. This is how stages work. Each stage corresponds to a new layer of logic (table 1.2).

The first two periods are pretty much driven by brain development, especially the first one, and it really isn't possible to speed things up. An impoverished environment can slow things down, though. The third and fourth periods are driven by education. They won't happen without literacy and a supportive environment.

TABLE 1.2. *What they “get”*

1. Sensorimotor period (infancy)	
What they “get”	events
Stage	
A: single ~	single event; trial and error for two or three events (Piaget’s sensorimotor stages 1–3)
B: two or three ~	comparison between two or three events; trial and error for more (Piaget’s sensorimotor stages 4 and 5)
C: multiple ~	multiple events → single object (or situation) (Piaget’s sensorimotor stage 6: object synthesis)
What they’re working on	objects

2. Representational period (early/middle childhood)	
What they “get”	objects
Stage	
A: single ~	single object; trial and error for two or three objects (Piaget’s preoperational period I: symbolic thought)
B: two or three ~	comparison between two or three objects; trial and error for more Piaget’s preoperational period II: intuitive thought)
C: multiple ~	multiple objects → single set (representational synthesis)
What they’re working on	sets

Logic, Social Development, and Behaviour

As our minds get more logical, our social behaviour follows. As we think more logically, we expect ourselves and others to behave more logically. As we get better at organizing information; we tend to organize people and social organizations the same way. Science comes last, because of how long it takes to actually figure out how the world works. So first we change the way we organize our thoughts, then we change how we organize our lives on a personal level, then we figure out how to explain it all. As a result, it is often

TABLE 1.2. What they “get” (page 2)

3. Linear period (late childhood/adolescence)	
What they “get”	sets
Stage	
A: single ~	single set; trial and error for two or three sets (Piaget’s concrete operations = concrete logic)
B: two or three ~	comparison between two or three sets; trial and error for more (Piaget’s formal operations I = abstract logic)
C: multiple ~	multiple sets → single system (Piaget’s formal operations II = linear synthesis)
What they’re working on	systems

4. Complex nonlinear period (youth/adulthood)	
What they “get”	systems
Stage	
A: single ~	single system; trial and error for two or three systems (complex nonlinear logic)
B: two or three ~	comparison between two or three systems; trial and error for more (complex nonlinear logic)
C: multiple ~	multiple systems → single organism (complex nonlinear synthesis)
What they’re working on	organisms

much easier to tell what level of cognitive development a person is at by watching their behaviour than by asking them.

How This Book Is Organized

The first part of this book describes the logic children acquire as they grow up, along with the shifts in behaviour and social organization that go with it. Then it describes the behaviour of young “adults” today, with only brief descriptions of the logic involved, because so much of it is still being figured

out by scientists. The second, third and fourth parts of this book describes human behaviour throughout history, as people in the past have described it in literature written by them for adults in their societies. It is fairly easy to assign behaviour to the different cognitive levels, once you know what to look for. This survey should make it obvious that human civilization has gone through some major shifts in sophistication over the last few thousand years, which should make it easier to understand the changes that are happening today.